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APPENDIX TO THE JOURNALS
OF THE
SENATE AND ASSEMBLY
OF THE
THIRTY-SEVENTH SESSION
OF THE
LEGISLATURE OF THE STATE OF CALIFORNIA

VOLUME III.



SACRAMENTO :

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ANNUAL REPORT.

STATE OF CALIFORNIA, ADJUTANT GENERAL'S OFFICE,
SACRAMENTO, November 1, 1906.

To His Excellency, GEORGE C. PARDEE,
Governor and Commander-in-Chief.

SIR: As required by Section 1923, Political Code, I have the honor to submit the annual report of this department for the fiscal year ended June 30, 1906, with subsidiary reports and papers pertaining thereto, setting forth in brief outline the status of the military establishment of this State with sundry recommendations deemed necessary to improve the discipline and increase the efficiency of the National Guard and the Naval Militia.

ENROLLED MILITIA.

According to the returns of the Commanding Generals of the First and Second Brigades for the year 1906, the total number of male citizens of this State between the ages of eighteen and forty-five years, subject to military duty, is 260,367, which is 2,820 less than the enrollment of 1905.

NATIONAL GUARD.

This branch of the State militia remains in force practically the same as stated in my last report, with the following changes:

ORGANIZATIONS MUSTERED OUT.

Name.	Location.	Date.	Reason.
Band, Second Infantry.....	Sacramento..	September 19, 1905..	Disobedience of orders.
Company C, Second Infantry..	Nevada City..	January 6, 1906.....	Inefficiency.

ORGANIZATIONS MUSTERED IN.

Name.	Location.	Date.
Band, Second Infantry.....	Sacramento.....	November 5, 1905
Company C, Second Infantry.....	Nevada City	January 6, 1906

In accordance with the provisions of Sections 1927 and 1933, Political Code, on August 15, 1905, Troops A, B, C, and D, Cavalry, were organized into a squadron of cavalry, to be known and designated as the First Squadron of Cavalry.

As now constituted, the National Guard consists of two companies of signal corps, four companies of coast artillery, and forty-seven companies of infantry, organized into two brigades; and, in addition, one squadron of cavalry of four troops, and one independent company of veteran reserves.

The First Brigade, commanded by Brigadier General Robert Wankowski, with headquarters at Los Angeles, consists of the First Company, Signal Corps, and the Sixth and Seventh Regiments of Infantry.

The Second Brigade, commanded by Brigadier General John A. Koster, with headquarters at San Francisco, consists of the Second Company, Signal Corps, the First Battalion of Coast Artillery, and the First, Second, and Fifth Regiments of Infantry.

(For a detailed statement of the organized strength of the National Guard, see Appendix "C.")

NAVAL MILITIA.

During the past year no changes in organization have occurred in this branch of the State troops, which consists of seven divisions, organized into a battalion, under the command of Captain George W. Bauer, with headquarters at San Francisco.

After years of persistent effort to obtain a suitable training ship for the use of the Naval Militia, on June 10, 1906, the United States Government formally turned over to the State the U. S. S. "Alert" in exchange for the antiquated and practically unserviceable U. S. S. "Marion." This valuable acquisition has been placed in the custody of the San Francisco divisions of the Naval Militia and will, no doubt, prove a material factor in increasing interest and efficiency in this branch of the service.

ARMS, UNIFORMS, AND EQUIPMENTS.

During the past year no change has been made in the armament, uniforms, and equipment of the National Guard, which are similar to those of the United States Army.

In the destruction of the armories of the State troops located in San Francisco, incident to the earthquake and conflagration of April, 1906, much valuable United States and State property was destroyed, which will take time and money to replace. As near as can be estimated at this time this property loss will reach \$60,000. The needs of these organizations have been receiving the special attention of this department and prompt and effective steps have been taken to complete all deficiencies in equipment.

In addition to the receipt of the U. S. S. "Alert" in exchange for the U. S. S. "Marion," as previously stated, the following arms and equipments have been received from the United States Government and issued to the Naval Militia:

1 whaleboat and equipment. Issued to the Sixth Division.

1 steam cutter and equipment. Issued to the Fifth Division.

3 one-pounder Hotchkiss heavy guns, mark II, complete. One each issued to the Fourth Division and the U. S. S. "Alert" and U. S. S. "Pinta" Detachments, Engineer Division.

INSPECTIONS.

The annual State inspection and muster of the National Guard for 1906, as for the preceding year, was made in conjunction with the inspection ordered by the War Department, by Colonel Thomas Wilhelm, Assistant Inspector General, N. G. C. (Major U. S. A., retired, on duty with the Organized Militia of California), between January 4th and March 26th. Colonel Wilhelm was ably assisted in the First Brigade by Lieutenant Colonel Wm. G. Schreiber, Assistant Adjutant General of that Brigade, Major P. M. Norboe, Sixth Infantry, and First Lieutenant Charles H. Howland, Aid-de-Camp, First Brigade; and in the Second Brigade, by Major David A. Smith, Fifth Infantry.

Most of the organizations reported for inspection with nearly full strength of membership, and extracts from the report of the Government inspecting officer show that the equipment was nearly complete at the time of inspection. Where organizations were reported as not sufficiently armed, uniformed, and equipped, steps are being taken to obtain and issue the articles needed to complete their equipment.

The personnel of the Guard at the present time is good and with few exceptions shows the result of careful training.

SMALL ARMS PRACTICE.

Our small arms practice for 1905 was more successful than for any previous year since the adoption of "Special Course C, Small Arms Firing Regulations" (as prescribed by the War Department for the Organized Militia), in the number of men that succeeded in qualifying. 1,901 men practiced with the rifle and carbine and 301 with the revolver.

The United States Government regards it of great importance that the Organized Militia or National Guard of the several states be thoroughly instructed in the use of the United States magazine (Krag-Jorgensen) rifle and have enough target practice to enable them to shoot with a fair degree of accuracy at from 200 to 1,000 yards. At the present time but two or three organizations of the Guard are equipped with range facilities that will permit of practice at a greater distance than 500 yards. This precludes the holding of practices under the Sharpshooter's and Expert Rifleman's record courses in "Special Course C," and works a great disadvantage to the Guard. The securing of adequate range facilities for each organization is a difficult matter and utterly impossible with the present limited appropriation for target practice. In the matter of ammunition a like difficulty is met with in the insufficiency of funds for its purchase. With the increased cost of ammunition and the more exacting requirements of the Federal Government, a liberal appropriation for target practice is necessary. With the means at hand and resources available every encouragement possible is given in aid of this work by this department.

An impetus was given to small arms practice during 1905 by the participation of a team from this State in the National Rifle Match, held at Sea Girt, New Jersey, August 24th to September 2d. Although our team did not win either of the prizes, in fact, was well down on the list of competitors, yet under existing conditions its shooting reflected credit upon the members and upon the State.

BRIGADE TROPHIES.

During the past year this department has had manufactured by Messrs. Shreve & Co., of San Francisco, two trophies (one for each brigade) of handsome and appropriate design, each to be awarded to the company receiving the highest marking for attendance, discipline, military appearance, instruction, drill, guard duty, small arms practice, field exercises, administration, etc., and to be permanently retained by the company winning it three times. The showing made by the different companies at the annual inspection of 1906 largely determined their rating.

The competition for the brigade trophies proved an incentive to greater effort on the part of many organizations, resulting in a corresponding increase in interest and efficiency.

The Second Brigade trophy for 1906 has been awarded to Company B, Fifth Infantry, of San José. The award of the First Brigade trophy is being withheld pending the receipt of the complete report of the inspection of that brigade.

SERVICE OF NATIONAL GUARD OF CALIFORNIA INCIDENT TO THE EARTHQUAKE OF APRIL 18, 1906.

The earthquake of April 18, 1906, which affected certain portions of the State and more particularly the City of San Francisco, was the direct cause of calling into active service all organizations but one (Fifth Division, Naval Militia, Eureka, Cal.) of the State troops. In the forenoon of April 18th, Your Excellency directed that instructions be wired to all commanding officers to immediately prepare for shipment and hold, subject to instructions, such tents and blankets as were in their possession. Directions were also given to pack, for shipment, all blankets in the State Arsenal and gather all those in the possession of organizations located in Sacramento and have them sent, in care of a commissioned officer and a detail of enlisted men, to Mayor Eugene E. Schmitz, of San Francisco. Accordingly these supplies, some four hundred blankets, left on the 19th for San Francisco, in charge of the Quartermaster, Second Infantry. Before they could be delivered, however, they were needed by the troops that followed on the 20th.

At 12:30 P. M. of April 18th Your Excellency directed this office to wire orders to Major E. G. Hunt, commanding Third Battalion, Fifth Infantry, N. G. C., to order out Companies A and F of said regiment

and report with them to His Honor, Mayor Frank K. Mott, for patrol duty in Oakland. Telegraphic instructions were also sent to the commanding officers of the above mentioned companies to report to Mayor Mott. Major Hunt was directed to order out Company G, Fifth Infantry, located at Alameda, and if this company was not required at home to direct its commanding officer to report to him at Oakland for duty. Instructions were also wired to the commanding officer of this company to report to Mayor Mott, if not required in Alameda. It later transpired that all three of these organizations had been reported for duty prior to receiving the above instructions.

Meanwhile this department, through your instructions, had been endeavoring to reach, in every possible manner, Brigadier General John A. Koster, commanding Second Brigade, N. G. C., with instructions to order out the troops in San Francisco for patrol duty in that city, but owing to the fact that all communication with San Francisco was severed these instructions did not reach him until some days after. General Koster, however, had received instructions from the undersigned, with whom he had been at Ukiah looking over a proposed camp site, to order the troops in San Francisco to duty, and upon returning to that city on the evening of the 18th found a considerable portion of the troops already performing patrol duty. Under the direction of the brigade commander and the undersigned these troops were disposed in a manner to render the most efficient service. It speaks well for their conception of their duty that these National Guardsmen, at the very time when their own business, or homes, were threatened with destruction and their families needed their protection, reported, of their own free will, to their armories, realizing that they would be needed to assist in preserving order and rendering aid to the homeless.

After issuing instructions to General Koster, as above stated, I established my headquarters at the Occidental Hotel, at the corner of Bush and Montgomery streets, informing the brigade commander that I would remain there as long as possible and would go from there to the Union League Club, near the corner of Post and Stockton streets; and if driven from there I would endeavor to advise him where I could be found. At about 7:30 P. M. of the 18th I left the Occidental Hotel and went to the Union League Club, where I remained until about 9:15 P. M., when all were ordered out of the building by a detachment of regulars. I then established myself at the Fairmont Hotel. Up to this time I had made every endeavor to find Mayor Schmitz in order to place myself and the State troops at his disposal. I first went to the St. Francis Hotel, where I was told Mayor Schmitz, Chief of Police Dinan and Brigadier General Funston, U. S. Army, commanding Department of California, could be found, but was informed by the manager of the hotel that they had left there between 4 and 5 P. M. and had

gone to the Fairmont. Upon arriving at the Fairmont I was advised by Chief Dinan, about 10:30 P. M., that both Mayor Schmitz and General Funston had gone to their homes to obtain rest, as they were very tired. Upon arriving at the Fairmont I sent word to General Koster where I could be found and that I would remain until again driven out. At about 3:00 A. M. of the morning of the 19th I moved to the North End Police Station, on Washington street. Between 8:30 and 9:00 A. M. of the 19th the Mayor came to the North End Police Station and took charge, at which time I in person informed him that all the troops of the National Guard of California located in San Francisco had been ordered out and were doing patrol duty and such other service as seemed necessary in aid of the civil authorities. The Mayor immediately requested me to place most of our available men along the east side of Van Ness avenue, and to prevent the people from going down to the fire line, and to have the remainder of the available force clear all persons out of the buildings between Polk and Larkin streets north to Washington street and south to the "fire line" near Market street, as he was going to have all the buildings within that territory dynamited. The line along Van Ness avenue was established shortly after 9:00 A. M. and held until after 2:00 P. M., but no steps were taken by the authorities to dynamite the buildings in accordance with the statement previously made by the Mayor. The Commanding General, Second Brigade, in his report, states, however, that a detachment under the command of Lieutenant W. H. Talbot, First Infantry, N. G. C., did some dynamiting within the territory mentioned. I remained in San Francisco among the troops until the evening of the 20th, when I crossed to Oakland, where Your Excellency had established your headquarters in the office of Mayor Mott in the City Hall. At your direction I then called up by telephone the commanding officers of the organizations of the National Guard located in the northern portion of the State, including the Sixth Infantry, excepting Companies A, B, C, E, F, and G, of the Fifth Infantry, and the Fifth Division, Naval Militia of California, and ordered them to proceed with their commands to San Francisco without delay, by rail, in heavy marching order, with ten days' rations, and report to General J. A. Koster, commanding Second Brigade, N. G. C. Companies A, F, and G, Fifth Infantry, had already been ordered to duty by Your Excellency, and Companies C and E were ordered to duty in Santa Rosa by me when on my way through these places to San Francisco. Upon communicating with the Commanding Officer, Company B, Fifth Infantry, San José, it was found that this command had gone on duty early in the forenoon of the 18th and was still on duty in aid of the civil authorities. This organization rendered excellent service at its home station and was highly commended by the civil authorities of the City of San José.

On April 20th the Commanding General, First Brigade, was telegraphed as follows:

Get entire Seventh Infantry ready to leave for San Francisco with full supplies. Order Troop D into readiness also. May not need more than eight companies, but get all organizations ready.

On the 21st telegraphed him as follows:

Have Troop D, Signal Corps, and two battalions, Seventh, leave for Oakland at once. You and staff also. Wire me when leave Los Angeles.

To which the following reply was received:

LOS ANGELES, CAL., April 21, 1906.

GENERAL J. B. LAUCK, *Oakland, Cal.*

Ready to move. Await instructions regarding transportation.

WANKOWSKI, Brig. Gen.

He was immediately telegraphed as follows:

Order special train and leave at once. Transportation settled this end.

In accordance with the above the organizations mentioned left Los Angeles at 7:00 P. M. of the 21st, arriving at Oakland late in the afternoon of the 22d, and with the exception of the First Company, Signal Corps, which was ordered to proceed to Sacramento, went into camp that evening in Oakland. On the 22d the four remaining companies of the Seventh Infantry (B, G, K, and M) were directed to proceed to Oakland without delay, and arrived on the 24th, one company (B) having had some difficulty in procuring transportation, thereby delaying the entire battalion one day.

Meanwhile directions had been given to the several organizations of the Naval Militia located outside of San Francisco, excepting the Fifth Division, at Eureka, to report to the Commanding Officer, Naval Militia of California, at San Francisco, and by the 24th all of them were on duty in that city. Owing to the isolated position of the Fifth Division it was deemed inadvisable to order it into service. Thus by April 24th all of the National Guard of the State were on active duty in aid of the civil authorities with the one exception above mentioned. These troops were organized into two provisional brigades (First and Second Provisional Brigades) on April 23d, under the command of Brigadier Generals Wankowski and Koster, respectively, the First Provisional Brigade, with headquarters at Oakland, being composed of all troops outside of San Francisco, as follows:

Seventh Infantry (twelve companies), Oakland.

One battalion, Fifth Infantry (Companies C and E), Santa Rosa.

One battalion, Fifth Infantry (Companies A, F, and G), Oakland.

One battalion, Second Infantry (Companies A, C, and D), Oakland.

Company H, Second Infantry, and Company B, Fifth Infantry, San José.

Troop D, First Squadron of Cavalry, Oakland.

First Company, Signal Corps, Sacramento.

Company A, Veteran Reserves, Berkeley.

The Second Provisional Brigade, with headquarters in San Francisco, was made up of the following organizations:

- First Infantry (eight companies), San Francisco.
- Companies B, E, F, G, and I, Second Infantry, San Francisco.
- Companies D, H, and I, Fifth Infantry, San Francisco.
- Sixth Infantry (nine companies), San Francisco.
- First Battalion Coast Artillery (four companies), San Francisco.
- First Squadron of Cavalry (three troops), San Francisco.
- Second Company, Signal Corps, San Francisco.
- Naval Militia battalion (six divisions), San Francisco.

On the 24th the battalion of the Second Infantry (three companies) attached to the First Provisional Brigade was directed to report to the Commanding General, Second Provisional Brigade, for duty in San Francisco. Excepting this change the brigades remained as above organized until various organizations were from time to time relieved from further duty in the field, and approximated a total strength of 3,400 officers and men, of which about 2,100 were at San Francisco, 875 in and near Oakland, 175 at Santa Rosa, 115 at San José, and 35 at Sacramento.

The principal work performed by the troops of the National Guard in San Francisco was to assist the civil authorities, in conjunction with the regular troops, in preserving order in both the burned and unburned districts; also much relief work was done, notably by the First Battalion Coast Artillery and the First Infantry. Indeed, the first relief measures were instituted by the commanding officer of the First Battalion Coast Artillery, who kept a wagon train loaded with supplies, obtained through contribution and otherwise, running for several days to the refugees at Golden Gate Park and other places, and but for his prompt action in this matter untold suffering would have occurred before regular relief measures were undertaken by the civil authorities among those who were obliged to seek refuge in the parks.

The territory controlled and patrolled by the troops of the National Guard in San Francisco is outlined in the report of the Commanding General, Second Brigade, hereto attached and marked Exhibit "BB."

The troops comprising the First Provisional Brigade performed practically the same kind of service as did the troops in San Francisco, those in Oakland and Alameda guarding the several relief camps located in those cities in addition to patrolling the streets and guarding various public buildings, banks, storehouses, etc., and assisting the local authorities in preserving order.

RELIEVING TROOPS.

On May 8th, Company H, Second Infantry, on duty at San José, was relieved from further duty in the field and ordered to its home station. The First Company, Signal Corps, was directed on the same day to pro-

ceed from Sacramento to Oakland upon the arrival of a detachment of the Second Infantry, that had been ordered to the former city to guard the State Arsenal.

On the 9th the Commanding General and Staff, First Brigade, the First Company, Signal Corps, the Seventh Infantry, and Troop D, First Squadron of Cavalry, were directed to entrain for their home stations on the 12th. This movement was under the direction of the Commanding General, First Brigade, and was accomplished in a businesslike manner. After the departure of these troops there being no further necessity for maintaining the two provisional brigades organized April 23, 1906, by Field Orders No. 1, the same were discontinued on May 12th, by Field Orders No. 7, dated May 11, 1906, the Sixth Infantry, regularly belonging to the First Brigade, being attached temporarily to the Second Brigade, together with the headquarters and the six divisions of the Naval Militia on active duty. As thus organized the Second Brigade comprised the following organizations: Second Company, Signal Corps; First Squadron of Cavalry (three troops); First Battalion Coast Artillery (four companies); First Infantry (eight companies); Second Infantry (eight companies); Fifth Infantry (nine companies); Sixth Infantry (nine companies).

Of these organizations all were on duty in San Francisco except Company B, Fifth Infantry, on duty at San José; Companies A and F, Fifth Infantry, at Oakland; Company G, Fifth Infantry, at Alameda, and Companies C and E, Fifth Infantry, at Santa Rosa.

Company C, Fifth Infantry, was ordered relieved on May 12th, but owing to a misunderstanding of orders remained on duty until the 16th. Company A, Veteran Reserves, was relieved from further duty in the field and proceeded to its home station from Berkeley on the 13th.

Troop C, First Squadron of Cavalry, Companies C and I, Second Infantry, Companies E, G, and I, Sixth Infantry, the Third and Sixth Divisions, and U. S. S. "Pinta" Detachment, Engineer Division, N. M. C., were relieved on May 15th; Company G, Fifth Infantry, on the 16th, and Companies A and F, Fifth Infantry, on the 17th.

On May 17th, directions were given that all troops of the Second Infantry, Sixth Infantry, First Squadron of Cavalry (except Troop A), the Fourth Division, N. M. C., and Company I, Fifth Infantry, be relieved from further duty in the field on the 19th of May and proceed to their home stations. This movement was accomplished early on the 19th, most of the organizations reaching their home stations on the same day. Company B, Fifth Infantry, was relieved on the 19th, Companies D and H on the 21st, and Company E on the 23d, the latter organization being the last of this regiment to be relieved from duty in the field.

On May 31st all the troops then on duty, excepting a detachment of three commissioned officers and sixty-six enlisted men, left in San Francisco to guard State property, were relieved from further duty in the field and ordered to their home stations. In addition to the detachment mentioned above, several administrative officers of the staff department were continued on duty for a short time for the purpose of closing up the business connected with their respective departments.

There being no further necessity for maintaining the Adjutant General's Office at Oakland, and as Your Excellency had decided to return to Sacramento, the Adjutant General's Office was transferred to the State Capitol on June 1st. On June 12th directions were given to the Commanding General, Second Brigade, to dismiss on June 15th the guard detail on duty at San Francisco, and this was accordingly done, this detachment being the last of the State troops to be dismissed.

SUPPLIES AND TRANSPORTATION.

Subsistence supplies were obtained, for the most part, from merchants in San Francisco and Oakland upon requisitions countersigned by the Adjutant General, and the subsisting of the troops was in charge of the brigade commissaries under the direction of the brigade commanders, and seldom, if ever, were troops better subsisted and at such small expense.

Quartermaster's supplies were obtained by regular requisition upon the United States Government from supplies in store at the United States Quartermaster's supply depot, Presidio of San Francisco, and by requisition countersigned by the Adjutant General upon merchants of Oakland, San Francisco, and Los Angeles. These supplies, even those obtained from the United States Government, were not always of the best, but under the circumstances were the best that could be had.

Wagon transportation was procured upon requisition similar to that given for supplies, and was exceedingly difficult to obtain. In fact, arbitrary confiscation had to be resorted to in some instances, for the reason that owners of teams were soon apprised of the fact that there were no funds at the disposal of this department with which to pay for transportation, and, therefore, they did not care to enter their teams in the service of the State, knowing that it was very uncertain when they would be paid for the service rendered. Similar reluctance was shown on the part of many merchants who were requested to furnish supplies. This action on the part of those to whom this department was obliged to look to furnish transportation and supplies was often the cause of much inconvenience and serious delays, and emphasizes the need of a special fund upon which the Adjutant General, at the direction of the Governor, may draw in such emergencies.

CONDUCT OF TROOPS.

I could not conscientiously close this part of my report without commenting upon the splendid conduct of the officers and enlisted men of the Guard while performing the duty which devolved upon them in connection with the disaster. Considering the conditions in San Francisco for several days following the earthquake, when, owing to the destruction of several stations and the City Hall, the police force of the city was for a time somewhat disorganized, the situation would have been deplorable in the extreme had it not been for the timely assistance of the National Guard and the troops of the Regular Army. It speaks well for the conduct of the former that in spite of the abuse heaped upon them by some of the very people they were doing all in their power to assist and protect, and the provocations to which they were subjected, they performed their duty with commendable patience and in a soldierly manner. Only in two instances has it been possible to trace the shooting of citizens to National Guardsmen, and while it is much to be deplored that a seeming necessity existed to resort to extreme measures, yet from the fact that in one case the jury promptly acquitted the Guardsmen, and in the other case the district attorney moved for dismissal, which action was taken by the court, it would seem to indicate that these two men were justified in their actions.

Attached hereto are the reports of the Commanding Generals, First and Second Brigades, covering the operations of their commands while in active service subsequent to the disaster of April 18, 1906, and marked respectively Exhibit "AA" and "BB."

The reports of other subordinate commanders are not attached, for the reason that all have not as yet been received, and also that the operations of all troops are generally covered by the reports of the brigade commanders.

Attention is invited to the accompanying report of observations of the calamity, marked Exhibit "CC," made by Colonel Thomas Wilhelm, Assistant Inspector General, at the direction of the Adjutant General.

Accompanying this report will also be found copies of the "Field Orders," marked Exhibit "DD," issued by this department during the period of the active service of the troops.

WAR RECORDS.

The Adjutant General's Office, being the natural custodian of all official records, reports, and files pertaining to the services of California Volunteers in the Civil War and the Spanish-American War, as well as of those who served in the California Indian Wars and Expeditions during the fifties, is constantly in receipt of requests from ex-soldiers, their widows or children, for certificates of military service or data in

connection with such service, to enable them to present claims for pension and homestead, or to procure admission to Soldiers' Homes or Grand Army Posts.

It is the policy of this office to give careful attention to every such inquiry, to make painstaking search through records and files for the information of those requesting it, and to supply the same as completely and promptly as possible.

In the case of those who served in any of the expeditions against the Indians, the records on file in this office are so lamentably meager and incomplete as to be practically worthless. In this connection reference is made to the subject of "California Indian War Records" as treated in the last annual report of this department and the recommendation therein made that the necessary steps be taken to insure the return of the various papers and files delivered some years ago to one Captain John Mullan of Washington, D. C., as agent and attorney for the State in the collection of certain Indian War claims against the Federal Government.

Seven years have passed since the close of the Spanish-American War, in which California furnished 495 more officers and men than the pro rata required of her, and proved conclusively her loyalty and patriotism. There is not a man or woman in the great State of California but feels a just pride in her soldiers in the war with Spain.

That the record of these brave men has not been compiled for present reference and future history is a mistake, which the State should hasten to rectify. I therefore renew the recommendation previously made by this department that a sufficient appropriation be made to compile and print five thousand copies of a history and record of the California Volunteers in the Spanish-American War, the same to include a history of the operations of each organization, and the individual service record of each officer and soldier, giving name, rank, place and date of enlistment, service rendered, promotions, final discharge, and present post-office address when obtainable.

A record of this kind is needed to meet the constant inquiries made, but aside from this the State owes it to herself that the services of her soldiers, so loyally rendered, be preserved for future generations.

California is one of the few states that has not compiled a history and record similar to the one above suggested.

EXTRA PAY OF CALIFORNIA U. S. VOLUNTEERS.

In accordance with the provisions of an Act of Congress, entitled "An Act to amend an Act approved March third, eighteen hundred and ninety-nine, entitled 'An Act to amend an Act entitled "An Act to reimburse the governors of states and territories for expenses incurred by them in aiding the United States to raise and organize and supply

and equip the Volunteer Army of the United States in the existing war with Spain," approved July eighth, eighteen hundred and ninety-eight,' and so forth, and for other purposes," this department forwarded to the Auditor for the War Department, on December 20, 1905, for settlement, a claim composed of 757 individual vouchers of California Volunteers for pay, at State rate, between the date of assembly at rendezvous and the date of muster-in to the United States service or the date of rejection by medical examiner or mustering officer. This claim aggregated \$16,324.77.

On May 16, 1906, this claim, designated as the "Fourth installment of the claim of the State of California," was allowed in the sum of \$8,669.88, and War Settlement Warrant No. 20,296, together with a statement of differences, forwarded in payment.

The State's claim had been cut down for seemingly insufficient reasons. Exceptions were accordingly taken by this department to the disallowance, reduction, or suspension of many items in the proposed settlement and payment rejected.

I immediately took the matter in hand and upon obtaining all the additional data and evidence possible, at the direction of Your Excellency, made a special trip to Washington, D. C., where I presented the findings in person to the Federal authorities, together with a request for a revision of the proposed terms of settlement.

This was in turn followed by Your Excellency's formal appeal to the Comptroller of the Treasury.

The success of these efforts is attested by the fact that in addition to the \$8,669.88 previously allowed, an additional allowance of \$6,952.55 has been made. This leaves a balance of the State's claim unpaid amounting to \$702.34. As this amount is composed in part of items that have been suspended, pending the receipt of additional evidence and explanations, a possible reduction in the unpaid balance may be brought about.

As soon as the necessary statements have been received from the U. S. Treasury Department and the pay rolls have been prepared, the disbursement of this money will be undertaken. Individual checks will be issued for the amount due each man, showing the organization, the dates of enrollment and muster-in or rejection, the number of days, the rate per day, and the amount; said checks to be signed by the Governor and countersigned by the Adjutant General and drawn upon the State Treasurer as custodian of this fund, with whom the money has been deposited as a special trust fund.

The following is a statement of the condition of the funds received from the United States Government on January 7, 1902, for the payment of members of the National Guard of California for services between the date of assembly at rendezvous and the date of muster-in

to the United States service or rejection therefrom, and designated as the second installment of the claim of the State of California:

Amount received from U. S. Treasury Department, January 7, 1902, as per War Settlement Warrant No. 17,333	\$58,151 26
Amount allowed by U. S. Treasury Department on claims Nos. 1392-1393 in excess of Adjutant General's pay rolls	32 00
Amount subject to disbursement on checks to be issued by Adjutant General (representing claims of 2,709 men)	\$58,119 26
Amount of 2,549 checks drawn and paid up to and including June 30, 1906	55,147 26
Balance to be checked against, representing 160 unpaid claims	\$2,972 00

CLAIMS AGAINST THE UNITED STATES ON ACCOUNT OF SPANISH-AMERICAN WAR.

There are claims still pending against the United States Government arising out of and incidental to the Spanish-American War, for transportation, subsistence, incidental expenses, and pay of Naval Militia guard on the U. S. S. "Marion" and the U. S. S. "Pinta," amounting to \$8,013.06.

This amount was suspended by the Auditor for the War Department on August 12, 1903, in the settlement of the third installment of the claim of the State of California.

Every effort will be made by this department to procure the additional evidence and explanations required to insure payment of the balance claimed.

RULES AND REGULATIONS, N. G. C.

For a number of years this State has been sadly in need of a new set of rules and regulations for the government of its National Guard that would accord with modern military service and usages and conform to recent National and State military enactments.

The officers and enlisted men approve and prefer modern rather than antiquated and obsolete military laws and regulations for their government and instruction, especially when such improvements bring them in closer touch with the government, drill, and discipline of the Regular Army, if they are to act in conjunction therewith. An efficient militia must be organized and disciplined to modern methods, if a force for actual service of the State is to at once associate and coöperate with the troops of the Regular Army.

The task of formulating new Rules and Regulations was assigned by this department to Colonel Thomas Wilhelm, Assistant Inspector General, during the latter part of 1905. The results of Colonel Wilhelm's efforts were compiled and published on March 1, 1906.

The thanks of this office, as well as of the entire National Guard, are due Colonel Wilhelm for the able and efficient manner in which these Rules and Regulations have been prepared.

ALLOWANCE TO OFFICERS.

An annual allowance of \$25 should be made to all line officers below the grade of major, to assist them in defraying the expense of providing themselves with uniforms and equipments. Each officer is required to provide himself with a dress uniform and a service uniform. In addition to this, proper equipment must be provided. This entails considerable expense upon officers, many of whom can ill afford it, and has caused some of our most capable young Guardsmen to decline an appointment or election to a commission. For the same reason intelligent men in civil life, qualified for military command by a previous service, decline to reënter the State militia, and oft times officers of intelligence, long service, and experience resign their commissions, thereby entailing a positive loss to the service.

The requirements of the service are exacting, and where duties are conscientiously performed the expenditure of much time and effort is entailed. The necessity for varied military knowledge and administration requires a higher mental attainment than heretofore. The State should at least provide for a part of the expense of uniforming and equipping officers who are willing to give their time and talent to the service.

I therefore most earnestly recommend that an appropriation be made for an allowance covering the above and as contemplated by Section 2078, Political Code.

COLORS OF CALIFORNIA U. S. VOLUNTEERS.

In the treatment of this important subject I can not do better than reiterate in part what was said in my last annual report:

"The preservation of our State battle flags should appeal to the patriotism of every citizen, and it is hoped that the time is fast approaching when the standards of all the regimental organizations that served during the War of the Rebellion and the Spanish-American War will be represented in the collection of flags in the State Capitol, instead of being permitted to remain in the hands of private individuals and societies. Some special provision should be made by the Legislature for the care of the flags already possessed. It is suggested that instead of occupying cramped quarters in the Adjutant General's office, they be placed in a suitable depository in the rotunda of the Capitol, where they can be viewed by the public at all times and each flag can be displayed by itself with a distinct and suitable inscription detailing its history."

OFFICE BUSINESS.

The demands made upon this department by individuals, correspondence, and other sources are of a varied nature and much greater than in previous years.

Requests for certified statements of service in the California Indian Wars and Expeditions, and the Civil and Spanish-American Wars, requiring careful and oftentimes lengthy search of the records, are daily received in increasing numbers, and correspondence of this character will continue to increase as we get farther away from the periods of the past and the several wars in which Californians participated.

The keeping of the records in this office is a most important work, the magnitude of which is known to but comparatively few outside of the department. It is essential that accurate and complete records be kept of all officers and men of the National Guard and the Naval Militia, and these records require constant attention, owing to the frequent changes caused by resignation, retirement, discharge, appointment, and enlistment.

Owing to the lack of sufficient and experienced clerical help in the past, the records previous to 1898 were inaccurately kept, and upon the induction into office of the present administration were found to be in an unsatisfactory condition. The matter of correcting and completing the records from the earliest practicable date is receiving special attention, a large share of the time of one clerk being devoted thereto.

The handling of the property and financial accounts with the War and Navy departments, and more particularly with the organizations of the National Guard and the Naval Militia, has assumed such large proportions as to demand the constant services of one clerk.

During the past year the correspondence and other work of this office have been greatly augmented by the additional duties imposed in connection with the claims of the California Volunteers for extra pay from date of enrollment to date of muster-in to the United States service or date of rejection therefrom, in 1898; also by the active tour of duty of the State troops subsequent and incident to the great catastrophe that visited San Francisco and other localities in April, 1906.

Arrangements were successfully made for the borrowing from banks and other financial institutions of sufficient funds to insure immediate payment of the troops for said service.

Moreover, the auditing of all claims for services, subsistence, supplies, transportation, and other expenses of the National Guard and the Naval Militia in connection with this service has devolved upon this department and is now occupying a very considerable part of the time of a portion of the clerical force.

The following has been a part of the work performed in this office during the year:

Communications received	5,507
Communications written	5,350
General Orders issued	16
Special Orders issued	6
Commissions issued	240

Certificates of reflection issued.....	22
Certificates of service issued.....	70
Certificates of honorary membership issued.....	12
Exempt certificates issued.....	42
Service medals and bars issued.....	53
Resignations accepted in Special Orders.....	50
Retirements.....	17
Leaves of absence granted.....	88

The foregoing does not include monthly returns, quarterly demands for State allowance, and semi-annual returns of property received from each headquarters and organization of the National Guard and Naval Militia and requiring careful examination and final action, and the preparing and forwarding of about a dozen annual reports and returns required of this department by the War and Navy departments.

MILITARY MAP.

It is recommended that an appropriation be made for the preparation and publication of a military map of the State of California, the same to indicate in a clear and distinctive manner the location of each headquarters and organization of the National Guard of California and the Naval Militia of California, and to show in colors the different steam railroads and public roads.

There is an increasing demand on the part of military officers and transportation companies for such a map, which would prove invaluable in connection with the movement of troops.

ARMORIES.

The following excerpt from my last annual report relative to the above subject is here given:

"This is a subject of great importance to the State at large, as well as to the National Guard, and I desire to call special attention to the necessity of providing our military organizations with suitable armories for the care and safekeeping of the United States and State property issued to them, as well as for the drill and instruction of their members. Until suitable buildings are provided, either by the State or by the local authorities of the cities or towns where companies are located, the officers responsible for such property must labor under very great disadvantages, and the discipline and drill of their commands materially suffer. Every military company should own its own armory, as is the case in many communities in other states, and the influence from every authorized agency, the State, city, or town, should be exerted to arouse sufficient patriotism to make that possible.

"The Secretary of War, in his report for the year 1904, presents the following suggestions relative to the subject of armories for the organized militia:

"The duty imposed upon the Governors of the states and territories by Section 1661, Revised Statutes, as amended, and by the Militia Act of January 21, 1903, of accounting

for public property issued under authority thereof, presented immediately the question of providing adequate facilities for the storage and protection of such property.

"Diligent inquiry has developed the fact that, while in the larger cities of the more populous states there are buildings excellently adapted to the purposes for which they are designed and used, there is in general a lamentable lack of proper armory accommodations in the smaller cities and villages.

"This is an evil which can be remedied only by liberal appropriations by the states and territories, or by private contributions. The Department is encouraged to hope that the State and local authorities are awakening to the importance of this subject; and it is known that in many instances where armory facilities have been found palpably deficient, temporary accommodations have already been provided, with the ultimate object of supplanting these makeshifts by substantial structures owned by the State or by the bodies corporate of the organizations themselves. In mitigation of any blame that may be attached to the militia organizations, it is to be remarked that the most convenient and in every respect the most suitable armories are those owned by such organizations, constructed from funds raised by private subscription and practically without State aid.

"Experience has demonstrated that there is no element more effective in promoting the organization of National Guard companies and in sustaining the interest of their members, thus contributing to their efficiency as component parts of the National Guard, than the providing of attractive and suitable buildings for their accommodation and the safe storage of their supplies and equipments."

GENERAL REMARKS.

The National Guard is for the benefit and protection of all the people. It is the conservator of the public peace. In times of riot or disorder it is called upon to restore peace and order and aid in the enforcement of the laws, making our homes and institutions secure and securing to every citizen the rights and privileges to which he is entitled. It should be maintained from the public treasury and in a manner in keeping with its dignity and the duties devolving upon it, and also in a way that will attract to the service the very best of our citizenship.

EMERGENCY FUND.

I desire to renew and emphasize the recommendation previously made by myself and some of my predecessors in office that provision be made by the Legislature for the establishment of an Emergency Fund, to be used only for the pay, travel, and subsistence of the State military forces, or any portion thereof, when called into service in case of war, insurrection, rebellion, or resistance to the execution of the laws of the State, or for any other necessary purpose; expenditures from that fund to be made only upon direct authorization of the Governor.

The necessity for such a fund became signally apparent at the time of the tour of active duty of the State troops incident to the great catastrophe in this State in April last, and had it not been for the action of the State Legislature in extraordinary session assembled in June last, no provision would or could have been made until the convening of the regular session of the State's law-making body in January next for the payment of claims for services, subsistence, sup-

plies, transportation, etc. Even so, the appropriation provided by the Act of the Legislature of June 14, 1906, for the payment of expenses in connection with the service of the State troops in April, May, and June of this year, does not become available until July 1, 1907; and had it not been for the prompt and splendid action of many of our banks in coming forward and advancing the necessary money, the troops could not have been paid for their efficient services and self-sacrificing efforts until the middle of next year. As it is, claimants for pay for transportation and supplies will not receive their money until July 1, 1907.

Realizing that they will be compelled to wait a long time for their money, individuals and firms are rather loth to enter into contracts with the State for the benefit of her military and where they do are often disinclined to submit prices and terms favorable to the State.

APPENDICES.

The following reports and tabulations are submitted for your information and made appendices to this report:

- Appendix "A"—Statement of appropriations and expenditures for military purposes for the fifty-seventh fiscal year.
- Appendix "B"—Statement of enrolled militia.
- Appendix "C"—Statement of organized strength of the National Guard and the Naval Militia in detail.
- Appendix "D"—Statement of dates of organization of regiments, companies, troops, and Naval Militia.
- Appendix "E"—Report of Uniform Board.
- Appendix "F"—Report of Captain C. J. Fulle on practice march and encampment of Troop C, First Squadron of Cavalry, July 2-16, 1905.
- Appendix "G"—Report of First Lieutenant Earl W. Jonas on practice march and encampment of Troop D, First Squadron of Cavalry, July 4-15, 1905.
- Appendix "H"—Report of First Lieutenant H. H. Look, Assistant Surgeon, Second Infantry, on encampment of Detachment Hospital Corps, Second Infantry, in July and August, 1905.
- Appendix "I"—Report of Second Lieutenant Jacob Alexander, Second Infantry, as special aid to Governor.
- Appendix "J"—List of Adjutants General.

EXHIBITS.

The following reports are submitted for your information and made exhibits to this report:

- Exhibit "AA"—Report of Commanding Officer, First Brigade, as to service rendered by his command in April and May, 1906, incident to the great calamity in San Francisco and vicinity.
- Exhibit "BB"—Report of Commanding Officer, Second Brigade, on the operations of the State troops on duty in San Francisco during period immediately following the earthquake and conflagration of April 18, 1906.
- Exhibit "CC"—Report of Major Thos. Wilhelm, U. S. A. (on duty with the National Guard of California), as to his observations and impressions relative to the great catastrophe of April 18, 1906.
- Exhibit "DD"—Field Orders, April, May, and June, 1906.

CONCLUSION.

I am indebted to Colonel Thomas Wilhelm, Assistant Inspector General, N. G. C. (Major U. S. A., retired, on duty with the National Guard of California), for valuable assistance rendered, able counsel and advice.

My thanks and appreciation are due to Colonel A. W. Bradbury, Assistant Adjutant General, and the other members of my office force, for their able and efficient service rendered in the administration of this department.

Finally, permit me to officially and personally express my appreciation of and to recognize the continued uniform courtesy extended by you to myself and to my assistants and for your personal interest manifested toward the officers and enlisted men connected with the military and naval forces of the State.

Everything bears evidence of your hearty coöperation and the kindly interest you have shown toward this branch of the State government, which has been appreciated by the officers and gratifying to the enlisted men.

Very respectfully,

J. B. LAUCK,
Adjutant General.

APPENDIX "A."

STATEMENT OF APPROPRIATIONS AND EXPENDITURES FOR
MILITARY PURPOSES FOR THE FIFTY-SEVENTH
FISCAL YEAR.

Salary of Adjutant General.

To appropriation	\$3,000 00	
By J. B. Lauck		\$3,000 00
	\$3,000 00	\$3,000 00

Salary of Assistant Adjutant General.

To appropriation	\$2,400 00	
By A. W. Bradbury		\$2,400 00
	\$2,400 00	\$2,400 00

Salary of Chief Clerk, Adjutant General's Office.

To appropriation	\$1,800 00	
By Howard S. McIntire		\$1,800 00
	\$1,800 00	\$1,800 00

Salaries of Three Clerks, Adjutant General's Office.

To appropriation	\$4,800 00	
By Jacob Alexander		\$1,600 00
By J. M. Milliken		1,600 00
By H. B. Van Horn		1,600 00
	\$4,800 00	\$4,800 00

Salary of Stenographer, Adjutant General's Office.

To appropriation	\$1,200 00	
By Miss Alice M. Coughlin		\$1,200 00
	\$1,200 00	\$1,200 00

Salary of Armorer and Porter.

To appropriation	\$1,200 00	
By Joseph Bauquier		\$1,200 00
	\$1,200 00	\$1,200 00

Postage, Expressage and Telegraphing, Adjutant General's Office.

To appropriation	\$800 00	
By expenditures		\$670 20
By balance		129 80
	\$800 00	\$800 00

Care of State Army, Cleaning and Transportation of Arms, Traveling and Contingent Expenses of the Adjutant General.

To appropriation	\$2,500 00	
By expenditures		\$2,499 63
By unexpended balance		37
	\$2,500 00	\$2,500 00

Allowance, Brigade Headquarters.

To appropriation	\$2,300 00	
By expenditures		\$2,300 00
	\$2,300 00	\$2,300 00

Allowance, Regimental Headquarters and Bands.

To appropriation	\$7,116 00	
By expenditures		\$7,116 00
	\$7,116 00	\$7,116 00

Armory Rents and Other Expenses.

To appropriation	\$90,000 00	
By expenditures		\$80,851 47
By unexpended balance*		9,148 53.
	\$90,000 00	\$90,000 00

* The above balance will be expended by granting an annual allowance.

Armory Rents and Other Expenses of Unattached Companies of the National Guard.

To appropriation	\$750 00	
By Company A, Veteran Reserves		\$500 00
By unexpended balance		250 00
	\$750 00	\$750 00

Traveling Expenses and Per Diem of Officers on Detail Duty.

To appropriation	\$3,000 00	
By expenditures		\$2,070 24
By unexpended balance		929 76
	\$3,000 00	\$3,000 00

Target Practice and Purchase of Medals.

To appropriation.....	\$5,000 00	
By expenditures.....		\$4,431 31
By unexpended balance.....		568 69
	\$5,000 00	\$5,000 00

Hospital Supplies.

To appropriation.....	\$500 00	
By expenditures.....		\$61 76
By unexpended balance.....		438 24
	\$500 00	\$500 00

***Encampment, National Guard and Naval Militia.**

To appropriation for 57th and 58th fiscal years.....	\$15,000 00	
By expenditures.....		\$56 40
By unexpended balance.....		14,943 60
	\$15,000 00	\$15,000 00

*This fund is exempt from Section 4, General Appropriation Act, 1905.

Purchase of Uniforms and Equipments for National Guard.

To appropriation.....	\$2,500 00	
By expenditures.....		\$2,369 00
By unexpended balance.....		131 00
	\$2,500 00	\$2,500 00

Furnishing Coal and Other Supplies and for Repairs to Training Ships, Naval Militia.

To appropriation.....	\$1,500 00	
By expenditures.....		\$759 95
By unexpended balance.....		740 05
	\$1,500 00	\$1,500 00

Printing, Binding, Ruling, and All Other Work Performed, and Materials Furnished by the State Printing Office.

To appropriation.....	\$2,000 00	
By expenditures.....		\$2,000 00
	\$2,000 00	\$2,000 00

STATE OF CALIFORNIA, }
COUNTY OF SACRAMENTO. } ss.

J. B. LAUCK, Adjutant General of California, being duly sworn, says that the amounts certified to in the foregoing statements, under the heads of Postage, Expressage, Telegraphing, Care of State Armory, Cleaning and Transportation of Arms, Traveling and Contingent Expenses of the Adjutant General's Office, were expended for the purposes mentioned, to the best of his knowledge and belief.

J. B. LAUCK,
Adjutant General of California.

Subscribed and sworn to before me, this first day of November, 1906.

A. B. NYE,
Private Secretary to Governor.

APPENDIX "B."

STATEMENT OF ENROLLED MILITIA.

Giving Number of Persons Between the Ages of Eighteen and Forty-five Years, Subject to Military Duty in Each County, as Shown by Returns of Brigadier Generals, Made for the Year 1906.

County.	Number.	County.	Number.
Alameda	17,550	Placer	2,235
Alpine	65	Plumas	791
Amador	1,911	Riverside	4,922
Butte	2,721	Sacramento	9,222
Calaveras	3,593	San Benito	1,329
Colusa	1,508	San Bernardino	4,246
Contra Costa	3,418	San Diego	5,488
Del Norte	428	San Joaquin	4,302
El Dorado	2,215	San Luis Obispo	2,820
Fresno	7,436	San Francisco	53,180
Glenn	1,217	San Mateo	2,606
Humboldt	7,339	Santa Barbara	3,080
Inyo	800	Santa Clara	8,589
Kern	4,470	Santa Cruz	2,732
Kings	1,880	Shasta	4,719
Lake	620	Siskiyou	4,038
Lassen	821	Sierra	863
Los Angeles	22,675	Solano	4,148
Madera	1,594	Sonoma	15,497
Marin	2,302	Stanislaus	3,456
Mariposa	1,000	Sutter	1,019
Mendocino	3,023	Tehama	1,541
Merced	2,305	Trinity	559
Modoc	919	Tulare	3,348
Mono	333	Tuolumne	4,055
Monterey	4,195	Ventura	2,875
Napa	3,128	Yolo	1,896
Nevada	2,669	Yuba	2,171
Orange	2,505	Total	260,367

APPENDIX "C."

ORGANIZED STRENGTH OF THE NATIONAL GUARD AND NAVAL
MILITIA IN DETAIL, JUNE 30, 1906.

Organization.	Location.	Commis- sioned.	Enlisted.	Aggre- gate.	Totals.
NATIONAL GUARD.					
Staff of Commander-in-Chief	-----	30	-----	30	30
General officers and staffs	-----	13	-----	13	13
Hospital Corps	-----	17	56	73	73
Signal Corps.					
First Company	Los Angeles	3	33	36	
Second Company	San Francisco	3	37	40	
Totals	-----	6	70	76	76
First Squadron of Cavalry.					
Field and Staff	Sacramento	4	4	8	
Troop A	San Francisco	3	52	55	
Troop B	Sacramento	3	58	61	
Troop C	Salinas	3	46	49	
Troop D	Los Angeles	3	49	52	
Totals	-----	16	209	225	225
First Battalion Coast Artillery.					
Field, Staff, and Band	San Francisco	5	35	40	
Company A	San Francisco	3	65	68	
Company B	San Francisco	3	61	64	
Company C	San Francisco	3	67	70	
Company D	San Francisco	3	51	54	
Totals	-----	17	279	296	296
First Infantry.					
Field, Staff, and Band	San Francisco	15	47	62	
Company A	San Francisco	1	65	66	
Company B	San Francisco	3	63	66	
Company C	San Francisco	3	58	61	
Company D	San Francisco	3	57	60	
Company E	San Francisco	3	59	62	
Company F	San Francisco	3	54	57	
Company G	San Francisco	3	61	64	
Company H	San Francisco	3	64	67	
Totals	-----	37	528	565	565
Second Infantry.					
Field, Staff, and Band	Sacramento	14	26	40	
Company A	Chico	3	67	70	
Company B	Colusa	3	50	53	
Company C	Nevada City	3	51	54	
Company D	Marysville	3	55	58	
Company E	Sacramento	3	66	69	
Company F	Woodland	3	53	56	
Company G	Sacramento	3	66	69	
Company H	Placerville	3	55	58	
Company I	Vacaville	3	49	52	
Totals	-----	41	538	579	579

Organization.	Location.	Commis- sioned.	Enlisted.	Aggre- gate.	Totals.
Fifth Infantry.					
Field and Staff	San Francisco.....}	13	30	43	
Band	San Rafael				
Company A	Oakland	3	58	61	
Company B	San José	3	50	53	
Company C	Petaluma	3	49	52	
Company D	San Rafael	3	55	58	
Company E	Santa Rosa	3	51	54	
Company F	Oakland	3	56	59	
Company G	Alameda	3	65	68	
Company H	Napa	3	53	56	
Company I	Livermore	3	56	59	
Totals	40	523	563	563
Sixth Infantry.					
Field and Staff	Modesto	13	28	41	
Band	Fresno				
Company A	Stockton	2	38	40	
Company B	Stockton	3	47	50	
Company C	Fresno	3	62	65	
Company D	Modesto	2	34	36	
Company E	Visalia	2	47	49	
Company F	Fresno	3	57	60	
Company G	Bakersfield	3	54	57	
Company H	Merced	3	62	65	
Company I	Hanford	2	53	55	
Totals	36	482	518	518
Seventh Infantry.					
Field and Staff	Santa Ana	17	28	45	
Band	Pomona				
Company A	Los Angeles	3	59	62	
Company B	San Diego	3	53	56	
Company C	Los Angeles	3	51	54	
Company D	Pomona	3	53	56	
Company E	Anaheim	3	52	55	
Company F	Los Angeles	2	51	53	
Company G	Redlands	3	50	53	
Company H	Long Beach	2	52	54	
Company I	Pasadena	3	48	51	
Company K	San Bernardino	3	52	55	
Company L	Santa Ana	2	52	54	
Company M	Riverside	3	50	53	
Totals	50	651	701	701
Co. A, Veteran Reserves	Oakland	3	59	62	62
Grand totals	306	3,395	3,701	3,701
NAVAL MILITIA.					
Headquarters, Staff and Band	San Francisco	9	30	39	
First Division	San Francisco	3	44	47	
Second Division	San Francisco	2	45	47	
Third Division	San Diego	3	59	62	
Fourth Division	Santa Cruz	3	62	65	
Fifth Division	Eureka	4	56	60	
Sixth Division	Santa Barbara	4	47	51	
Engineer Division—					
U. S. S. "Marion" Detach- ment	San Francisco	2	18	20	
U. S. S. "Pinta" Detach- ment	Los Angeles	2	37	39	
Totals	32	398	430	430
Grand totals—National Guard and Naval Militia	338	3,793	4,131	4,131

APPENDIX "D."

DATES OF ORGANIZATION OF REGIMENTS, COMPANIES, TROOPS,
AND NAVAL MILITIA.

Location.	Name of Organization.	Date Organized.
SIGNAL CORPS—		
Los Angeles	First Company	May 28, 1890
San Francisco	Second Company	Apr. 30, 1899
FIRST SQUADRON OF CAVALRY		
Sacramento	Troop A	Aug. 15, 1905
San Francisco	Troop A	Formerly Lt. Baty. A. July 27, 1849
Sacramento	Troop B	Formerly Lt. Baty. B. Sept. 27, 1866
Salinas	Troop C	Aug. 5, 1895
Los Angeles	Troop D	Aug. 9, 1895
FIRST BATTALION COAST ARTILLERY		
San Francisco	Organized by transfer of Companies C, F, G, and K, from 1st Infantry	Apr. 19, 1901
San Francisco	Company A	Formerly Co. F, 1st Inf. which was formed Dec. 7, 1895, from consolidation of—Baty. D, 2d Art. May 28, 1868 Baty. F, 2d Art. Mar. 18, 1878
San Francisco	Company B	Formerly Co. G, 1st Inf. Jan. 9, 1879
San Francisco	Company C	Formerly Co. C, 1st Inf. Aug. 31, 1835
San Francisco	Company D	Formerly Co. K, 1st Inf. which was formerly Baty. E, 2d Art. July 24, 1882
FIRST INFANTRY		
San Francisco	Dec. 9, 1895, formed from consolidation of— 1st Inf. May 8, 1861 2d Art. June 1, 1881 3d Inf. June 21, 1883	
San Francisco	Company A	Dec. 7, 1895, formed from consolidation of— Co. A, 3d Inf. Apr. 18, 1883 Co. E, 3d Inf. Apr. 18, 1883
San Francisco	Company B	Dec. 7, 1895, formed from consolidation of— Co. B, 1st Inf. May 31, 1854 Co. D, 1st Inf. June 15, 1861
San Francisco	Company C	Formerly Co. I, 1st Inf., which was Baty. C, 2d Art. Nov. 27, 1871
San Francisco	Company D	Formerly Co. C, 3d Inf. Mar. 7, 1871
San Francisco	Company E	Formerly Co. D, 3d Inf. Apr. 18, 1883
San Francisco	Company F	Formerly Co. L, 1st Inf., which was Co. F, 1st Inf. Dec. 9, 1858
San Francisco	Company G	Formerly Co. M, 1st Inf., which was formed Dec. 7, 1895, from consolida- tion of— Baty. G, 2d Art. Apr. 8, 1878 Baty. H, 2d Art. Aug. 7, 1863
San Francisco	Company H	Dec. 7, 1895, formed from consolidation of— Co. B, 3d Inf. May 22, 1885 Co. F, 3d Inf. Sept. 24, 1883

REPORT OF ADJUTANT GENERAL.

Location.	Name of Organization.	Date Organized.
Sacramento	SECOND INFANTRY	Dec. 9, 1895, formed from consolidation of—
		8th Inf. Oct. 31, 1891
		1st Art. Mar. 19, 1880
Chico	Company A	Dec. 7, 1895, formed from consolidation of—
		Co. A, 8th Inf. Apr. 5, 1875
		Co. F, 8th Inf. Oct. 17, 1891
		Formerly Co. B, 8th Inf. Oct. 10, 1887
Colusa	Company B	Jan. 6, 1906
Nevada City	Company C	Formerly Co. C, 8th Inf. Dec. 19, 1889
Marysville	Company D	Nov. 26, 1883
Sacramento	Company E	Apr. 21, 1899
Woodland	Company F	July 29, 1870
Sacramento	Company G	Oct. 16, 1899
Placerville	Company H	Dec. 7, 1904
Vacaville	Company I	
San Francisco	FIFTH INFANTRY	Nov. 26, 1887
Oakland	Company A	Sept. 1, 1861
San José	Company B	Aug. 30, 1863
Petaluma	Company C	June 29, 1869
San Rafael	Company D	May 14, 1885
Santa Rosa	Company E	June 10, 1885
Oakland	Company F	Sept. 23, 1878
Alameda	Company G	June 1, 1893
Napa	Company H	Formerly Baty. B, 2d Art. May 27, 1893
Livermore	Company I	Apr. 20, 1900
Modesto	SIXTH INFANTRY	Feb. 21, 1888
Stockton	Company A	Sept. 7, 1861
Stockton	Company B	May 21, 1884
Fresno	Company C	June 15, 1885
Modesto	Company D	Oct. 29, 1887
Visalia	Company E	Dec. 9, 1887
Fresno	Company F	Jan. 26, 1888
Bakersfield	Company G	May 25, 1893
Merced	Company H	May 24, 1893
Hanford	Company I	Mar. 14, 1900
Santa Ana	SEVENTH INFANTRY	Dec. 9, 1895, formed from consolidation of—
		7th Inf. May 5, 1888
		9th Inf. Feb. 8, 1890
Los Angeles	Company A	June 9, 1881
San Diego	Company B	Dec. 7, 1895, formed from consolidation of—
		Co. A, 9th Inf. Sept. 7, 1889
		Co. B, 9th Inf. Oct. 12, 1881
Los Angeles	Company C	July 18, 1894
Pomona	Company D	Formerly Co. D, 9th Inf. Oct. 28, 1887
Anaheim	Company E	Apr. 28, 1900
Los Angeles	Company F	Dec. 20, 1887
Redlands	Company G	Formerly Co. G, 9th Inf. June 3, 1893
Long Beach	Company H	Dec. 21, 1904
Pasadena	Company I	Formerly Co. B, 7th Inf. Dec. 23, 1889
San Bernardino	Company K	Formerly Co. E, 9th Inf. Oct. 29, 1887
Santa Ana	Company L	Dec. 19, 1904
Riverside	Company M	Formerly Co. C, 9th Inf. Jan. 3, 1890
San Francisco	NAVAL MILITIA	Oct. 21, 1891
San Francisco	First Division	Formerly Co. C Sept. 3, 1891
San Francisco	Second Division	Formerly Co. D Sept. 29, 1891
San Diego	Third Division	Formerly Co. A Sept. 12, 1891
San Cruz	Fourth Division	Formerly Co. E June 13, 1895
Eureka	Fifth Division	Formerly Co. A, 10th Inf. Feb. 10, 1879
Santa Barbara	Sixth Division	July 10, 1897
San Francisco	Engineer Division	Aug. 30, 1897

APPENDIX "E."

REPORT OF THE UNIFORM BOARD.

STATE OF CALIFORNIA, ADJUTANT GENERAL'S OFFICE,
SACRAMENTO, July 30, 1906.

The Adjutant General, State of California, Sacramento.

SIR: I have the honor to submit the following report of the purchases made during the fifty-seventh fiscal year by the Uniform Board, National Guard of California, appointed by Paragraph XLII, S. O. No. 8, A. G. O., series 1905:

Feb. 27, 1906—B. Pasquale Company, Inc., 2 uniforms, Hospital Corps, at \$12.00.....	\$24 00
Mar. 20, 1906—General Storekeeper, Mare Island—	
200 Trousers, blue, pairs at \$4.00.....	\$800 00
200 Overshirts, blue, at \$2.50.....	500 00
200 Caps, blue, cloth, at 65 cents.....	130 00
200 Jumpers, white, undress, at 60 cents.....	120 00
200 Trousers, white, undress, pairs, at 90 cents.....	180 00
200 Hats, white, at 40 cents.....	80 00
200 Leggings, pairs, at 60 cents.....	120 00
100 Trousers, white, dress, pairs, at \$1.00.....	100 00
100 Blouses, white, dress, at \$1.40.....	140 00
	<hr/>
	2,170 00
April 10, 1906—G. G. Kammerer—	
5 Chief Petty Officers' uniforms, at \$35.00.....	175 00
	<hr/>
	\$2,369 00
Balance to fifty-eighth fiscal year.....	131 00
	<hr/>
	\$2,500 00

Very respectfully,

A. W. BRADBURY,
Colonel and Assistant Adjutant General of California,
Recorder of Board.

APPENDIX "F."

REPORT OF PRACTICE MARCH AND CAMP OF INSTRUCTION,
TROOP C, CAVALRY.

SALINAS, CAL., July 19, 1905.

The Adjutant General, State of California, Sacramento, California.

SIR: I respectfully render herewith my report on the practice march and camp of instruction of Troop C, Cavalry, First Brigade, N. G. C., from July 2 to July 16, 1905, both dates inclusive.

Permission being granted by the Adjutant General and Brigade Commander, copies of same inclosed, Troop C (3 officers and 32 enlisted men) left Salinas at 9 A. M., July 2d; marched to Mud Creek, arriving at 11:30 A. M.; had lunch, and left at 12:30 P. M., and marched to San Juan, arriving at 3 P. M. Distance, 16 miles.

July 3d: Troop left camp at 6:30 A. M., and marched to Gilroy, arriving at 9:30 A. M.; rested on account of heat until 5 P. M.; left Gilroy at 5 P. M., and marched to Madrone, arriving at 8 P. M. Distance, 26 miles.

July 4th: Troop left Madrone at 5:30 A. M., and marched to San José, arriving at 9:30 A. M. Distance, 18 miles. Upon arrival at San José I reported to Major Keesling, commanding Battalion of Artillery, and paraded with the battalion. Camp was visited by Brigadier General J. A. Koster, commanding Second Brigade, N. G. C.

July 5th: Troop left San José at 5:30 A. M., and marched to Santa Cruz, arriving at 6 P. M. Distance, 38 miles. Troop pitched shelter tents on vacant lot near beach.

July 6th: Troop pitched permanent camp; camp being laid out as per sketch attached. The following order for duty in camp was issued to command:

CAMP ORDER }
No. 1. }

CAMP J. B. LAUCK, July 6, 1905.

The following calls will be sounded commencing to-morrow morning:

First call	5:45 A. M.	Swimming horses	11:00 A. M.
Reveille	5:55 A. M.	Dinner	12:00 noon
Assembly	6:00 A. M.	Water	12:30 P. M.
Stable call	6:05 A. M.	Water and stables	5:30 P. M.
Breakfast	7:00 A. M.	Supper	6:15 P. M.
Water	7:30 A. M.	Guard mounting	6:45 P. M.
Boots and saddles	7:45 A. M.	Assembly	7:07 P. M.
Assembly	8:00 A. M.	Retreat and inspection	7:15 P. M.
Recall	10:30 A. M.	Taps	11:00 P. M.

The troop will wear for mounted drill khaki trousers, leggings and blue shirts. For guard mounting, retreat and inspection, blue dress uniform.

C. J. FULLE,
Captain, commanding.

July 7th: 8 to 10:30 A. M., mounted drill, close order, and bareback riding. 11 to 11:30 A. M., swimming horses.

July 8th: 8 to 10:30 A. M., mounted drill, extended order. 11 to 11:30 A. M., swimming horses.

July 9th: Camp was visited by Brigadier General J. A. Koster, commanding Second Brigade, N. G. C.

July 10th: 8 to 10:30 A. M., mounted drill, extended order, and bareback riding. 11 to 11:30 A. M., swimming horses.

July 11th: 8 to 10:30 A. M., mounted drill, close order, and bareback riding. 11 to 11:30 A. M., swimming horses.

July 12th: Troop left camp at 7:30 A. M. and marched to Big Trees, forming advance guard and scouting parties. Left Big Trees at 12:30 P. M., returning to camp by way of ocean road, forming rear guard, and arriving in camp at 4 P. M. Distance, 17 miles.

July 13th: 8 to 10:30 A. M., mounted drill, extended order, and bareback riding. 11 to 11:30 A. M., swimming horses.

July 14th: 8 to 10:30 A. M., mounted drill, extended order, and bareback riding. 11 to 11:30 A. M., swimming horses.

July 15th: Troop broke camp at 7 A. M. Left Santa Cruz at 11:30 A. M., and marched to Watsonville, arriving at 3:30 P. M. Distance, 20 miles.

July 16th: Troop left Watsonville at 8 A. M., and marched to Salinas, arriving at 1 P. M. Distance, 20 miles.

Total number of miles marched, 155 miles.

First Lieutenant F. W. Winham was detailed as Acting Quartermaster and Commissary and performed his duties in a very satisfactory manner. The troop was armed with the carbine only, and saddles were packed according to Cavalry Drill Regulations. Shelter tents were used on the march. Wall tents, blue clothing, etc., were shipped to Santa Cruz by freight.

The camp was named "Camp J. B. Lauck," in honor of the Adjutant General.

Carbines were inspected every evening after retreat and were kept in good condition. The troop had two thousand rounds blank cartridges, which were used in the extended order drill.

The officers and men performed their duty cheerfully at all times. The health of the troop was excellent, there being no case of sickness on the entire trip. At Santa Cruz one horse developed a mild case of lockjaw, but was cured by being turned over for treatment to Dr. Graves of Santa Cruz. There were no soreback horses on the entire trip. The behavior of the men was excellent and no complaint of any kind came to the notice of the commanding officer.

The march and camp have done much good to the troop.

Very respectfully,

(Signed) CHARLES J. FULLE,

Captain, Commanding Troop C.

APPENDIX "G."

REPORT OF PRACTICE MARCH AND CAMP, TROOP D, FIRST SQUADRON OF CAVALRY.

LOS ANGELES, CAL., August 22, 1905.

*Commanding Officer, First Squadron of Cavalry, N. G. C.,
Sacramento, California.*

SIR: I have the honor to report that on July 4, 1905, Troop D, Cavalry, under command of Captain J. D. Fredericks, left Los Angeles, mounted, at 4 P. M., for Pasadena, where we arrived 7 P. M. Present, 40 officers and enlisted men. Distance, 9 miles.

July 5th: Left Pasadena at 6 A. M. for Pomona; arrived in Pomona at 6 P. M. Distance traveled, 33 miles. Horses and men in good condition. Roads good.

July 6th: Left Pomona at 6 A. M. for Riverside; arrived in Riverside at 6 P. M. Distance traveled, 33 miles. Men and horses in good condition. Roads good.

July 7th: Left Riverside at 6 A. M. for Hemet; arrived in Hemet at 7:30 P. M. Distance traveled, 34 miles. Men and horses in fair condition. Roads poor. Heat intense, 122° on Mareno desert.

July 8th: Left Hemet at 6 A. M. for Idyllwild; arrived at Idyllwild at 4:30 P. M. Distance traveled, 17 miles. Men and horses in fair condition.

July 9th: Sunday, no drill. Inspection of equipment at 9 A. M.

July 10th: Drill in close order, mounted, also as skirmishers and foragers, attack and defense of wagon train.

July 11th: Maneuvers in attack and defense of a position held by dismounted men.

July 12th: No drills. Inspection of equipment in morning. Started for Los Angeles at 3:30 P. M.; arrived in Hemet at 8:30 P. M. Distance traveled, 33 miles.

July 13th: Left Hemet for Riverside at 6 A. M.; arrived in Riverside at 6:30 P. M. Distance traveled, 35 miles. Men and horses in good condition.

July 14th: Left Riverside for Pomona at 6 A. M.; arrived in Spadra at 5:30 P. M. Distance traveled, 35 miles. Men and horses in good condition. Roads good.

July 15th: Left Spadra at 6 A. M. for Los Angeles; arrived in Los Angeles at 4 P. M. Distance traveled, 30 miles.

Total distance traveled, 259 miles.

Hospital Steward Frank H. Sanborn in attendance on entire trip, with the necessary medicines and appliances.

Health of the men as a whole was very good, with the exception of two men who were badly galled, owing to the intense heat.

Very respectfully,

(Signed) EARL W. JONAS,

First Lieutenant, Troop D.

First Squadron of Cavalry, N. G. C., Commanding Troop.

APPENDIX "H."

REPORT ON ENCAMPMENT OF DETACHMENT HOSPITAL CORPS,
SECOND INFANTRY.

SACRAMENTO, CAL., November 7, 1905.

MAJOR W. J. HANNA, *Surgeon, Second Infantry, N. G. C.,*
Sacramento, California.

SIR: I have the honor to report on the encampment of the detachment of the Hospital Corps, as per request forwarded through channels while stationed at Idlewild in July and August of this year.

A squad of the detachment of the Hospital Corps, under my command, left Sacramento by train July 23, 1905, en route to Idlewild, Lake Tahoe, California, for the purpose of going into camp of instruction. The detachment was compelled to remain over night at Truckee but proceeded by train on the following morning to Lake Tahoe. On arriving at Tahoe City, a wagon was engaged to transport the equipments and provisions to Idlewild, a distance of about four miles south and west on the lake shore. Here the detachment went into camp and gave it the name of Camp Hanna. The remainder of the day was spent in pitching camp. The following day, the 25th, the corps devoted to cleaning the camp grounds and putting the equipment in order. On the 26th the squad practiced the litter drill until noon.

The 27th was occupied by a march of four miles along the lake to a place called McKinney's and return. The 28th was spent in camp with a drill. On the following day, the 29th, the squad went on a long march back into the mountains to snow line, a distance of seven or eight miles. The 30th was given up to rest and entertaining visitors. The forenoon of the 31st was occupied in drill and the afternoon in laundering the clothing. On the 1st of August the squad drilled in the morning and rowed across the lake to McKinney's. The 2d was spent in a march to Tahoe City and the Fishery and return. The 3d was devoted to drill and getting the camp in order for breaking up. The 4th, a drill in the morning and packing in the afternoon preparatory to breaking camp on the following morning. At 6 A. M. on the 5th, the detachment was packed and the encampment sent by wagon to Tahoe City. At 9 A. M. we took the steamer at McKinney's, where we had marched for the return home. The night of the 5th was spent in Truckee, and we reached Sacramento on the morning of the 6th.

Respectfully submitted.

(Signed) H. H. LOOK,
Lieutenant and Assistant Surgeon,
Second Regiment of Infantry, N. G. C.

APPENDIX "I."

REPORT OF SECOND LIEUTENANT JACOB ALEXANDER, SECOND INFANTRY, AS SPECIAL AID TO THE GOVERNOR.

OAKLAND, CAL., May 24, 1906.

To His Excellency, GEORGE C. PARDEE,
Governor of the State of California, Oakland, California.

SIR: At about 2:45 o'clock on the afternoon of April 18th last, under your instructions, I accompanied you to the City of Oakland for the purpose of observation and report upon the conditions resulting from the appalling calamity caused by the earthquake and fire on that and subsequent days in the City of San Francisco.

We left Sacramento on the first available train at about 5:45 o'clock on the afternoon of April 18th, arriving at Oakland at about 10:45 o'clock that night. You immediately repaired to the City Hall, where Mayor Frank K. Mott of Oakland courteously tendered the use of his offices, in which you established your temporary office. Shortly thereafter I was furnished with messages to the Mayor of San Francisco and to Brigadier General John A. Koster, commanding the Second Brigade, National Guard of California, on duty in San Francisco. In the message to Mayor E. E. Schmitz you conveyed to him, and through him, your sympathy to the sufferers of the city, and requested that he convey to the Governor through me any request he might have to make, indicating what might be necessary for you to do in coöperation with him to relieve the sufferings of the homeless people of San Francisco. You advised the Mayor that owing to the fact that you desired to keep in telephonic and telegraphic touch with Sacramento and other parts of the State, San Francisco being utterly cut off, you would remain at the City Hall in Oakland during the night. The message to General Koster I was unable to deliver, for the reason that he was somewhere in the district on duty at a place unknown to me at the time.

I left Oakland for San Francisco at 3:30 o'clock on the morning of April 19th, arriving there at about 5 o'clock. I reached San Francisco by means of a launch which had been used to transport to that city reporters of the San Francisco "Call," "Chronicle," and "Examiner," who had been engaged the night and day before in preparing for publication a newspaper entitled "The Call-Chronicle-Examiner," jointly published by those journals in the City of Oakland.

Upon arriving at the Fairmont Hotel, California and Mason streets, San Francisco, shortly after daybreak, at which place Mayor Schmitz for a time had maintained his headquarters, and which he was compelled to vacate because of the near approach of the flames, I was informed by Chief of Police Dinan that the Mayor had gone to his residence, which is located some distance from the Fairmont Hotel, to rest—to obtain some sleep. I was conveyed in a police department buggy to the residence of Mayor Schmitz, arriving there, as nearly as I

can remember, between 7:30 and 8 o'clock on the morning of April 19th, and found him up and fully dressed. I delivered to him your message, which I supplemented with words in consonance with the text of the communication. The Mayor requested me to say to you that from 75,000 to 100,000 people had been rendered homeless and destitute by the fire, which by that time had destroyed nearly every structure and habitation within the district finally devastated; that provisions, tentage, and supplies of every essential character were required for those in distress, and that Golden Gate Park had been selected as the base of supplies. The Mayor also urged me to convey to you his heartfelt thanks for your expressions of sympathy and offer of good office in the great needs of the distressed of the city. I also informed the Mayor of the dispatches received by you from the President of the United States, and from the Governors of Oregon and Washington, offering tentage for sheltering the homeless. I thereupon returned to Oakland as speedily as possible and conveyed to you the Mayor's verbal reply.

My instructions regarding General Koster were to say to him that he should make every effort to obtain everything required to facilitate the work in hand. And although I was unable to locate General Koster, yet from close observations of the situation, and from reliable information, I soon saw that this was already being accomplished by that officer.

Under the same instructions I made a second visit to San Francisco on the same day for further observations in order to acquaint you with the condition of affairs as they progressed. On this second visit to San Francisco I met Adjutant General J. B. Lauck and Colonel Thomas Wilhelm (Major, U. S. Army), Assistant Inspector General of the National Guard of California, in Jefferson Square, which was but a short distance west and north of what was termed the "fire-line," which was rapidly approaching the square. The Adjutant General and Colonel Wilhelm had been in Mendocino County on important military business, and they arrived in San Francisco about 6 o'clock on the evening of April 18th. General Lauck immediately assumed control of the situation within the scope of the operations of the State troops, and has been on continual duty ever since the disaster.

I beg to state that this report would have been submitted to Your Excellency some days prior to the date hereof, but has been delayed for the reason that I have been quite busily engaged in connection with my duties in the Adjutant General's Office, although, as you know, I acquainted you, from time to time, with the condition of affairs as they existed in San Francisco in the early days of the disaster.

Very respectfully,

(Signed) JACOB ALEXANDER,
Second Lieutenant, Second Infantry, N. G. C.

APPENDIX "J."

LIST OF ADJUTANTS GENERAL.

Name.	Rank.	Date of Rank.	Term Expired.
T. R. Persee	Brigadier General	Apr. 12, 1850	..... 1851
E. W. McKinstry	Brigadier General	Apr. 20, 1851	..... 1852
William C. Kibbe	Brigadier General	May 2, 1852	Dec. 31, 1863
Robert Robinson	Brigadier General	Jan. 1, 1864	May 1, 1864
George S. Evans	Brigadier General	May 1, 1864	Nov. 30, 1865
Robert Robinson	Brigadier General	Dec. 1, 1865	Apr. 1, 1866
George S. Evans	Brigadier General	Apr. 2, 1866	Apr. 30, 1868
James M. Allen	Brigadier General	May 1, 1868	Nov. 30, 1870
Thos. N. Cazneau	Brigadier General	Dec. 1, 1870	Dec. 20, 1871
L. H. Foote	Brigadier General	Dec. 21, 1871	Dec. 12, 1875
P. F. Walsh	Brigadier General	Dec. 13, 1875	Jan. 8, 1880
Samuel W. Backus	Major General	Jan. 9, 1880	June 30, 1882
John F. Sheehan	Major General	July 1, 1882	Jan. 10, 1883
George B. Cosby	{ Major General Brigadier General }	Jan. 11, 1883	Oct. 31, 1887
Richard H. Orton	Brigadier General	Nov. 1, 1887	Jan. 8, 1891
Charles C. Allen	Brigadier General	Jan. 9, 1891	May 24, 1895
Andrew W. Barrett	Brigadier General	May 24, 1895	Dec. 23, 1898
Robert L. Peeler	Brigadier General	Dec. 23, 1898	June 5, 1899
W. H. Seamans	Brigadier General	June 5, 1899	* Jan. 3, 1902
George Stone	Brigadier General	Jan. 13, 1902	Feb. 15, 1904
Joseph B. Lauck	Brigadier General	Feb. 15, 1904	Incumbent.

* Died.

EXHIBIT "AA."

REPORT OF COMMANDING GENERAL, FIRST BRIGADE, AS TO
SERVICE RENDERED BY HIS COMMAND IN APRIL AND
MAY, 1906, INCIDENT TO THE GREAT CALAMITY IN SAN
FRANCISCO AND VICINITY.

HEADQUARTERS, FIRST BRIGADE,
NATIONAL GUARD OF CALIFORNIA,
LOS ANGELES, CAL., October 31, 1906.

The Adjutant General, State of California, Sacramento, Cal.

SIR: I have the honor to make the following report relative to the service of the First Brigade rendered in connection with the earthquake in San Francisco during April and May, 1906:

On April 20th the following telegram was received:

SACRAMENTO, CAL., April 19, 1906.

BRIGADIER GENERAL ROBT. WANKOWSKI,
*Commanding First Brigade, N. G. C.,
Los Angeles Trust Co., Los Angeles, Cal.*

Governor directs that you wire colonels your brigade to wire company commanders to keep in close touch with their men so they can be summoned without delay if necessary.

BRADBURY, A. A. G.

Orders were immediately telephoned to commanding officers accordingly. Owing to inability to reach Commanding Officer, Sixth Infantry, the orders were mailed.

(It was afterwards learned that he had received orders from the Adjutant General to report with the Sixth Infantry to Brigadier General Koster, commanding Second Brigade, at San Francisco.)

On April 21st, at 7 A. M., this telegram was received:

OAKLAND, CAL., April 20, 1906.

BRIGADIER GENERAL ROBT. WANKOWSKI,
Commanding First Brigade, N. G. C., Los Angeles, Cal.

Get entire Seventh Infantry ready to leave for San Francisco with full supplies. Order Troop D into readiness also. May not need more than eight companies, but get all organizations ready.

J. B. LAUCK, Adjutant General.

OAKLAND, CAL., April 21, 1906.

BRIGADIER GENERAL R. WANKOWSKI,
Care L. A. Trust Co., Los Angeles, Cal.

Have Troop D, Signal Corps, and two battalions Seventh, leave for Oakland at once. You and staff also. Wire me when leave Los Angeles.

J. B. LAUCK, Adjutant General.

A special train was ordered on the following:

OAKLAND, CAL., April 21, 1906.

BRIGADIER GENERAL WANKOWSKI, *Los Angeles, Cal.*

Order special train and leave at once. Transportation settled this end.

J. B. LAUCK, Adjutant General.

And at 8 P. M., April 21st, myself and Staff, Troop D, First Company, Signal Corps, Band, and Companies A, C, D, E, F, H, I, Seventh Infantry, left Los Angeles for Oakland. Colonel Finley, Hospital Corps, and Company L, not having received orders in time, left at 11:30 P. M. April 21st.

The troops arrived at Oakland about 5 P. M. April 22d, and were ordered into camp at Lincoln Park.

Orders were received from the Adjutant General to have Companies B, G, K, and M report for duty, and they arrived at Oakland on April 24th.

First Company, Signal Corps, was ordered to Sacramento, where it remained on duty until May 11th, when it reported at Oakland preparatory to returning to home station.

Brigade Headquarters were established in the Council Chamber, City Hall, Oakland, until May 3d, when they were removed to the camp of the Seventh Infantry.

Field Orders No. 1, A. G. O., April 22, 1906, designated the First Provisional Brigade, commanded by Brigadier General Wankowski, to be composed as follows:

Seventh Infantry, Colonel S. H. Finley, commanding.
 One battalion, Fifth Infantry (Companies C and E), Lieutenant Colonel L. W. Juilliard, Fifth Infantry, commanding.
 One battalion, Second Infantry (Companies A and D), Major Lon Bond, commanding.
 One battalion, Fifth Infantry (Companies A, F, and G), Major E. G. Hunt, commanding.
 Company H, Second Infantry, and Company B, Fifth Infantry, Captain G. L. Holtum, commanding.
 Troop D, First Squadron of Cavalry.
 First Company, Signal Corps.

Field Orders No. 2, A. G. O., April 24th, relieved battalion, Second Infantry (Major Bond), from duty with the First Provisional Brigade to duty with Second Provisional Brigade, San Francisco.

Field Orders No. 5, A. G. O., April 29th, attached Company A, Veteran Reserves, stationed at Berkeley, to this brigade.

Paragraph 1, Field Orders No. 6, A. G. O., May 8th, relieved Company H, Second Infantry, from further duty in the field and ordered it to its home station.

Paragraph 2, Field Orders No. 6, A. G. O., May 8th, ordered First Company, Signal Corps, Sacramento, to report for duty at Oakland.

Paragraphs 3 and 4, Field Orders No. 6, A. G. O., May 8th, detailed First Lieutenant H. B. Van Horn, Second Infantry, and two non-commissioned officers and twelve privates from Companies E and G, Second Infantry, to proceed to Sacramento for duty at State Arsenal.

Paragraph 6, Field Orders No. 6, A. G. O., May 9th, ordered that the Brigade Commander and Staff, First Company, Signal Corps, Seventh Infantry, and Troop D, First Squadron of Cavalry, entrain for their home stations, May 12th, which order was complied with, the troop trains leaving Oakland about 12 o'clock noon on that day, arriving at Los Angeles about 10 A. M. May 13th.

The disposition of the troops of this Brigade was as follows:

First Company, Signal Corps, at Sutter's Fort, Sacramento.
 Headquarters, Band, and Companies B, E, G, H, K, and L, Seventh Infantry,
 Colonel Finley, commanding, at Lincoln Park, Oakland.
 First Battalion, Seventh Infantry (Companies A, C, F, and I), Major Truman Cole, commanding, at Adams Point, Oakland.

Company D, Seventh Infantry (Captain W. E. Stevens), at Alameda; Company M, Seventh Infantry (Captain F. M. Heath), at Second and Broadway, Oakland.

One battalion, Fifth Infantry (Companies C and E), Lieutenant Colonel L. W. Juilliard, commanding, at Santa Rosa.

One battalion, Fifth Infantry (Companies A, F, and G), Major E. G. Hunt, commanding, at City Hall Park, Oakland.

One battalion, Second Infantry (Companies A, C, and D), Major Lon Bond, commanding, at Twentieth street and Telegraph avenue, Oakland. (This battalion was relieved from duty with this brigade on April 24th, and assigned to duty with the Second Provisional Brigade, San Francisco).

One battalion (Company H, Second Infantry, and Company B, Fifth Infantry), Captain G. L. Holtum, commanding, at San José.

Troop D, First Squadron of Cavalry, at City Hall Park, Oakland.

Company A, Veteran Reserves, at Berkeley.

The duty performed by these troops consisted mainly in maintaining order at the different refugee camps, at supply depots, and throughout the towns where they were stationed, and at Oakland, assisting the local police, especially during the night time; escorting supply wagons to and from San Francisco, transferring large sums of money from the United States Mint, San Francisco, to the local banks in Oakland, and escorting civil prisoners, temporarily in confinement at Alcatraz Island, to the several county jails in and around Oakland.

The discipline and general morale of the troops were excellent and no complaint was at any time made to these Headquarters of any men conducting themselves in an unsoldierly manner. When one considers that duty of this nature was entirely new to the men and almost all of the officers, too much praise can not be given the guard.

It is true that the guard duty was faulty, but considering the many calls made on the men for escort and patrol duty, both day and night, to which the men at all times answered most cheerfully, considerable experience was gained by the troops, both officers and men.

The health of the troops was excellent, due to a large extent to the constant supervision and attendance of the medical department.

The subsistence department did not issue the regular ration, but furnished the troops with subsistence bought each day in the open market, based upon the morning reports furnished by these Headquarters to the brigade commissary.

The troops outside of Oakland were subsisted partly from the refugee supply camps and partly from rations purchased in the open market by direction from the Adjutant General's Office.

It was found that many company commanders enlisted men just previous to leaving their home stations, and in most cases these men were without previous military service. Aside from this irregular way of enlisting men, without making application to enlist at least one week previous to being voted in to the company, making all these enlistments practically illegal, so far as the company commanders are concerned, this practice must necessarily be very detrimental to the service, and it is suggested that General Headquarters call the attention of all officers to this most injurious and illegal manner of enlistment.

It is earnestly hoped that the coming Legislature will be urged by the Adjutant General's Office to provide means whereby the pay, subsistence, and other expenses incident to the calling out of the Guard for active service can be provided for in such a manner that the necessary money is available at any time, as it is very discouraging to the officers and men, especially to the latter, to know that while they are

subject to call for duty at any time, there are no adequate means available to pay them.

The Brigade Commander desires to express his gratification for the prompt and eager manner in which the troops reported for duty, the consolidated brigade report showing that more than ninety per cent of the officers and men at a moment's notice left their homes, businesses, etc., and cheerfully answered the call for duty.

Attention is respectfully invited to the attached reports of the commanding officers and also to the fact that the report from Colonel S. H. Finley, commanding Seventh Infantry, and from Lieutenant Colonel L. W. Juilliard, commanding battalion Fifth Infantry, have not been received at these Headquarters, and that this report is forwarded without such reports to save further delay.

Very respectfully,

(Signed) W. G. SCHREIBER,

Assistant Adjutant General,

In temporary absence of Brigade Commander.

EXHIBIT "BB."

REPORT OF COMMANDING GENERAL, SECOND BRIGADE, ON
THE OPERATIONS OF THE STATE TROOPS ON DUTY IN SAN
FRANCISCO DURING PERIOD IMMEDIATELY FOLLOWING
THE EARTHQUAKE AND CONFLAGRATION OF APRIL 18, 1906.

HEADQUARTERS, SECOND BRIGADE, N. G. C.,
SAN FRANCISCO, CAL., November 12, 1906.

The Adjutant General, State of California, Sacramento, California.

SIR: I have the honor to present herewith a report of the operations of the National Guard troops on duty in San Francisco during the period immediately following the earthquake and conflagration of April 18, 1906.

The reports of subordinate commanders transmitted herewith, and copies of such as have already been forwarded to General Headquarters, will furnish much detailed and valuable information relative to the character of the services performed by the individual organizations.

Primarily, it should be stated that at the time of the calamity I was at Ukiah, Cal., with the Adjutant General and others on military business.

Owing to the interruption of the railway service, San Francisco was not reached until about 7:30 o'clock P. M. on that day.

While en route, and nearing San Francisco and realizing the severity of the situation, General Lauck directed me verbally that if, upon my arrival, the National Guard troops were not already on duty, to summon every available man for patrol or such other duty as might be required by the civil authorities.

Several days later (April 20th) the following telegram was received:

SACRAMENTO, CAL., April 18, 1906.

BRIGADIER GENERAL JOHN A. KOSTER, *Commanding Second Brigade,*
218 Rialto Building, or Twenty-second and Illinois Sts., or No. 1318 Masonic Ave.,
San Francisco, California.

If necessary order out troops for patrol duty in San Francisco. Make necessary contracts in name of State. Issue multi-ball ammunition at discretion. Advise me of situation. A, F and G, Fifth, have been ordered to report to Major Hunt for duty in Oakland.

BRADBURY,
Assistant Adjutant General.

Arriving at San Francisco, it was found that the streets were being patrolled by troops and the impression prevailing quite generally, that martial law had been declared. Our efforts were immediately directed, but without success, to locating Mayor Schmitz or General Funston, U. S. Army, with a view of ascertaining the true status, and placing at the disposal of the proper authority the troops in San Francisco.

I then left General Lauck and proceeded to the Armory of the First Battalion Coast Artillery, and Second Company, Signal Corps, that

had already been abandoned by these organizations, and which had temporarily located at Jefferson Square. Here the Headquarters of the Brigade were established and all officers notified of this as promptly as conditions would permit.

The First Infantry had already on the morning of April 18th established itself at Duboce avenue, between Market and Church streets, commonly known as the Market Street Cut.

Information was received from various sources that Troop A, First Squadron of Cavalry, was on duty, but the whereabouts of this organization were not learned until the following day, April 19th.

After locating the First Infantry, First Battalion Coast Artillery, and Second Company, Signal Corps, and notifying the commanding officers thereof of my having assumed command, the matter of organizing the staff and its administrative force received attention.

During this time the troops were engaged in removing military property from the armories (which were afterwards destroyed) to places of safety, rendering assistance and comfort to those who had been driven from their homes by the conflagration, giving medical aid where necessary, moving invalids from threatened hospitals, procuring quartermaster's supplies, clothing, etc., from burning stores (which articles were subsequently distributed to refugees), aiding the fire department, and patrolling the streets.

On the morning of April 19th, General Lauck called at Brigade Headquarters and informed me that the Mayor desired that the National Guard troops be distributed along Van Ness avenue, to be utilized in clearing streets and buildings of people east of the avenue, prior to dynamiting the structures between Van Ness avenue and Polk street. Verbal orders were immediately sent to all commanding officers, directing them to proceed with their commands to designated places on Van Ness avenue, and there await further instructions. I then proceeded with General Lauck to the Mayor's office and again received from him personally the orders given by General Lauck, with the additional information that the necessary dynamite would be provided. Returning to the places designated for the troops, I was intercepted by an official representing the Mayor, who placed at my disposal a wagonload of dynamite (a hose wagon of the San Francisco Fire Department), which was then stationed at the junction of Sutter street and Van Ness avenue. Those in charge of the wagon were directed by this official to take orders from me, and were by me in turn instructed to remain at that point until further orders.

Upon reaching the troops orders were given to make a house-to-house canvass on the streets east of the avenue, and compel all people to vacate and move to the west of the avenue. This having been accomplished in the course of several hours, it was deemed safe to proceed with the dynamiting, which duty was assigned to, and carried out under the supervision of, Lieutenant W. H. Talbot, First Infantry, N. G. C., and a detachment composed of noncommissioned officers and soldiers of the First Infantry, N. G. C., and several petty officers of the United States Navy, who had volunteered for this service.

During the time in which the troops were engaged in clearing the streets, much opposition to the plan of action was interposed by the chiefs of the Police and Fire departments. I strongly urged upon these officials the advisability of presenting their objections to the Mayor, to

enable him to modify or change his orders if such a conclusion should be arrived at. The time for the accomplishment of this was ample, but neither of the officials appeared sufficiently interested in my recommendation.

When ready to proceed with the work of dynamiting, the wagon containing the explosive had been removed from the position assigned to it by me, and could not again be located. It is presumed that, being a portion of the equipment of the Fire Department, the same was withdrawn by direction of the chief of this department, in order to prevent the carrying out of the Mayor's orders. After the lapse of considerable valuable time, during which the conflagration was rapidly approaching the avenue, a quantity of dynamite was obtained from a quarry in the Mission district and the work proceeded with. But few buildings were leveled by this method, owing to the rapid headway of the fire. Whether or not a greater saving of property would have resulted had the work been permitted to go on without delays encountered, I am not prepared to say, as this demonstration was insufficient to enable me to form an intelligent opinion of the effectiveness of this method of checking a fire.

The conflagration crossed the avenue in several places, but was quickly extinguished through the heroic efforts of the soldiers and citizens who volunteered assistance. At one point the fire reached Franklin street, one block west of the avenue, but was fortunately prevented from spreading, due to the good work of the soldiers and citizens. Late during the afternoon a west wind came up, driving the flames eastward, thus lessening the danger of the westerly spread of the fire. By 2 o'clock A. M., April 20th, all danger in this vicinity was passed.

Until the assignment to the National Guard of a certain special district in this city, the troops were continued on patrol duty along Van Ness avenue and the streets to the west and adjacent thereto, with instructions to preserve order, prevent looting, and render assistance where necessary.

The foregoing is intended to briefly indicate the character of the operations during April 18th and 19th, and prior to the time of perfecting the organization of the Brigade.

ORGANIZATION.

April 20th was principally occupied in perfecting the organization of the brigade and systematizing the work in hand. The brigade, then consisting of the three organizations previously mentioned, was shortly thereafter augmented by the arrival of the following:

Companies D, H, and I, Fifth Infantry.
Headquarters, Hospital Detachment, and eight companies (except Company H, ordered to San José), Second Infantry.
Headquarters, Hospital Detachment, and nine companies, Sixth Infantry.
Headquarters, Troops A, B, and C, First Squadron of Cavalry.
Headquarters, First, Second, Third, Fourth, Sixth, and Engineer Divisions, N. M. C.
California Grays (an independent military organization that volunteered its service).

Pursuant to Field Orders No. 1, A. G. O., dated April 23, 1906, the foregoing organizations were assigned to the Second Provisional Brigade, which was discontinued in accordance with Paragraph I, Field Orders No. 7, A. G. O., dated May 11, 1906.

THE STAFF.

The following officers comprised the Staff as originally organized:

Lieutenant Colonel Fred J. H. Rickon, Assistant Adjutant General.
 Captain James A. Margo, Fifth Infantry, Acting Assistant Adjutant General.
 Lieutenant Colonel Adolph Huber (retired), Acting Brigade Commissary.
 Major John H. Dockweiler (retired), Acting Assistant Brigade Commissary.
 Captain P. L. Bush (retired), Acting Assistant Brigade Commissary.
 Major Emmet R. Jones, Brigade Quartermaster.
 Major Wm. P. Humphreys, Judge-Advocate.
 Major W. J. Hanna, Surgeon, Second Infantry, Acting Brigade Surgeon.
 Captain George M. Scott, Second Company, Signal Corps, Acting Brigade Signal Officer.
 First Lieutenant S. W. Morehead, Fifth Infantry, Aid-de-Camp.
 Second Lieutenant H. D. Walter, First Infantry, Aid-de-Camp

The list was modified and changed in orders, by relieving those whose services could be dispensed with, re-assignments, and the addition of the following-named officers:

Colonel J. F. Hayes (retired), Acting Brigade Inspector.
 Lieutenant Colonel C. L. Hewes (retired), Acting Assistant Adjutant General.
 Lieutenant Colonel M. M. Ogden (retired), Acting Brigade Inspector.
 Lieutenant Colonel Theo. Rethers, Chief Surgeon.
 First Lieutenant C. W. Jones Second Company, Signal Corps, Assistant to Brigade Quartermaster.
 First Lieutenant J. J. Hyer, First Battalion Coast Artillery, Assistant to Brigade Quartermaster.
 Second Lieutenant A. B. Daly, Second Infantry, Assistant to Brigade Quartermaster.
 Second Lieutenant W. H. Reed, Fifth Infantry, Assistant to Assistant Adjutant General.
 First Lieutenant H. Huber (retired), Assistant to Brigade Commissary.
 First Lieutenant E. Kehrlein (retired), Assistant to Brigade Commissary.

DISTRICTING THE CITY.

At a conference on the morning of April 21st, at Fort Mason, with the Governor of the State, the Mayor, General Funston, and the Chief of Police, it was decided to district the city, assigning certain territory respectively to the Regular Army, National Guard, and Police.

The territory thus assigned to the National Guard and the subdivision of same is fully described in General Orders No. 2, Headquarters, Second Provisional Brigade, dated April 21st, which is made a part hereof and designated Exhibit "A." Such modifications made therein will be indicated in the orders herewith submitted and designated Exhibit "B." This district was left in charge of the National Guard organizations until the entire redistricting on May 8, 1906, in conformity with General Orders No. 25, Headquarters, Pacific Division, dated San Francisco, Cal., May 8, 1906, and pursuant to General Orders No. 13, Headquarters, Second Provisional Brigade, N. G. C., dated San Francisco, May 8, 1906, which orders are made a part of this report and marked Exhibit "C." Attention is respectfully invited to the large area thus placed under the control of the National Guard, being occupied by them until the commencement of the homeward movement of the different organizations on May 15th.

GENERAL DIRECTIONS TO TROOPS.

The movement of the troops as required in General Orders No. 2 having been completed by retreat on April 22, 1906, the commanding

officers were assembled at Brigade Headquarters on that evening and verbally instructed practically as follows:

The responsibility for the maintenance of good order in the district assigned to the National Guard rests with the troops. Owing to the peculiarity of the situation, it is imperative that officers of all grades, as well as the enlisted men, assume and maintain a courteous but firm attitude, and deport themselves at all times in a manner that will reflect creditably on the organization as a whole.

All streets will be properly patrolled, suspicious characters will be arrested and brought before the subdistrict commander, who will, if in his judgment the cases warrant, turn them over to the police authorities.

Lights of any kind in residences or buildings and the use of stoves of any description will not be permitted until further orders.

Fires will only be permitted on the streets or roads between the hours of 7:00 A. M. and 6:00 P. M., and must at all times be kept under control.

Sanitary measures will be strictly enforced, particularly regarding the use of latrines and disposition of all garbage. Citizens will be required to police in the vicinity of their homes or temporary quarters, and daily inspections by medical officers of the subdistricts will be made and reports rendered to this office.

The sale or disposition of liquors in any manner is forbidden.

The comfort of the public will at all times receive careful consideration and every assistance rendered to alleviate suffering and relieve distress.

Such features not covered by these instructions will, if considered of sufficient importance, be immediately reported to these Headquarters.

In addition to the published orders bearing upon this subject, and which are made a part of this report and designated Exhibit "D," all district commanders were required to report daily at Brigade Headquarters for verbal instructions. This plan of issuing orders was necessary by reason of the great number of directions issued and requests made (many of which were conflicting) by the heads of the different departments of the municipal government to all of which it was felt that due importance should attach.

ADMINISTRATION.

The staff and administrative departments are universally commended.

The Acting Brigade Inspector, Colonel J. F. Hayes (retired), instituted a daily system of inspection of the entire territory controlled by the National Guard, covering matters especially pertaining to sanitation. Under careful and constant supervision the thorough policing of the refugee camps and public streets was accomplished and hygienic conditions improved.

Latterly this officer was relieved from duty and superseded by Captain James A. Margo, Fifth Infantry.

The Board of Health of the City and County of San Francisco having assumed the responsibility of the sanitation of all but the military camps, this officer directed his attention to the correcting of the oftentimes faulty conduct of patrols and sentinels, owing to inexperience and to the fact that this duty was becoming more irksome as the general excitement subsided.

The *Quartermaster's Department*, under Major Emmet R. Jones, Quartermaster, Second Brigade. Considering the limitations as to lack of properly trained assistants, as well as equipment that beset this department, the service rendered was most satisfactory. Authorized purchases, including articles of clothing, building material for housing troops, tent floors, camp kitchens, latrines, bath houses, etc., fuel and forage were supplied promptly on requisition and at reasonable cost. The important matter of providing suitable transportation, although

obtained at all times under the greatest difficulties. was carefully looked after, preventing much friction and needless delay in the movement of troops, which at times was very extensive.

Commissary Department. This department was most efficiently conducted under the supervision of Lieutenant-Colonel Adolph Huber (retired), Acting Chief Commissary and late Division Commissary, N. G. C. During the first days after the calamity, it was found necessary to obtain supplies from stores abandoned on account of the approaching fire. All business having been temporarily suspended, it was impossible to purchase. In addition to subsisting the troops, it was found necessary to provide for a large number of refugees. Upon resumption of trade, contracts were made with leading concerns for such articles as constitute the United States Army ration and regular issues made in accordance with Army Regulations.

The *Medical Department* was not organized as a brigade institution, it being thought advisable and more effective to allow each regimental or subdistrict command to conduct a regimental or district hospital. For the care of the more serious cases that were brought to the attention of the Brigade Surgeon, it was arranged to have these transferred to the general hospital under the supervision of the Regular Army and maintained in Golden Gate Park.

The health of the entire command was excellent throughout, although the sick reports of the various hospitals indicate a large number of cases having been treated, which was due to medical aid given to refugees and the public generally.

Medical officers were required to make a daily inspection of the camps under their control, as well as all streets, public latrines, and garbage pits in their respective districts, and render a report thereon to these Headquarters.

Judge-Advocate's Department. Major Wm. P. Humphreys, Judge Advocate, Second Brigade, directed his attention to the careful investigation of all reported cases of alleged looting by National Guardsmen, as well as the shooting of two citizens by enlisted men of Troop A, First Squadron of Cavalry, and Company C, First Infantry.

Careful investigation of the cases of reported looting developed the fact that these could not, except in one instance, be traced as having been committed by National Guardsmen.

The report of the Judge Advocate, embodying all the cases brought to his notice and investigated by him, has some time ago been forwarded to General Headquarters, and from which more detailed information can be obtained.

It is much deplored by all that it should have become necessary for National Guardsmen to shoot any one. While it is believed that with the use of their weapons in another manner the soldiers implicated might have effected the desired results, it nevertheless remains that the conditions justified the taking of drastic measures. Since that time one of these men has been acquitted by a civil court, and it is generally understood that the other case will be accorded the same treatment.

Signal Corps. The Second Company, Signal Corps, under Captain G. M. Scott, Acting Brigade Signal Officer, deserves the highest com-

mentation for the efficient service rendered. The laying and operating of the military telegraph lines, which connected Brigade Headquarters with the Headquarters Pacific Division, and the different headquarters of the commanders of the subdistricts, was at all times accomplished under great difficulties. Much ingenuity was displayed by individual members in laying these lines by dropping them into the temporarily abandoned cable slots instead of attempting the erection of the overhead system. This method was not only very expeditious, but economical as well.

THE RELIEVING OF TROOPS.

The recall of troops was commenced on May 15th and completed by retreat of May 31, 1906.

Each organization located in San Francisco was required to maintain a guard for a period of fifteen days after May 31st, for the protection of armories and military stores.

RECOMMENDATIONS.

To properly carry on the administration of the brigade when on active duty, it is highly essential that some provision be made for the employment of necessary civilian clerks and employes for the various staff departments.

It is impracticable to fill these positions by detailing men from the line. Primarily much delay would result from this method, and it is doubtful if suitable material could always be obtained in that manner. On the other hand, the organization of the noncommissioned staff similar to the one existing in the regular establishment should receive attention.

The question of clothing troops when on active duty is one that should receive careful consideration. During the recent activity it was noticed that certain organizations, after being on duty for a period of forty-eight hours or less, were in need of shoes as well as other articles of clothing. Upon investigation of this condition it was found that the men had been instructed to wear their oldest shoes and clothing, which seems reasonable. They should not be expected to sacrifice their best without an opportunity to have same replaced when called into active service.

It is believed that this could be overcome by providing for a clothing allowance to cover a certain period, the equivalent cost of which, if not drawn by the soldier, to be paid to him on the completion of his duty.

Attention is also respectfully invited to the fact that the law prescribes that the Attorney-General should appear for soldiers subjected to civil trial for the committing of any act while on active duty, where such soldiers may be brought before a civil court for trial. Reference is especially made to the cases of shooting of civilians by certain enlisted men and who were brought before a civil court for trial, where, owing to the lack of interest, or perhaps faulty construction of the law, the Attorney-General refused to appear and necessitating the engaging of special counsel by these soldiers, although the Brigade Judge-Advocate was retained on active duty to assist in the defense.

It is believed that if the law were changed to provide for the handling of such cases by the Judge Advocates of the respective brigades that better results would be obtained.

In concluding my report I desire to express warm appreciation for the exemplary deportment, uncomplaining and self-sacrificing devotion to duty, and the zeal that characterized the various organizations on duty during this very trying period. Never in the history of this country have National Guardsmen faced a more serious and complicated situation, and notwithstanding the unjust and unwarranted criticisms of the local press and others, I feel that the troops performed their duty thoroughly and well.

I desire to refer particularly to the valuable service rendered by the California Grays, that was offered without hope of reward. Their manly conduct, splendid discipline, and the very intelligent performance of the duties assigned them, won for the members of this organization the respect and admiration of all.

Reports are herewith transmitted from the Second Infantry, Second Company, Signal Corps, First Squadron of Cavalry, and Naval Militia of California.

Very respectfully,
(Signed) JOHN A. KOSTER,
Brigadier-General.

EXHIBIT "CC."

REPORT OF MAJOR THOMAS WILHELM, U. S. A. (ON DUTY WITH THE NATIONAL GUARD OF CALIFORNIA), AS TO HIS OBSERVATIONS AND IMPRESSIONS RELATIVE TO THE GREAT CATASTROPHE OF APRIL 18, 1906.

OAKLAND, CAL., April 29, 1906.

To the Adjutant General, State of California, Sacramento, California.

SIR: Having been instructed to make a statement as to my observations of the appalling calamity which has befallen San Francisco and some of its surroundings, the following is a very meager report of my impressions of the first few days. Of course, the end is not yet. Among other serious conditions the question of food for this mass of people is of great moment.

Three hundred thousand people rendered homeless by the terrible earthquake and subsequent fire which devastated about four square miles of territory (taking in nearly six hundred blocks) in San Francisco is the history in brief of a day, April 18, 1906. Buildings collapsed and flames broke out in many places, the broken gas mains contributing to this added terror. One of the most appalling consequences of the shock was the destruction of the Valencia-Street Hotel, a large three-story frame structure which was on made ground and on the line of the old Willow Creek. This building sank below the street level to a depth of two stories, and the third story was pitched into the street. Many inmates were buried in the ruins. A great water main burst in front of the ruined building and the water flooded the buried stories. Mission street for three fourths of a mile was shifted in places five or six feet from its former straight line. Steel rails of the street railways were snapped and curved up in the air; many of the thoroughfares of the city are covered with brick and steel beams thrown there by the earthquake so as to overlap in the middle of the roadway. By this it will be seen that had the shock taken place during the business hours or early in the evening thousands upon thousands would have been killed in fleeing from the sidewalks.

Two thirds of the great buildings have been converted into heaps of charred timbers and streamers of bent and twisted steel. Miles of dwellings through the districts south of Market street, the Western Addition, and Russian, Telegraph, and Nob Hills, have been swept away. The waste of ruin stretches from many blocks south of Channel street, where are situated all the great lumber yards, north to Fort Mason, several miles distant. In short, the desolated area includes, generally speaking, one half of the Mission, all of the manufacturing and business districts, the North Beach sections, Telegraph, Russian, and Nob Hills, Rincon Hill, and the water front. Two wide thoroughfares, Dolores street and Van Ness avenue, gave the fire-fighters a

chance to dynamite a swath behind the flames. It was at these points that the raging flames were arrested, and a part of the city saved from destruction. To the width of these two streets San Francisco owes the absence of complete annihilation. This does not detract in any way from the gallant and untiring efforts of the Federal troops, the National Guard, and both the Fire and Police Departments. At the Union Iron Works several vessels are lying on their beam ends, half in and half out of water; collapsed and sunken docks covered with ruins stretch inland. The large passenger steamers "City of Puebla" and "Columbia" are damaged at their docks at the iron works. The historic Palace Hotel, the largest in the world when built in the early seventies, was ignited from the south side by the fire that swept up Mission and lesser streets. The walls still stand as a monument to the builders of the first earthquake-proof building erected in San Francisco after the shake of 1868.

The breaking of the water mains by the earthquake left the city defenseless against the fire, and buildings like the Emporium, of which class there was none finer in the United States, was dynamited to prevent the spread of the fire; but all was futile in that part of the city until broad Van Ness avenue was reached, and a fortunate temporary change in the direction of the wind drove the flames back over the already desolated district. Van Ness avenue was really the key to the situation, and it was the heroic stand made by the firemen and the military at the widest thoroughfare of San Francisco that really saved the western part of the city. The blasting operations have left their terrible marks on the mansions of the rich on the west side of the avenue; not a pane of glass is left; the footpaths have been torn up, and staircases and railings have been demolished and twisted out of shape. Words are inadequate to even faintly describe the awfulness of the fire (the roaring of which was all too plainly heard fifteen blocks, or more than a mile, away) following the terrifying earthquake which caused it. The finish of the fire was at a grain warehouse and United States bonded warehouse in the block bounded by Sansome and Battery streets, Telegraph Hill, and the bay. There the fire that swept to the north and west of Telegraph Hill met the stout walls of the grain warehouses and its progress was stopped. That part of the fire which passed to the south and east of the hill spread down to a junction with the burned district at Market street and was practically out before the other had finished with the big sugar refinery next to the bonded warehouse. When the progress of the fire toward the Western Addition was stopped it directed its fury toward the water front and North Beach. It cleaned all the territory east to Van Ness avenue as far as Union street, where it was stopped in the middle of the block beyond by a wide stretch of lawn filled with trees and shrubbery. After taking out the northeast of that block, the fire swept across the city diagonally, over hills and valleys, destroying the pretty residence district along Union, Filbert, Greenwich, and Lombard streets to Chestnut. On Chestnut street, between Hyde and Leavenworth, broad lawns, with houses far back from the street, saved that portion of the water front. From there the flames had an uninterrupted sweep down the hill to Fishermen's wharf, which it missed by half a block, having found better material in the shape of the gas plant at the foot of

Powell street. This it licked up rapidly, and growing on what it fed, started for the warehouse district lying along the water front at the foot of Telegraph Hill. This district it wiped out to the grain warehouses—long, one-story brick buildings, with metal roofs and doors which successfully resisted the fire.

While this flank of the fire was doing its work the other had passed over toward Russian Hill and did its work as thoroughly, destroying everything in its path. It swept everything from the foot of the hill, but failed to reach the few houses on the summit. It was on Telegraph Hill that one of the most picturesque and stubborn fights of all the three days was made. Perched up there on the eaves of the city the residents of that historic landmark made an almost superhuman fight for the preservation of their little homes, and they won out. When the water was exhausted they had recourse to red wine. The hill was first attacked by that wing of the fire which passed around the north and west sides. There was not the slightest chance for assistance; there had never been any hope of getting a fire engine to the top of the hill, even in less strenuous times, and there was no hope for water pressure, what little there was being used in the valleys below. Neither was there any hope of reinforcements, for every man was engaged. On the top of the hill is a well, and a pump and bucket brigade was organized. Surrounded by billows of fire, the little band of firefighters were slowly driven to the very top, but were not ready to quit. They were of all nationalities, but they were all San Franciscans, and they fought on. At one of the most critical moments the pump suddenly sucked dry and the water in the well was exhausted. Then the Italian residents crashed in the doors of their cellars, and calling for assistance began rolling out barrels of red wine. Sacks were dipped in the wine and used for beating out the fire. Beds were stripped of their blankets, and these were soaked in wine and hung over the exposed parts of the cottages. The men on the roofs used their wine-soaked sacks and blankets to good effect, and saved their homes.

The fire failed to reach the wharves and piers along the bay shore. From Meiggs's wharf on the north to Steuart street on the southeast the broad thoroughfare of East street interposed a barrier which the flames could not cross. Only once was any portion of the wharves in danger of fire, and that was at the old dock of the Pacific Mail Company; but the revenue cutter "Golden Gate" was convenient and soon had out lines of hose which saved the dock. The piers generally are all in ruins, the old long sheds having fallen to pieces. The Harbor Commissioners, at a rough estimate, approximate the damage to State property, including East street, over which they have jurisdiction, at \$1,000,000.

Surrounded by a sea of indescribable devastation the United States Mint stands above the leveled landmarks of pioneer days. Nearly \$200,000,000 in coin and bullion are stored in vaults, and for the preservation of this treasure a devoted band of employés, reinforced by the military, fought for the safety of the edifice. For seven hours a sea of fire surged around this grand old Federal building, attacking it on all sides with waves of fierce heat. The United States Mint was constructed in 1874 of granite and sandstone blocks, well calculated to withstand fire from without. Iron shutters shield the lower floors,

but the windows of the upper story, on which is located the refinery and assay office, were exposed. Fortunately the Mint is provided with an artesian well and independent pumping power plant, and water was pumped by the engineer to the fire-fighters assembled on the roof. Of these, forty were Mint employés, and they were aided by a company of Coast Artillery. As the fire swept up Fifth street, the heat increased to a dangerous degree as one by one the Metropolitan Temple and historic Lincoln School burst into flames, reinforced by the roaring furnace of the Emporium. Fanned by a northerly wind the flimsy old structures in the rear were licked up by sheets of flame two hundred feet high. Then came a lull; the brick walls of buildings across the street had fallen, and at length the Mint was declared out of danger.

The Mint is one of the few massive structures in the heart of the city which has survived, but little impaired, the earthquake and subsequent conflagration. The value of an independent water supply on the premises was also exemplified in the case of the Palace Hotel. For hours that structure was defended in a similar manner by an inferior plant supplied with water drawn from tanks on the roof and pumped from wells in the basement. It seemed possible that the big hotel might finally be saved, for the fire in the buildings in the rear had practically expended itself, when the water supply gave out and the building on the west side was ignited by the flames at the corner of Third and Market streets, and so threatened from a new quarter the Palace was doomed to share in the catastrophe. The Subtreasury building on Commercial street was destroyed by the fire, but the vaults are safe.

The number of dead in San Francisco is yet unknown, although all possible means have been used to reach an accurate estimate of the lives lost. The most searching investigation by the Coroner and military authorities has disclosed but two hundred and ninety-seven deaths from unnatural causes from April 18th to April 29th, inclusive. There were doubtless numbers of bodies consumed, but it is unlikely that the total mortality list, if obtainable, would reach five hundred, of which but a small number lost their lives by the earthquake alone. At five o'clock in the morning there were but few persons on the streets to be struck by falling débris. Some were killed by chimneys or brickwork falling outward on to adjoining buildings, and there was some loss of life in the poorly constructed frame buildings which collapsed. The greatest casualties resulted from walls falling as the result of the fire before the military cordons were established to keep people out of danger.

With the exception of Santa Rosa and San José, the damage done by the temblor was comparatively slight, chimneys and tank-houses showing the worst effects, although in a number of instances frame buildings were moved from six inches to six or eight feet on their foundations. The small towns on the verge of the bay, such as Alvarado and Mount Eden, where are located sugar mills and salt works, suffered severely. In Oakland hardly a chimney was left standing in the immense area occupied by that city. At Santa Rosa the dead, so far as known at present, are reported to be fifty-two; many are injured and a number missing. Seventeen were killed by the fall of the St. Rose Hotel. The appalling immensity of San Francisco's catastrophe obscured Santa Rosa's sorrow for a time from the world's

attention. Though less in extent, it was greater in degree than that of the metropolis. The loss of life was proportionately greater, and the business part of the town was annihilated. Santa Rosa differed from most towns of a similar size in being more compactly built. All its business houses were closely grouped about the center, where stood the County Court House, so when this group of business blocks was tumbled into blazing ruins there were no suburban stores to supply the pressing needs of the moment. The breaking off of all communication left the State in ignorance of Santa Rosa's destruction, and, beyond mere surmises, the city's first intimation of San Francisco's terrible calamity was the arrival of a trainload of nearly a thousand refugees, wounded, sick, half-clad, seeking shelter and begging help where help was needed.

San José was not so badly dealt with by the earthquake as at first reported. Only a few buildings will have to be entirely rebuilt and only two were destroyed by fire. A great many buildings were damaged by the shock, but can easily be repaired. Plate glass in the fronts of many of the business houses was shattered, and brick chimneys in the residence portions of the city have suffered quite generally, but repairs are progressing rapidly, and in a short time the city will resume its normal appearance. The number killed is nineteen. The State Hospital at Agnew, near San José, collapsed and ninety-six patients were killed, making the total number of deaths in Santa Clara County one hundred and fifteen.

There are no words to express the praise due those who have stood in the breach of the great disaster armed with absolute authority—authority created by wise forethought for just such circumstances as those in which the people find themselves to-day.

Governor Pardee, Mayor Schmitz of San Francisco, and Mayor Mott of Oakland are entitled to all the commendation that the citizens of California can bestow upon them. They have been prompt to act, and wise in their action; they have inspired confidence and averted panic where panic seemed an inevitable consequence of a catastrophe of unutterable horror, uncontrollable terror, and the realization that human endeavor is inadequate to cope with the resistless force of the two most potent elements in nature—the earthquake and a great fire with a water supply so crippled that no hope of staying the progress of the flames by this means could be entertained.

The Governor was immediately on the scene with every appliance of the authority vested in his office. He has been untiring, sleepless in his vigilance, and unceasing in his effort to bring chaos to an end. Making his headquarters at Mayor Mott's office in the Oakland City Hall, he worked without cessation during the first days of the stricken people's immediate need. Offers of help literally poured in from all places, and the work of replying, of advising, and of giving orders was no light task.

Brigadier General J. B. Lauck, the Adjutant General of the State, who has been in charge of the State troops, has been on continual duty ever since the disaster, and together with the Assistant Inspector General on the Staff of the Governor, and detailed by the War Department for duty with the National Guard of the State, for days and nights worked unceasingly. The State troops were all ordered for duty in guarding San Francisco, Oakland, Santa Rosa, San José, and

other places from the depredations of looters and crooks, and for the protection of the careless from dangerous buildings; and the vast amount of work entailed by this is past description, for unlike time of war, when weeks or more may be spent in preparation or in civil emergencies that may be more or less expected, it was a matter of but a few hours to bring the State troops to the scenes of disaster. All the available canvas, blankets, and other comforts of this nature were distributed by General Lauck from the State arsenal and regimental armories to the sufferers. Too much praise can not be given this officer for his never-ceasing vigilance in using the National Guard and available material for the care and comfort of the stricken.

Oakland, the headquarters of Governor Pardee, has received and cared for more than one hundred thousand refugees; every city, town, and village has its quota of the homeless, varying in number from one hundred to several thousand. Supplies of all kinds reached San Francisco in an incredibly short time. In this the little town of Haywards should have the credit of the first load of supplies landed in San Francisco for the sufferers. It seemed but a few hours after the shock before relief trains were flying to the rescue from as far as Victoria in the north to the southern boundary of the State, and from hundreds of points in the East. More than seven hundred carloads have arrived; river boats and ocean steamers have brought generous cargoes. More are following laden with food, raiment, and housing. The heart of the world has been touched. Offers of assistance have followed in quick succession from all parts of the globe, from warm-hearted Ireland to the great southern continent, Australia; from Japan to South Africa. It is as it should be, for San Francisco is a most cosmopolitan city, sheltering all nationalities—yet the proof of the generous sympathy extended to our suffering metropolis is touching and most gratifying to all Californians.

The great railway companies have shared well in the work of relief by moving without charge the hundreds of thousands of the distressed to points both in and out of the State.

The press of Oakland and the city have done most noble and kindly service in publishing, without expense, all notices of inquiries for relatives or friends that could not be located. So also have the Chambers of Commerce of both great cities, thus relieving the terrible anxiety of thousands.

In times of peace the National Guardsman makes his living in civil pursuits, and his enlistment is purely from patriotic feeling and civic pride. It is a natural sequence that where a man's home is, property placed in his charge will be most carefully guarded. In many words of praise of the National Guard the San Francisco "Call" of April 27th says in an editorial:

The work done and still being done by the militia, the National Guard of California, will be long and gratefully remembered by the people of San Francisco and the State. The Minute Men and the Old Continentals were the National Guard of their day.

They were the militia that fought through the Revolution. Our present National Guard is descended in direct official line from those citizen soldiers that stood, yielding not, at Saratoga, Ticonderoga, and Stony Point, Bennington and Yorktown, and have proved themselves worthy of their ancestors.

In the war for the Union the army that defended it, the million men that rallied to the standard, were citizen soldiers. The backbone of the Union army was the militia. They went to war, trained in military formation and tactics and discipline in the militia organizations of the different States, and those who survived and

marched before their commanders in the last review were the best seasoned veterans that ever bore arms.

In the National Guard is an *esprit de corps* as high as that in any regular army. The Guards enlist from patriotic motives only. They give the time and strength necessary to the maintenance of organization, and when ordered to duty they obey at any personal sacrifice. In the emergency that fell upon San Francisco the National Guard was immediately indispensable.

It was a situation quite beyond the police. The regulars within instant reach were few. The warships were at a distance with their bluejackets. But Governor Pardee and Adjutant General Lauck at once threw the National Guard into the streets of the city, and there, facing all the risk of a battle, and more, doing all duty and more, for they manned engines and fought fire, the militia preserved order, restrained the prowling and dishonest, succored and protected the fire refugees and held the situation in hand until the augmentation of the regular forces.

The National Guards were at once soldiers, firemen, doctors, nurses and purveyors of food to the hungry. Attempts have been made to discredit them and their service, but Governor Pardee found groundless the accusations against them.

The Constitution of the United States provides for the militia and calls it "the safeguard of a free state." So it is. We have in the Union ten millions of men of military age and potential members of the National Guard. They are the same kind of men that composed it in the Revolution and Civil War.

These members of the California National Guard, who have blistered, and breathed ashes, standing guard over San Francisco, who have kept watch and ward in the night lit only by the burning city, and have chased marauding wretches in the furtive shadows of toppling walls, are our fellow citizens, with the same stake in the State that we have, and they sacrifice themselves to protect others.

Calamities like that in San Francisco call for instant and organized authority. The ordinary machinery of government is not adjusted to such an emergency. That to which it was fitted has disappeared. Its mechanism will not fit the new conditions. The National Guard, however, is trained not to administer civil government when matters are placid and normal.

Its discipline is to fit it for dealing with the abnormal, with emergency and sudden change, to walk into chaos and make it order. The militia is the dependence of the whole country in time of disjointed government and affairs. The country must have such a dependence. If it be not the militia, the country must maintain an immense standing army, at an enormous cost, for the necessity exists for organization in emergency, and if it be not supplied by the National Guard it must be by an increase in the regular army far beyond any that has ever been contemplated.

Indeed, to have at hand, ready, equipped and disciplined, the force that must be kept available for emergencies that may end in anarchy, if it be a standing army, would exceed in cost the resources of the country, great as they are. People should stop and think soberly of what the militia means to the country.

Suppose that there had been nothing in San Francisco to represent order, no force capable of compelling obedience, it is easy to see that anarchy would have been added to conflagration. The National Guard supplied its share of the order-compelling force, and the whole State will applaud Governor Pardee and his adjutant general for standing by the National Guard.

They gave the starving of their rations, they shared the water from their canteens, their field ovens baked thousands of loaves of bread daily for the hungry, and they have rendered most invaluable assistance to the city and State. All careful observers, apart from the prejudiced, speak and write in the highest praise of the great work done by all the military. The regular army, from its proximity, was prompt in its assistance and noble in its work. Too much praise can not be given the permanent military establishment for its loyalty and good service so well exemplified in the time of great peril.

Respectfully,

(Signed) THOS. WILHELM, U. S. A.

EXHIBIT "DD."

FIELD ORDERS—APRIL, MAY, AND JUNE, 1906.

FIELD ORDERS.

No. 1.

STATE OF CALIFORNIA, ADJUTANT GENERAL'S OFFICE,
OAKLAND, CAL., April 23, 1906.

I. The troops of the National Guard of California are temporarily assigned as follows, until further orders:

First Provisional Brigade.

Brigadier General Robert Wankowski, commanding.

Seventh Infantry, Colonel S. H. Finley, commanding.

One battalion Fifth Infantry (Companies C and E), Lieutenant Colonel

L. W. Juilliard, Fifth Infantry, commanding.

One battalion Second Infantry (Companies A, C. and D), Major Lon

Bond, commanding.

One battalion Fifth Infantry (Companies A, F, and G), Major E. G.

Hunt, commanding.

Company H, Second Infantry, and Company B, Fifth Infantry, Captain

G. L. Holtum, commanding.

Troop D, First Squadron Cavalry.

First Company, Signal Corps.

Second Provisional Brigade.

Brigadier General John A. Koster, commanding.

First Infantry.

Companies B, E, F, G, and I, Second Infantry.

Companies D, H, and I, Fifth Infantry.

Sixth Infantry.

First Battalion Coast Artillery.

Troops A, B, and C, First Squadron Cavalry.

Second Company Signal Corps.

Naval Militia of California, excepting Fifth Division.

II. The Commanding General, Second Provisional Brigade, having reported to Brigadier General Frederick Funston, U. S. A., commanding Pacific Division, San Francisco, Cal., will dispose his troops as may be directed by the latter.

III. Consolidated parade or morning reports will be forwarded to this office daily.

By order of the Commander-in-Chief.

J. B. LAUCK, Adjutant General.

Official:

A. W. BRADBURY, Assistant Adjutant General.

FIELD ORDERS.

No. 2.

STATE OF CALIFORNIA, ADJUTANT GENERAL'S OFFICE,
OAKLAND, April 24, 1906.

The battalion of the Second Infantry, composed of Companies A, C, and D, on duty in the City of Oakland, is relieved from further duty with the First Provisional Brigade, and will be reported by the battalion commander to the Commanding General, Second Provisional Brigade, for duty. This movement will be made with as little delay as possible. The commanding officers concerned will report the execution of this order to this office.

By order of the Commander-in-Chief.

J. B. LAUCK, Adjutant General.

Official:

A. W. BRADBURY, Assistant Adjutant General.

FIELD ORDERS.

No. 3.

STATE OF CALIFORNIA, ADJUTANT GENERAL'S OFFICE,
OAKLAND, April 28, 1906.

I. Major J. W. A. Off, Quartermaster, First Brigade, is detailed as Assistant to the Quartermaster General, and will report immediately to the Quartermaster General for duty. (Approved April 26, 1906.)

II. At his own request, First Lieutenant R. J. Faneuf, Company G, Fifth Infantry, is relieved from field duty with his company for one month from date.

By order of the Commander-in-Chief.

J. B. LAUCK, Adjutant General.

Official:

A. W. BRADBURY, Assistant Adjutant General.

FIELD ORDERS.

No. 4.

STATE OF CALIFORNIA, ADJUTANT GENERAL'S OFFICE,
OAKLAND, April 29, 1906.

The Fifth Infantry Band, N. G. C., is relieved from duty in the City of San Francisco and will report for duty to Major E. G. Hunt, commanding Third Battalion, Fifth Infantry, City Hall Park, Oakland, without delay.

The Commanding Generals, Second and First Provisional Brigades, will promptly notify this office of time of departure and arrival of said Band.

By order of the Commander-in-Chief.

J. B. LAUCK, Adjutant General.

Official:

A. W. BRADBURY, Assistant Adjutant General.

FIELD ORDERS,

No. 5.

STATE OF CALIFORNIA, ADJUTANT GENERAL'S OFFICE,
OAKLAND, April 29, 1906.

The Commanding Officer, Company A, Veteran Reserves, will assemble his company at its armory in this city on April 30, 1906, for duty.

This organization will be attached to the First Provisional Brigade, and its commanding officer will report to the Commanding General, First Provisional Brigade, at such an hour as will permit of its assignment to duty in the town of Berkeley, California, not later than 9 o'clock A. M. on April 30, 1906.

By order of the Commander-in-Chief.

J. B. LAUCK, Adjutant General.

Official:

A. W. BRADBURY, Assistant Adjutant General.

FIELD ORDERS,

No. 6.

STATE OF CALIFORNIA, ADJUTANT GENERAL'S OFFICE,
OAKLAND, May 9, 1906.

I. Company H, Second Infantry, will be relieved from further duty in the field and will return without delay to its home station and dismissed, its services being no longer required.

The Commanding General, First Provisional Brigade, is charged with the execution of this movement.

(Approved May 8, 1906.)

II. The First Company, Signal Corps, is directed to proceed from Sacramento, Cal., to Oakland, Cal., upon the arrival at Sacramento of the detachment of the Second Infantry ordered there to guard the State Arsenal.

The Commanding General, First Provisional Brigade, is charged with the execution of this movement.

(Approved May 8, 1906.)

III. The Commanding Officer, Second Infantry, will detail two noncommissioned officers and twelve privates from Companies E and G, Second Infantry, who will proceed to Sacramento, Cal., without delay, for the purpose of guarding the State Arsenal.

The Commanding General, Second Provisional Brigade, is charged with the completion of this movement.

(Approved May 8, 1906.)

IV. First Lieutenant H. B. Van Horn, Battalion Adjutant, Second Infantry, will proceed to Sacramento, Cal., in command of the detachment of the Second Infantry referred to in Paragraph III, of this order. He will make such disposition as may be necessary for the proper protection of the State Arsenal.

The travel enjoined is necessary for the public service.

(Approved May 8, 1906.)

V. Lieutenant Colonel L. W. Juilliard, commanding Fifth Infantry, will report to the Commanding General, Second Provisional Brigade, for duty.

The travel enjoined is necessary for the public service.

VI. The following organizations of the National Guard of California will entrain for their home stations Saturday, May 12, 1906:

Commanding General and Staff, First Brigade.

First Company, Signal Corps.

Seventh Infantry.

Troop D, First Squadron Cavalry.

The Commanding General, First Provisional Brigade, N. G. C., is charged with the execution of the above movement.

All commanding officers will report to the Adjutant General by telegraph the arrival of their organizations at their home stations.

The Quartermaster's Department will furnish the necessary transportation, the Subsistence Department the necessary subsistence, and the Medical Department the necessary medical attendance.

By order of the Commander-in-Chief.

J. B. LAUCK, Adjutant General.

Official:

A. W. BRADBURY, Assistant Adjutant General.

FIELD ORDERS,
No. 7.

STATE OF CALIFORNIA, ADJUTANT GENERAL'S OFFICE,
OAKLAND, May 11, 1906.

I. The First and Second Provisional Brigades, N. G. C., organized by Field Orders No. 1, Adjutant General's Office, dated Oakland, Cal., April 23, 1906, will be discontinued at 6 o'clock P. M., May 12, 1906.

II. The Sixth Infantry, now in active service in the City of San Francisco, will be reported by the regimental commander to the Commanding General, Second Brigade, N. G. C., for temporary duty, at the time specified herein for the discontinuance of the provisional brigades aforesaid.

III. That portion of the Naval Militia of California now in active service in the City of San Francisco will be reported by its commanding officer to the Commanding General, Second Brigade, N. G. C., for temporary duty at the time specified herein for the discontinuance of the provisional brigades aforesaid.

IV. The Commander-in-Chief desires to express his thanks to the troops now under orders to proceed to their home stations, viz: Commanding General, First Brigade, and staff; Seventh Infantry; First Company, Signal Corps; Troop D, First Squadron of Cavalry, for their good service and soldierly bearing during the time of distressing conditions incident to the calamity which has befallen the City of San Francisco and neighboring localities.

The recognition of this service will be made a part of the permanent records of the State of California for all time to come.

By order of the Commander-in-Chief.

J. B. LAUCK, Adjutant General.

Official:

A. W. BRADBURY, Assistant Adjutant General.

FIELD ORDERS,
No. 8.

STATE OF CALIFORNIA, ADJUTANT GENERAL'S OFFICE,
OAKLAND, May 13, 1906.

I. Company C, Fifth Infantry, is relieved from further active duty in the City of Santa Rosa, and will return without delay to its home station, and there be dismissed, its services being no longer required.

The Commanding General, Second Brigade, is charged with the execution of this movement.

II. Major Charles E. Haven, Fifth Infantry, commanding the battalion of the Fifth Infantry in Santa Rosa, is relieved from further duty in the field. (Approved May 12, 1906.)

III. Company A, Veteran Reserves, N. G. C., now in active service at Berkeley, will be relieved from further duty in the field upon the receipt of this order, and will proceed to its home station without delay.

The travel enjoined is necessary for the public service. The Quartermaster General will furnish the necessary transportation.

The Commander-in-Chief desires to express his thanks and appreciation to this organization for the efficient service rendered during its tour of important duty about to close.

By order of the Commander-in-Chief.

J. B. LAUCK, Adjutant General.

Official:

A. W. BRADBURY, Assistant Adjutant General.

FIELD ORDERS,
No. 9.

STATE OF CALIFORNIA, ADJUTANT GENERAL'S OFFICE,
OAKLAND, May 15, 1906.

I. The following officers and organizations of the National Guard of California, and Naval Militia of California, will be relieved from further duty in the field upon the receipt of this order, and proceed to their home stations:

Major C. A. Swisler, Second Infantry, and staff, and Companies C and I, Second Infantry.

Major P. M. Norboe, Sixth Infantry, and staff, and Companies E, G, and I, Sixth Infantry.

Troop C, First Squadron of Cavalry.

Lieutenant Commander M. Ray Costerisan, N. M. C., and the Third and Sixth Divisions, and U. S. S. "Pinta" Detachment, Engineer Division, N. M. C.

First Lieutenant H. B. Van Horn, Second Infantry, is exempted from the provisions of this order.

The Commanding General, Second Brigade, is charged with the execution of this movement.

The Quartermaster's Department will furnish the necessary transportation and the Subsistence Department the necessary subsistence.

II. All commanding officers concerned will report to the Adjutant General by telegraph the arrival of their organizations at their home stations.

III. The Commander-in-Chief desires to express his gratification and thanks to the above-mentioned troops for their good work and soldierly behavior while on duty in San Francisco during the distressing conditions resulting from the calamity which has befallen that city.

By order of the Commander-in-Chief.

J. B. LAUCK, Adjutant General.

Official:

A. W. BRADBURY, Assistant Adjutant General.

FIELD ORDERS.

No. 10.

STATE OF CALIFORNIA, ADJUTANT GENERAL'S OFFICE,

OAKLAND, May 16, 1906.

I. Company G, Fifth Infantry, now in active service in the City of Oakland, will be relieved from further duty in the field upon the receipt of this order. The commanding officer of this company will report to the Adjutant General its arrival at home station.

The Quartermaster's Department will furnish the necessary transportation.

II. In relieving the above-named company from further field service the Commander-in-Chief desires to express his gratification and thanks to its officers and men for their excellent work and soldierly conduct while on duty during the distressing conditions incident to the earthquake and resultant fire in San Francisco.

III. Privates J. A. Hill and T. M. Boarman, Company G, Fifth Infantry, will continue on duty as orderlies at the temporary offices of the Governor and Adjutant General in the City of Oakland until further orders. Private Hill is attached to Company F, Fifth Infantry, for quarters and subsistence, and Private Boarman to Company A, Fifth Infantry, for subsistence.

By order of the Commander-in-Chief.

J. B. LAUCK, Adjutant General.

Official:

A. W. BRADBURY, Assistant Adjutant General.

FIELD ORDERS.

No. 11.

STATE OF CALIFORNIA, ADJUTANT GENERAL'S OFFICE,

OAKLAND, May 17, 1906.

I. That part of the Fifth Infantry now in active service in this city will be relieved from further duty in the field upon the receipt of these orders.

II. That part of the Second Infantry now in active service in the City of San Francisco will be relieved from further duty in the field on the 19th instant. The field and staff officers and organizations concerned will proceed to their home stations.

III. That part of the Fifth Infantry now in active service in the City of San Francisco will be relieved from further duty in the field on the 19th instant. The field and staff officers and organizations concerned will proceed to their home stations.

IV. That part of the Sixth Infantry now in active service in the City of San Francisco will be relieved from further duty in the field on the 19th instant. The field and staff officers and organizations concerned will proceed to their home stations.

V. Major S. W. Kay and staff, and Troop B, First Squadron of Cavalry, now in active service in the City of San Francisco, will be relieved from further duty in the field on the 19th instant, and proceed to their home stations.

VI. The Fourth Division, Naval Militia, now in active service in the City of San Francisco, will be relieved from further duty in the field on the 21st instant, and proceed to its home station.

VII. The Commanding General, Second Brigade, is charged with the execution of the movements of the troops included in these orders.

VIII. All commanding officers concerned, with the exception of Major E. G. Hunt, and the commanding officers of Companies A and F, Fifth Infantry, will report to the Adjutant General by telegraph the arrival of their organizations at home stations. Major Hunt and the commanding officers Companies A and F, Fifth Infantry, will report to the Adjutant General by letter.

IX. The Quartermaster's Department will furnish the necessary transportation, and the Subsistence Department the necessary subsistence.

X. That portion of Field Orders No. 10, Paragraph III, dated Adjutant General's Office, Oakland, May 16, 1906, which attached Privates J. A. Hill and T. M. Boorman, Company G, Fifth Infantry, orderlies at the temporary offices of the Governor and Adjutant General in this city, to Companies A and F, Fifth Infantry, for quarters and subsistence, respectively, is revoked.

XI. The Commander-in-Chief is pleased to express his gratification and thanks to the officers and men relieved by these orders from further field duty for the efficient and conscientious performance of the very difficult duties assigned them while in active service in connection with the calamity which has recently befallen the City of San Francisco.

By order of the Commander-in-Chief.

J. B. LAUCK, Adjutant General.

Official:

A. W. BRADBURY, Assistant Adjutant General.

FIELD ORDERS,
No. 12.

STATE OF CALIFORNIA, ADJUTANT GENERAL'S OFFICE,
OAKLAND, May 18, 1906.

I. The detachment of the Second Infantry now on active duty at the State Arsenal at Sacramento will be relieved from this duty on the 19th instant. The officer in command, and the enlisted men of this detachment, will report to their respective commanding officers at the earliest practicable opportunity.

The thanks of the Commander-in-Chief expressed to the troops on duty in San Francisco, and ordered relieved from further field service, in Field Orders No. 11, May 17, 1906, Adjutant General's Office, will also apply to this detachment.

II. That portion of Paragraph VI, Field Orders No. 11, May 17, 1906, Adjutant General's Office, directing that the Fourth Division, Naval Militia, be relieved from further duty in the field on the 21st instant, is amended, as will cause this organization to be relieved from active duty on the 19th instant.

III. So much of Paragraph I, Field Orders No. 9, May 15, 1906, A. G. O., as affects the movements of Second Lieutenant L. A. Walling, Battalion Quartermaster and Commissary, Second Infantry, is rescinded. Lieutenant Walling will continue on duty with that part of the Second Infantry now in the field, and the action of the Commanding General, Second Brigade, continuing this officer in service from the 15th instant, is approved and confirmed.

IV. Paragraph III, Field Orders No. 11, May 17, 1906, A. G. O., is revoked.

V. Colonel A. W. Bradbury, Assistant Adjutant General, State of California, is detailed as disbursing officer for the purpose of paying the officers and men of Company A, Veteran Reserves, N. G. C., for field service performed under verbal instructions from the Adjutant General on April 21, 1906.

VI. Lieutenant Colonel Fred J. H. Rickon, Assistant Adjutant General, Second Brigade, is detailed as inspector to pass upon and condemn unserviceable and unsuitable State property heretofore issued to the troops relieved by Field Orders No. 11, May 17, 1906, A. G. O.

By order of the Commander-in-Chief.

J. B. LAUCK, Adjutant General.

Official:

A. W. BRADBURY, Assistant Adjutant General.

FIELD ORDERS,
No. 13.

STATE OF CALIFORNIA, ADJUTANT GENERAL'S OFFICE,
OAKLAND, May 19, 1906.

I. Company B, Fifth Infantry, now in active service in the City of San José, will be relieved from further duty in the field upon the receipt of this order.

II. It is gratifying to the Commander-in-Chief to be able to avail himself of this opportunity to express his thanks to the officers and men of this company for the efficient and conscientious performance of the important and difficult duties imposed upon them in San José as a result of the earthquake on April 18, 1906.

III. Major J. W. A. Off, Quartermaster, First Brigade, detailed in extract of Field Orders No. 3, April 26, 1906, A. G. O., as Assistant to the Quartermaster General, is relieved from further active duty, and will proceed to his home station, Los Angeles.

The travel enjoined is necessary for the public service.

IV. So much of Paragraph II, Field Orders No. 11, May 17, 1906, A. G. O., as affects the movements of Second Lieutenant A. B. Daly, Battalion Quartermaster and Commissary, Second Infantry, is rescinded. Lieutenant Daly will report to the Commanding General, Second Brigade, for assignment to duty at brigade headquarters, and will continue in active service until the necessity therefor will have been no longer required. The brigade commander will then relieve Lieutenant Daly from further field duty, and direct him to proceed to his home station.

By order of the Commander-in-Chief.

J. B. LAUCK, Adjutant General.

Official:

A. W. BRADBURY, Assistant Adjutant General.

FIELD ORDERS,
No. 14.

STATE OF CALIFORNIA, ADJUTANT GENERAL'S OFFICE,
OAKLAND, May 21, 1906.

I. That part of the Fifth Infantry now in active service in the City of San Francisco will be relieved from further duty in the field upon the receipt of these orders. The field and staff officers, and organizations (Companies D and H) concerned, will proceed to their home stations, and the commanding officers of Companies D and H will report to the Adjutant General by telegraph the arrival of their organizations at home stations.

II. The commanding officer of the Fifth Infantry, and Regimental Adjutant, will continue on active duty for two days and four days, respectively, following the date of these orders, when they will be relieved by the Commanding General, Second Brigade, from further field duty.

III. The Commanding General, Second Brigade, is charged with the execution of the movement directed in Paragraph I of these orders.

IV. The Quartermaster's Department will furnish the necessary transportation, and the Subsistence Department the necessary subsistence.

V. The Commander-in-Chief is pleased to express to the troops herein relieved from active duty, and to Company I, Fifth Infantry, heretofore relieved by the brigade commander, his thanks for the efficient and conscientious performance of the very difficult duties assigned them while in the field in connection with the San Francisco calamity.

By order of the Commander-in-Chief.

J. B. LAUCK, Adjutant General.

Official:

A. W. BRADBURY, Assistant Adjutant General.

FIELD ORDERS,
No. 15.

STATE OF CALIFORNIA, ADJUTANT GENERAL'S OFFICE,
OAKLAND, May 23, 1906.

I. Company E, Fifth Infantry, is relieved from further active duty as of this date.

To this organization the Commander-in-Chief is pleased to express his thanks for the efficient and conscientious performance of the important and difficult duties imposed upon it in Santa Rosa as a result of the earthquake of April 18, 1906.

By order of the Commander-in-Chief.

J. B. LAUCK, Adjutant General.

Official:

A. W. BRADBURY, Assistant Adjutant General.

FIELD ORDERS,
No. 16.

STATE OF CALIFORNIA, ADJUTANT GENERAL'S OFFICE,
OAKLAND, May 30, 1906.

I. That part of the Naval Militia of California now in active service in the City of San Francisco will be relieved from such duty on the 31st instant.

The Commanding General, Second Brigade, is charged with the execution of this movement.

II. Upon the execution of this order the commanding officer of the Naval Militia will report to this office, in writing, the hour of dismissal of the organizations affected hereby.

III. To Captain George W. Bauer, commanding the Naval Militia of California, his officers and men, the Commander-in-Chief is pleased to express his gratification and thanks for the efficient and conscientious performance of the very difficult and important duties assigned them in connection with the recent San Francisco disaster.

By order of the Commander-in-Chief.

J. B. LAUCK, Adjutant General.

Official:

A. W. BRADBURY, Assistant Adjutant General.

FIELD ORDERS,
No. 17.

STATE OF CALIFORNIA, ADJUTANT GENERAL'S OFFICE,
OAKLAND, May 30, 1906.

I. That part of the National Guard of California now in active service in the City of San Francisco, except as hereinafter set forth, are relieved from further duty in the field, effective at retreat on the 31st instant.

The Quartermaster's Department will furnish the necessary transportation.

II. Major Emmet R. Jones, Chief Quartermaster, Second Brigade, and Major William P. Humphreys, Judge Advocate, Second Brigade, will continue in active service until relieved in orders from this office.

III. The Commanding General, Second Brigade, will cause a detail of three commissioned officers and sixty-six enlisted men to be made from the troops now in the field for the purpose of guarding public property pertaining to the various organizations of the National Guard of California in the City of San Francisco. This detail will continue in active service until relieved in orders from this office.

The Quartermaster's Department will furnish the necessary transportation, the Subsistence Department suitable subsistence, and the Medical Department proper medical attendance.

IV. With few exceptions the officers and men to be relieved from further field duty by operation of these orders reside at the home stations of their respective organizations, namely, San Francisco. To Brigadier General John A. Koster, commanding the Second Brigade, and the officers and men of his command, who have performed their duties in connection with the San Francisco disaster so well as to merit the laudation of the people of that city, and the State at large, the Commander-in-Chief is gratified to be able to avail himself of the opportunity to express his thanks for the efficient and conscientious performance of the manifold important and difficult duties imposed upon them since April 18th last.

By order of the Commander-in-Chief.

J. B. LAUCK, Adjutant General.

Official:

A. W. BRADBURY, Assistant Adjutant General.

FIELD ORDERS,
No. 18.

STATE OF CALIFORNIA, ADJUTANT GENERAL'S OFFICE,
OAKLAND, May 31, 1906.

I. The temporary office of the Adjutant General established in this city on April 19, 1906, on account of the necessity of being on the scene of the disaster which befell the City of San Francisco, will be discontinued at noon June 1, 1906.

II. Second Lieutenant Jacob Alexander, Second Infantry, and Corporal H. S. McIntire, Company E, Second Infantry, on special duty in the Adjutant General's office in this city, are relieved from such duty, and will proceed to their home stations.

The travel enjoined is necessary for the public service.

III. Privates J. A. Hill and T. M. Boarman, Company G, Fifth Infantry, on special duty in the Governor's office and Adjutant General's office, respectively, are relieved from such duty.

IV. Upon arrival at their home stations the officer and men relieved from further duty by these orders will report to their respective commanding officers.

V. Major D. A. Smith, Fifth Infantry, will report to the Adjutant General for active duty in connection with the payment of the State troops now in the field, and those already relieved from active duty.

By order of the Commander-in-Chief.

J. B. LAUCK, Adjutant General.

Official:

A. W. BRADBURY, Assistant Adjutant General.

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TRANSACTIONS
OF THE
CALIFORNIA
STATE AGRICULTURAL
SOCIETY

DURING THE YEAR 1904.



SACRAMENTO:

W. W. SHANNON, : : : : SUPERINTENDENT STATE PRINTING.
1905.

STATE BOARD OF AGRICULTURE, 1904.

DIRECTORS.

BENJAMIN F. RUSH	-	-	-	-	-	-	-	-	-	-	Suisun
F. H. BURKE	-	-	-	-	-	-	-	-	-	-	San José
F. W. COVEY	-	-	-	-	-	-	-	-	-	-	Palo Alto
THOMAS FOX	-	-	-	-	-	-	-	-	-	-	Sacramento
E. W. HOWARD	-	-	-	-	-	-	-	-	-	-	San Mateo
GEO. W. KINGSBURY	-	-	-	-	-	-	-	-	-	-	San Francisco
WILLIAM JOHNSTON	-	-	-	-	-	-	-	-	-	-	Courtland
WILLIAM LAND	-	-	-	-	-	-	-	-	-	-	Sacramento
C. W. PAINE	-	-	-	-	-	-	-	-	-	-	Sacramento
L. J. ROSE, JR.	-	-	-	-	-	-	-	-	-	-	Oxnard
J. W. WILSON	-	-	-	-	-	-	-	-	-	-	Sacramento
JAMES WHITAKER	-	-	-	-	-	-	-	-	-	-	Galt

OFFICERS OF THE BOARD.

BENJAMIN F. RUSH	-	-	-	-	-	-	-	-	President
JAMES WHITAKER	-	-	-	-	-	-	-	-	Vice-President
ALBERT LINDLEY	-	-	-	-	-	-	-	-	Secretary
L. R. MILLER	-	-	-	-	-	-	-	-	Assistant Secretary
									(Post Office, Sacramento)
C. W. PAINE	-	-	-	-	-	-	-	-	Superintendent of Park
WILLIAM LAND	-	-	-	-	-	-	-	-	Superintendent of Pavilion

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ALPHA RIVERSIDE.



GLETT'S ALPHA.



PRYON HERD.



REBECCA E



PRYON LA SIESTA



WINNARD

PRYON

PRYON

REPORT

OF THE

STATE AGRICULTURAL SOCIETY.

To His Excellency HON. GEORGE C. PARDEE,
Governor of the State of California,

SIR: In compliance with legal requirement we have the honor of submitting to you herewith the Fifty-first Annual Report of the State Agricultural Society. This report embraces the financial condition of the Society April 1, 1905, and shows that at that time the Society had funds sufficient to clear it of all indebtedness; that it has a tract of land containing almost 100 acres, well adapted to State Fair purposes, and that it has a balance of \$29,045.81 in the State Treasury, available for making improvements thereon. With this balance, and with the appropriation for improvements passed by the thirty-sixth session of the California Legislature, and approved by yourself, the Society expects to begin work immediately upon a scheme of improvements that, when finally completed, will give to California the best equipped State Fair grounds in the West; and it is hoped to have the speed track and buildings for live stock completed in time for the State Fair which is to be held upon the new fair grounds this year (1905).

A statistical report is also submitted containing data showing the resources, products, and manufactures of the different counties of the State, together with other information illustrating the growth, prosperity, and possibilities of California. It has been the intention to make a conservative representation and to embody nothing except that which is reliable and of permanent value.

The worth of the annual reports of the Society will undoubtedly be greatly enhanced by the passage, by the last Legislature, of the following law, which met with your approval:

SECTION 1. An Act to establish a uniform system of county and township governments, approved April 1, 1897, is hereby amended by adding a new section thereto, to be numbered 66a, and to read as follows:

Section 66a. It shall be the duty of the Board of Supervisors of each county, on or before the first day of November of each year, to supply the Secretary of the State Agricultural Society, upon blanks to be furnished by him for that purpose, statistics show-

ing the products grown, produced or manufactured in said county, for the year preceding, and the expense thereof shall be a county charge, to be paid as other county charges against the county.

SEC. 2. This Act shall take effect immediately from and after its passage.

With the assistance of this law, the Society should hereafter be able to issue an annual report containing absolutely correct statistics showing the products of each county in the State. Such a report will be of inestimable value to the producer and consumer of or dealer in California produce; nor can its value be overestimated as an honest advertisement of our State and its resources when sent to prospective settlers.

With the hope that the Society will continue to merit and receive the support of the Executive and the people of California, this report is respectfully submitted.

ALBERT LINDLEY,
Secretary.

BENJAMIN F. RUSH,
President.

FINANCIAL STATEMENT.

Made by Secretary to April 1, 1905.

This statement was approved by the special committee of three appointed at the thirty-fifth session of the Legislature of the State of California for the purpose of investigating the affairs of the State Agricultural Society. The members of this committee were Senator F. W. Leavitt, Senator J. B. Curtin, and Senator Hamilton Bauer. The committee met and organized by electing Senator F. W. Leavitt, chairman, and Senator Hamilton Bauer, secretary. E. B. Bullock, an expert accountant, was appointed to expert the books of the Society. The report of the committee was approved by the Senate of the thirty-sixth session of the Legislature of California.

The following is a synopsis of expert Bullock's report, to which has been added the sum of \$3,401.52, which represents the amount of bills received, interest accrued, and expenses incurred after said report was completed:

LIABILITIES, JANUARY 1, 1905.

D. O. Mills & Co., note.....	\$12,000 00
Interest on above from Dec. 1, 1901, to Jan. 1, 1905, 37 months, at 6%	2,196 00
D. O. Mills & Co., overdraft.....	2,330 65
Interest on above from Sept. 20, 1902, to Jan. 1, 1905, 27 months, at 7%.....	367 05
<i>Bills of 1901 unpaid:</i>	
J. E. Terry.....	\$855 00
Tom Scott.....	155 00
J. A. Lafferty & Son.....	100 00
Dr. G. W. Dufficy.....	162 00
Schaw, Ingram, Batchelor & Co.....	582 84
George B. Stack.....	345 85
Wood, Curtis & Co.....	235 28
C. W. Paine.....	166 00
Miller & Mathews.....	250 00
C. H. Krebs & Co.....	307 60
Charles M. Campbell.....	68 15
Wright & Kimbrough.....	63 60
Frank Hickman.....	69 60
H. J. Goethe Co.....	44 65
W. P. Coleman Co.....	154 05
Bosqui Engraving Co.....	135 00
Farrady & Co.....	42 40
Hawk & Carly.....	85 00
California State Bank.....	213 30
Wiseman & Wulff.....	63 70
Hawley, Bohl & Phillips.....	37 20
Curtis, Carmichael & Brand.....	97 55
S. Dwyer.....	97 50
Friend & Terry Lumber Co.....	477 05
Dr. G. L. Stephenson.....	50 00
Miller Bros.....	140 00
Phoenix Milling Co.....	173 67
	<hr/>
	5,132 49
Interest on above from Oct. 1, 1901, to Jan. 1, 1905, 39 months, at 6%.....	1,000 83
<i>Bills of 1902 unpaid:</i>	
W. F. Frazer.....	\$357 78
D. Falconer.....	250 00
Klune & Floberg.....	70 00
D. Falconer.....	250 00
California State Bank.....	213 30

Bills of 1902 unpaid—Continued.

Joseph M. Anderson.....	\$88 00
H. Hoffman & Son.....	1,180 69
George B. Stack.....	392 00
William Slaughter.....	50 00
Charles M. Campbell.....	14 00
J. A. Lafferty & Son.....	100 50
C. H. Krebs & Co.....	245 65
Sperry Flour Co.....	25 25
Miller Bros.....	102 79
George Z. Wait.....	46 25
Fred Raschen.....	51 50
Lewis Winter.....	12 00
Phoenix Milling Co.....	274 37
C. D. Conn.....	13 90
J. Martin.....	1 50
Kane & Trainor Ice Co.....	71 35
H. W. Rivett.....	4 00
A. A. Killen.....	23 00
D. Johnston & Co.....	3 60
Hevener & Mier.....	2 00
A. S. Hopkins Co.....	81 81
S. Dwyer.....	19 75
Capital Manufacturing Co.....	11 25
Pioneer Wood and Coal Co.....	13 00
H. S. Crocker Co.....	29 47
I. Christie.....	34 50
R. O. Kimbrough.....	21 35
Dr. Fox.....	50 00
Locke & Lavenson.....	37 00
Sacramento Abstract and Title Co.....	15 00
A. J. Wilson.....	17 00
A. Miester & Sons.....	33 80
H. B. Sleeper.....	2 00
A. J. Pommer.....	5 00
Charles W. Paine.....	303 00
Kirk, Geary & Co.....	10 44
Lynn Bros.....	4 20
James Mangan.....	196 00
Melvin & Son.....	26 50
Dan Dennison.....	40 00
C. W. Eldred.....	50 00
P. McGuire.....	40 00
Schaw-Batcher Co.....	192 12
George Boyne.....	400 00
Friend & Terry Lumber Co.....	1,103 77
Davis Bros.....	50 00
California Winery.....	61 00
John Breuner Co.....	3 00
E. S. Culver.....	21 00
California State Bank.....	213 30
Sacramento Chamber of Commerce.....	977 00
Wiseman, Wulff & Co.....	63 60
W. P. Coleman.....	88 60
F. Hickman.....	117 75
Curtis, Carmichael & Brand.....	88 15
Hawk & Carly.....	84 20
Wright & Kimbrough.....	82 60
Hawley & Bohl.....	36 95
Farrady & Co.....	46 95
H. J. Goethe Co.....	55 35
San Francisco Call.....	150 00
San Francisco Examiner.....	150 00
San Francisco Chronicle.....	100 00
San Francisco Bulletin.....	100 00
San Francisco Post.....	50 00
Sacramento Bee.....	210 20
Sacramento Record-Union.....	259 00
Sacramento Sunday News.....	10 00
Sacramento Sunday Leader.....	10 00
Sacramento Herold.....	5 00
Sacramento Western Elk.....	2 50
Sacramento Libertad.....	5 00
Sacramento Wednesday Press.....	7 50
Sacramento Tribune.....	10 00
Burns & Waterhouse.....	4,133 00
J. E. Terry.....	90 00

Bills of 1902 unpaid—Continued:

Charles Neal	\$115 00	
C. Cornell	5 00	
D. Falconer	359 50	
D. Falconer	112 50	
M. R. Beard	250 00	
O. P. Dodge	100 00	
W. A. Sayre	61 50	
Goodwin's Turf Guide	18 00	
Byron Jackson Machine Works	15 00	
Holbrook, Merrill & Stetson	3 35	
News Publishing Co.	41 50	
Matt Coffey	30 00	
W. H. Basler	20 00	
		\$14,994 69
Interest on above from Oct. 1, 1902, to Jan. 1, 1905, 27 months, at 6%		2,024 28

Bills of 1903 unpaid:

L. A. Blasingame	\$436 50	
A. Donohue	171 25	
Elmwood Stock Farm	1,357 25	
D. S. Cone	20 00	
W. S. Hobart	20 00	
C. Kerr	20 00	
E. Lanigan	20 00	
A. B. Spreckels	120 00	
M. F. Tarpey	20 00	
		2,085 00
Interest on above from Oct. 1, 1903, to Jan. 1, 1905, 15 months, at 6%		156 37

Bills of 1904 unpaid:

Electrical Engineering and Supply Co.	\$54 40	
W. F. Knox	343 80	
Friend & Terry Lumber Co.	525 66	
Thomas Lewis	11 00	
Siller Bros.	580 00	
Abe Moose	3 70	
California Winery	35 25	
W. P. Coleman Co.	63 00	
Curtis, Carmichael & Brand	25 20	
C. H. Krebs	3 50	
E. W. Major	30 00	
Meiss Bros.	416 00	
J. E. Mayo	7 50	
Scott, Lyman & Stack	8 50	
Tenbrook & Co.	11 80	
Kane & Trainor Ice Co.	61 50	
Shasta Water Co.	2 50	
R. O. Kimbrough	54 29	
Sacramento Union	20 00	
Sacramento Bee	7 70	
James Popert	1 00	
Western Union Telegraph Company	14 25	
Standard Oil Co.	5 60	
Fashion Stables	16 00	
Unique Dyeing Works	7 50	
Harness Horsemen:		
I. L. Borden	270 00	
S. S. Bailey	30 00	
W. G. Durfee	1,170 00	
E. D. Dudley	155 00	
Grace Bros.	120 00	
J. B. Iverson	60 00	
C. L. Jones	801 00	
Frank L. Martin	37 50	
Walter Mastin	1,293 50	
George J. Morgan	450 00	
I. C. Mosher	40 00	
J. D. Springer	157 50	
S. K. Trefry	225 00	
J. H. Vance	337 50	
Victor Verihac	50 00	
Emily Ward	400 00	
C. A. Durfee	1,928 00	
Ben Davis	75 00	
W. H. Lawrence	76 67	
Silva & Wright	350 00	
Geo. L. Warlow	38 33	
A. W. Wiley	25 00	

Bills of 1904 unpaid—Continued.

Running Horsemen:

B. F. Hobart	\$30 00
W. J. Hayes	30 00
S. Judge & Co.	20 00
G. D. Kinyon	165 00
Fred Merckle	165 00
J. Madison	165 00
W. H. McNames	20 00
G. Nevins	20 00
Angus Ross	15 00
W. Scharetz	455 00
P. E. Smith	60 00
W. L. Stanfield	20 00
B. O. Van Bokkelin	15 00

Newspaper advertising bills for 1904

1,502 50

\$13,172 17

Collected on futurities:

Harness Stallion Stake of 1905	\$1,930 00
Occident Stake of 1905	2,110 00
Occident Stake of 1906	980 00
Stanford Stake of 1905	1,250 00
Stanford Stake of 1906	320 00

6,590 00

Total

\$62,049 53

California State Bank, note

7,110 00

Interest on above from January 1, 1903, to January 1, 1905, at 6%

853 20

\$70,012 73

BILLS PAYABLE FROM JANUARY 1 TO APRIL 1, 1905.

D. O. Mills & Co., interest on note of \$12,000	\$382 02
D. O. Mills & Co., interest on overdraft of \$2,330.65	68 67
Office salaries, payrolls, and expenses	2,150 00
Expenses of livestock judge	72 50
Interest accrued from January 1 to April 1, 1905	728 33

3,401 52

\$73,414 25

RECEIPTS FROM JANUARY 1 TO APRIL 1, 1905.

Proceeds from sale of lots at Twenty-third and G streets

4,511 40

Net liabilities

\$68,902 85

State appropriation

\$70,000 00

Liabilities

68,902 85

Cash on hand

\$1,097 15

Pursuant to a decree of the Superior Court of the County of Sacramento, Agricultural Park, belonging to the State Agricultural Society, having been presented by the people of Sacramento, was sold at public auction to the highest bidder for the sum of \$82,500. From the gross price realized from the sale of said property, \$29,723.49, due to the National Bank of D. O. Mills & Co. upon its lien upon the property, was deducted, and paid said bank by order of the court, and also the sum of \$1,730.70 was paid for abstracts, advertising, and other expenses connected with the sale, leaving the net balance of \$51,045.81. From this amount has been deducted \$22,000 that was used in paying for the eighty acres of land bought by the State Board of Agriculture upon the approval of the State Board of Examiners, leaving a balance of \$29,045.81 in the State Treasury to the credit of the Board of Directors.

HISTORY OF THE STATE AGRICULTURAL SOCIETY OF CALIFORNIA.

A bill to incorporate a State Agricultural Society was introduced in the Assembly at the session of the Legislature in 1854. It passed that House by an almost unanimous vote, and passed the Senate by a vote of 18 to 8. It was approved by the Governor May 13, 1854. This Act authorized the Society "to buy, hold, and sell real estate not to exceed two sections of land, to be held for the purpose of establishing a model or experimental farm or farms, erecting inclosures, buildings, etc., calculated or designed for the meetings of the Society, and for an exhibition of the various breeds of horses, cattle, mules, and other stock, and of agricultural, mechanical, and domestic manufactures and productions, and for no other purpose." The Act provided that the sum of \$5,000 per year should be appropriated for the term of five years for the payment of premiums, and for no other purpose. The first officers were named in the charter, and were as follows: President, F. W. Macondray of San Francisco; Vice-Presidents, E. L. Beard of Alameda, J. K. Rose of San Francisco, D. W. C. Thompson of Sonoma, H. C. Malone of Santa Clara, W. H. Thompson of San Francisco, and C. I. Hutchinson of Sacramento; Corresponding Secretary, L. F. Warren of San Francisco; Recording Secretary, C. V. Gillispie of San Francisco; Treasurer, David Chambers of San Francisco. In June following, these officers, who constituted as well the Board of Directors, met in San Francisco, accepted the act of incorporation, adopted a constitution, and fixed the time and place for holding the first State Fair. October 4, 1854, was set as the time for the fair to commence, and the place San Francisco—the cattle show at the Mission, and the agricultural exhibition in Musical Hall. While the exhibits were not large, still they excited wonder and astonishment. No exhibition at all comparable in extent, variety, and excellence had theretofore been held in any State so young as California then was. The amount of premiums paid was \$4,660.

At the annual meeting of the Society a new set of officers and directors was elected, and one of the first acts of the executive committee of the new board was to call a State Agricultural Convention for the purpose of waking up a more general interest in agriculture, to meet in Sacramento April 25, 1855. The convention was largely attended by the leading men of the State.

The second annual fair of the Society was held in Sacramento, commencing September 25, 1855. The general exhibition was at the State House, and the stock show at the Louisiana Race Track. Nearly, if not every county was represented by persons in attendance. The premiums awarded amounted to \$6,500.

At the annual meeting of the Society, San José was selected as the place for the fair of 1856. This year the Society sent out a committee

to visit and report upon the progress of agriculture and horticulture in every section of the State. The report was extremely interesting and attracted great attention in all parts of the world. It had the effect of bringing to the State a large number of skilled farmers and horticulturists. There were instances given of remarkable yields in that early day. The owner of the Q Ranch, in Amador County, realized in 1855, \$4,000 from four acres of broomcorn, and the committee estimated that the yield from two acres of watermelons would be from \$15,000 to \$20,000. In Santa Clara County they saw in full bearing pear trees grafted in the previous year with the Bartlett variety. The fruit from four trees grafted but eighteen months before had been sold for \$160. In Los Angeles County \$120 had been realized for the fruit from one orange tree, and a net profit of \$700 had been made from the fruit gathered from seven trees. The oranges were sold at seven cents apiece. At that time the State was raising the breadstuffs to feed its population and a large surplus was exported. It excelled all the other States in the production of barley, and the amount raised in the year in question was worth more than the entire crop of all the States in 1850. California was at that time the ninth State in the production of wheat, and was, as early as 1853, the tenth in the amount of potatoes raised. The premiums awarded at the fair at San José amounted to \$6,746.

At the annual meeting of the Society held October 10th, the city of Stockton was selected as the place to hold the annual fair of 1857. That fair commenced September 29th and continued four days. The labors of the visiting committee were continued this season, and its report brought out many new facts. One was the great value of alfalfa as a forage crop and its adaptation to our soil and climate. The Stockton fair was in many respects a long step ahead of any preceding State Fair. Especially was this noticeable in the exhibition of manufactured articles and fine blooded stock. The attendance was also much larger. The amount awarded in premiums was \$7,991.

The city of Marysville was selected in which to hold the annual fair of 1858. At the annual meeting of the Directors in 1857 the question of selecting a permanent location for the fairs of the future was referred to a committee of five, to report at the next annual meeting. The fifth annual fair, held at Marysville, commenced August 23d and continued six days. The feature of this fair that gave best evidence of advancement was the exhibition of agricultural machinery of home manufacture. There was also a marked increase in the number of stock exhibited. Another interesting feature was an exhibition of tropical fruits from Los Angeles County—oranges, lemons, citrons, etc. Another was the exhibition of bees and honey. With a view to the accommodation of District and State Fairs in the future, the city of Marysville, in connection with the State Society, erected an exhibition hall covering an area of over 19,000 square feet, and the entire space was well filled. The amount of premiums awarded was \$7,485.

At the annual election of the Society held at Marysville August 16, 1858, a new constitution was adopted and one of its provisions was that the Society's annual meeting for the election of officers should be held at the State capital during the month of January.

Sacramento was selected as the place for holding the fair of 1859, and September 13th to 23d the time. One of the first acts of the new Board of Directors was to provide a suitable place to hold the fair. To this

and they obtained authority from the Legislature for the citizens of Sacramento City and County to vote upon the question of levying a tax of one quarter of one per cent on all taxable property in the city and county for the purpose of purchasing grounds and erecting buildings for the use of the Society—a permanent place in which to have its offices and hold its fairs. This tax was voted at a special election, and with the money raised in this manner, and that contributed by citizens, the site of the pavilion at Sixth and M streets, in Sacramento City, was purchased and a brick building erected, and in it was held the fair of 1859. The stock show was held on grounds set apart between O and Q and Eleventh and Twelfth streets in the city. The Society was now in a prosperous condition. Its membership this year numbered 1,100, including about 40 life members. The receipts for membership and entrance fees were \$28,639.50. The exhibitions of butter and cheese were by far the best theretofore made and served to greatly encourage the dairy interests. An attractive feature was the Oregon fruit, shown on tables set apart for that State. Oregon also exhibited a large assortment of woolen goods and blankets. The report of the visiting committee showed that it had greatly extended its labors. It reported that one firm carrying on the nursery and orchard business, in order to test the qualities of different varieties of fruits, was growing 263 varieties of apples, 324 of pears, 89 of peaches, 71 of cherries, 56 of plums, 14 of nectarines, 18 of apricots, 24 of currants, 86 of gooseberries, 12 of raspberries, 122 of foreign grapes, 4 of blackberries, and 21 of figs. This firm had over one million trees in its orchard and nursery in Santa Clara County. The amount of premiums awarded in 1859 was \$8,139.

The annual meeting of the Society was held in Sacramento January 18, 1860, and was the occasion of much interest and considerable excitement. The meeting was largely attended and lasted four days. The principal exciting cause was the location of the fair of that year. A large number of places desired to secure it, but upon final vote the location fell to Sacramento. While there was a falling off in the receipts of over \$10,000 from those of the year preceding, the fair was really a success. The amount disbursed for premiums was \$9,254.

The eighth annual meeting of the Society was held January 13, 1861. The first business was the consideration of an amendment to the constitution providing that "the Society shall hold an annual fair at the city of Sacramento." This amendment was adopted by a unanimous vote. Dr. John F. Morse stated to the meeting that, in view of the fact that Sacramento was to be the permanent location of the State Fairs, some gentlemen had subscribed money and purchased six blocks of land with a view of presenting it to the State Agricultural Society for stock grounds. The land was located between E and H and Twentieth and Twenty-second streets, in the city. The Society, by vote, accepted the donation and passed a vote of thanks to the donors. The Legislature, then in session, appropriated \$15,000 to aid the Society in making the necessary improvements to adapt the grounds to the uses contemplated. The streets were closed, the grounds inclosed by a brick wall, 401 stables and stalls built, a grand stand erected, a good half-mile track laid out and completed, and provision made for a show ground for all classes of stock. The improvements, which cost over \$25,000, were completed before the opening of the eighth annual fair, which commenced September 16, 1861. In the center of the grounds

there was erected a flagstaff 180 feet high. At ten o'clock on the morning of the 16th Jerome C. Davis, President of the Society, raised an American flag 42 feet in length on this staff as a signal of the opening of the fair. The band played the "Star-Spangled Banner," and the people cheered. This was all the ceremony of dedication. The receipts were \$22,452.50, and the amount of premiums paid was about \$7,500. These premiums were mostly awarded in silver plate, books, and diplomas.

In 1862, a number of citizens of Sacramento, seeing the disadvantages the Society had been laboring under in having only a half-mile track, determined to extend the grounds so that a mile track could be constructed. They formed an association, styled the "Union Park Association," and purchased six blocks lying north of the cattle grounds, and inclosed the tract with a high fence. By mutual agreement the new track thus built was made to accommodate the Society and the Association. Afterwards, the Society purchased this land and the improvements from the Association at its original cost. The fair of 1862 commenced on August 31st and closed September 4th.

Prior to January, 1860, the Society had just about paid current expenses, but had accumulated no property of value. In the erection of the pavilion in Sacramento, while the county undertook to provide the means, the special tax not being collected fast enough to meet the contractor's dues, the Society became a borrower and advanced the money. The report rendered January 16, 1860, showed the liabilities of the Society thus created \$5,944.45. The assets, mostly demands against Sacramento County for money advanced, were \$7,661.11. None of this was realized by the Society in 1860, and the current expenses for that year were large. In January, 1861, the excess of liabilities over assets was \$11,318.05, and in January, 1863, the excess had grown to \$16,507.61.

An Act was passed by the Legislature on March 12, 1863, that provided for the election of a Board of Agriculture, consisting of a president and nine directors, to be intrusted with the affairs of the State Agricultural Society. The first election was to take place in March, 1863, and annually thereafter in the month of January. The new board prepared a bill for funding the indebtedness of the Society—the issuance of warrants or bonds, and the creation of a fund to redeem these warrants. The Legislature passed a law to that effect.

The fair of 1863 commenced September 25th and ended October 3d. Among the important features was the exhibition of wine, brandy, and raisins. There was a list of seventy different kinds that represented the product of vineyards in all parts of the State. There was also entered for donation to the cabinet of the Society and for exhibition, gold- and silver-bearing rock to the number of more than three thousand samples. There were also samples of copper from fifty-four mining companies.

In 1864 no general fair was held, but simply a stock show confined to horses. This was on account of the failure of the Legislature to make an appropriation and the unprecedented drought throughout the State that cut short the crops and compelled stock-owners to drive their herds to the mountains for pasture. To enable the Society to present this horse show the citizens of Sacramento raised a fund of \$5,277 and placed it at the disposal of the Society for premiums and expenses. The fair was

held from the 17th to the 22d of October. The women of Sacramento improved the occasion to hold a fair in the pavilion for the benefit of the Sanitary and Christian commissions. The fair was a success financially, and after the expenses were paid \$8,412.72 was left to apply on the old indebtedness.

In 1865 the Society found itself in the same condition as in 1864—without a cent in the treasury and no State appropriation. Determined not to run the risk of putting the Society in a worse financial condition, the Board refused to publish a premium list or make provision for a fair until means were assured to meet expenses. Again the citizens of Sacramento by subscription raised and presented to the Board \$4,478.40, and at a late day preparations for the fair were commenced, and it was held from the 18th to the 23d of September. It was, however, a gratifying success.

In January, 1865, the financial report showed that in the year preceding \$5,987.36 of old debts were canceled, leaving an outstanding balance of \$6,204.44.

In 1866 conditions were improved. The State appropriated \$4,000, but had not taken any action looking to an exhibition of the products of California at the world's fair to be held in Paris in 1867. The Board undertook the collecting, packing, and shipping of articles without expense to contributors, and succeeded in forwarding samples of wines, hops, raisins, grain, and garden seeds, as well as manufactured products. Delegates were sent to attend the exposition to see that the articles were properly placed and brought to the notice of the European public.

The fair of 1867 was held from the 9th to the 14th of September. In the mechanical department the exhibition was the best that had ever been made.

The fairs of 1868 and 1869 passed off without unusual incident.

An important feature of the fair of 1870 was an exhibition of fruits from the mountain and foothill districts. A comparison of these with the valley fruits was highly creditable to the former.

In 1871 an addition was built to the pavilion that added one half more room. At the fair of that year this space was fully occupied for the display of Japanese goods sent out by that government and Chinese goods brought out from China. In many departments there was a marked improvement over the fairs of former years, notably in the live stock and the exhibition in the mechanical department of home-made articles. The display of fruit—green, dried, and preserved—was extensive and superior. Besides our own production, green apples and pears were exhibited from Massachusetts, Connecticut, Virginia, New York, Kentucky, Michigan, Illinois, Iowa, Kansas, Indiana, Wisconsin, Minnesota, and Nebraska—all in good condition. Samples of our fruits and grapes were exhibited this year at the fairs of nearly all these States, and at the fair of the American Pomological Society, held at Richmond, Virginia. The living floral garden this year was a new feature of the fairs of the Society.

In 1872, for the first time in ten years, the Board appointed a visiting committee to travel through the State in the interest of the Society, and that circumstance contributed largely to the success of the fair.

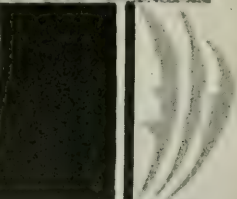
The fair of 1873 continued six days. The premium list was amplified in many of the departments, particularly for live stock. The result

was that there were more thoroughbred horses on exhibition than ever before. The show of cattle was also large, and included a herd just imported from Missouri.

In 1874 the Legislature appropriated \$15,000 and the Society received \$1,561 by subscriptions from citizens of Sacramento and \$10,000 was borrowed upon the note of the individual members of the Board. A new grand stand was erected and other improvements made at the park and pavilion at a cost of about \$24,000. The fair of that year was a great success.

The next important step in the history of the Society was the construction of the present pavilion on the State Capitol grounds. For several years the necessity for a more commodious exposition building had been apparent. A conference was held between the members of the Board of Directors and representatives of the Board of Trade of the City of Sacramento, and it was agreed that the city should be asked to subscribe the sum of \$30,000, and that the county should contribute the proceeds of the sale of the old pavilion at Sixth and M streets to aid in the erection of the new pavilion, provided the State would appropriate a corresponding amount. On January 13, 1883, Assemblyman Gillis Doty introduced a bill to authorize the erection of a State Agricultural and Industrial Exhibition Building on the State Capitol grounds. The Act provided for the appropriation of \$40,000, with the proviso that a like sum should be raised by the city and county of Sacramento. This bill passed and was approved March 9, 1883. At a city election in Sacramento held in that month the question of a special tax to raise \$40,000 for new pavilion purposes was submitted to a vote of the people of Sacramento City, who decided in favor of the proposition by a vote of 3,655 to 102. The \$30,000 was collected under this special levy and paid into the State treasury, together with \$10,000 raised by the Directors, making an amount equal to that appropriated by the State. On April 9, 1883, the State Board of Agriculture and the State Capitol Commissioners met jointly to receive plans, and selected those presented by A. W. Burrell of San Francisco. On June 5th the corner-stone of the new building was laid under the direction of Grand Master Clay W. Taylor of the Grand Lodge of Masons. Through an unforeseen accident the time for the construction of the building had to be extended. It had been contemplated that the fair of 1883 would be held in it, but it was not until January 22, 1884, that the structure was formally accepted as completed. The time occupied in the construction of this immense pavilion was eight months and six days. The dimensions of the building are: From ground to top of flag-pole, 160 feet; from floor to peak of main trusses in dome, 108 feet; height of dome, 40 feet; height of towers, 88 feet; from ground to apex of roof, 89 feet; from ground to eaves of building, 50 feet. The area of the building is as follows: Main hall, 45,600 square feet; horticultural hall, 12,000 square feet; machinery hall, 12,000 square feet; industrial hall, 12,000 square feet; art gallery, 12,000 square feet; conservatories, 12,800 square feet; promenade galleries, 17,600 square feet—making a total floor space of 124,000 square feet.

The next important step was in accordance with two Acts of the Legislature that were approved March 18, 1905. The first of these Acts appropriated the sum of \$25,000 to the Society for the purpose of paying and discharging the indebtedness, claims, and demands against the



Society, but it was provided in the subsequent Act that no money shall be paid until the Board of Directors of the Society should deed to the State all interest of the Society in and to all real estate that it owned. In pursuance of the terms of these Acts the Society sold the Agricultural Park within the limits of Sacramento city and purchased a tract of land comprising about 100 acres a short distance southeast from Sacramento city, and deeded it to the State. Work was immediately commenced and actively prosecuted to have the new grounds ready for the fair of 1905.

RESOURCES

OF THE

STATE OF CALIFORNIA.

(BY COUNTIES.)

CLIMATE OF CALIFORNIA.

By HON. N. P. CHIPMAN,
President of the State Board of Trade.

California must be counted among the most valuable possessions of the United States for many reasons; chiefly, however, because of the matchless climate of the State and the high economic value it bestows upon a large area of arable land whose coast line measures 850 miles from point to point, the average width of the State being about 200 miles. The south boundary line of latitude emerges on the Atlantic coast near Savannah, Georgia, and the north parallel near Boston, Massachusetts. Between these two latter points lie ten States of the Union. It counts for something to the nation that this extended coast line, on the Pacific Ocean, is fortified by a region capable of supporting many millions of people and that the coast to the Canadian boundary is backed by a country of almost boundless resources.

It is not generally appreciated that all of France, all of Italy north of Rome, and half of Spain lie *north of the north boundary of California*. This relative position on the west coast of our continent would suggest a mild climate, but not necessarily its unique and exceptional character. It is the purpose of the writer to bring to public attention the principal features of this climate and to show its economic value.

Professor Alexander G. McAdie, District Forecaster of the United States Weather Bureau, San Francisco, states that the climate of California is controlled by four great factors: (1) The movements of the great continental and oceanic pressure areas (commonly called "high" and "low"), together with the movements of individual pressure areas; (2) the prevailing drift of the atmosphere in temperate latitudes from west to east; (3) the proximity of the Pacific Ocean, with a mean annual temperature near the coast line of 55° Fahrenheit, a great natural conservator of heat, to which is chiefly due the moderate range of temperature along the coast from San Diego even to Tatoosh Island (extreme northwest coast of Washington); and (4) the exceedingly diversified topography for a distance of 200 miles from the coast inland. To this diversified topography is due the fact that California is a land of many climates, "from the hottest subtropical to the cold temperate, and from the driest desert to the most humid regions of the higher mountains and northern coast."

The Sierra Nevada Mountains form a natural boundary line on the east, rising gradually from the west to a height of from 8,500 to 14,000 feet, much above the snow line, and falling off to the Nevada plateau, which is about 4,000 feet above sea-level. The Coast Range Mountains form a broad belt, traversing the entire coast, and consist of two or three parallel ranges from 3,200 to 5,000 feet high, and between these

ranges are many rich valleys, some of large extent. The Coast Range merges into the Siskiyou Mountains on the north, a connecting link with the Sierra, crowned by Mount Shasta; and the Tehachapi Mountains, far to the south, form another connecting link.

Between the Sierra and the coast mountains and these connecting mountain links lies the Great Central Valley of California, about 400 miles long and from 50 to 60 miles wide; an agricultural district of great fruitfulness, comprising quite one ninth of the State. There is but little waste land in it. The northern portion is blessed by ample rainfall, and the southern part, when watered, is everywhere very productive, as is the entire valley. The Sacramento River runs south through the northern portion (Sacramento Valley), rising near Mount Shasta; the San Joaquin River runs north through the southern portion (San Joaquin Valley); the two rivers uniting near the middle of the great valley and flowing westward into San Francisco Bay, and thence through the "Golden Gate" into the Pacific Ocean.

There is here a wide break in the Coast Range through which the summer trade winds find their way into the interior, an important factor in the climatic conditions of the valley. This sea breeze every summer afternoon blows upstream, north into the Sacramento Valley and south into the San Joaquin Valley, thus tempering the heat of the great valley. This influence, together with the dryness of the atmosphere, renders the occasional high temperatures of these two valleys more easily endurable at 110° than is 95° in the humid regions of the Eastern States.

South of the Tehachapi Mountains the Sierra continue at less elevation, and are locally called Sierra Madre. The wonderfully developed region known as Southern California lies west. On the east is the Mojave Desert, and south and east the Colorado Desert; important regions of the State as yet but partially developed, but of great fertility by the application of water, which the genius and enterprise of the people will surely bring in touch with the land. As in the north, the breaks in the Coast Range and in the Sierra Madre become important factors in modifying the climate of the interior. In Southern California and in Central California (San Joaquin Valley) extensive irrigation systems already in operation greatly mitigate, if they do not satisfactorily supply, the lack of rainfall. Irrigation is also being much resorted to in the Sacramento Valley.

WINDS.

The prevailing winds come from the ocean and are principally from the southwest landward, producing a cool summer climate along the immediate coast. Fogs sometimes sweep in from the ocean, more or less unfavorably affecting the enjoyment of the climate, but by their moisture contributing to the growth of vegetation. These fogs are less harsh on the south coast. The heat rising from the great valley draws a strong current from the trade winds through the Golden Gate that divides as it passes and extends south to the Tehachapi Mountains and north to Mount Shasta, rendering the air of the valley more delightful. The same drift of the trade winds tempers the air far into the interior in Southern California. The high mountain barrier on the east, through the length of the State, deflects the cold winds that sweep down over the Nevada plains in winter from Alaska and prevents their

entrance into the valley regions of California. Dry north winds sometimes blow through the great valley in summer, raising the temperature, and are occasionally injurious to growing crops, but they seldom continue more than three or four days, when they are succeeded by the balmy and cool ocean breezes. Along the immediate coast the average winter and summer temperature differs only about four degrees, and one of the characteristic features of the San Francisco climate is exemplified by the sight of furs worn by women over summer garments, and fires in summer are not infrequent. All along the coast, however, there are thousands of sheltered nooks and small valleys and sequestered spots, where the fogs and harsh winds of the coast have no appreciable effect and where the climate is charming and sunny to the last degree, both winter and summer.

RAINFALL.

The terms "winter" and "summer," as commonly used in the Eastern States, have no application in California. The year is more properly divided into "rainy season" (winter) and "dry season" (summer). Practically all the rain falls from about the first of November until April; the remaining months of the year are rainless except in some parts of the mountains and on the coast north of Cape Mendocino, where occasional summer showers occur. Cereal crops mature in early summer after rain ceases, and no housing of crops is necessary for protection against rain in harvest time.

The rainfall of California is a characteristic feature of the climate. A word as to its source and cause will be interesting. Professor McAdie points out that over the North Pacific Ocean in winter there exists an area of low barometer (latitude 40 and 60 degrees north and 130 degrees west to 140 degrees east longitude), while an area of high pressure overlies the greater part of North America with a southwest extension to the Tropics and west to the one hundred and sixtieth meridian. He says: "We shall find that typical wet winters on the California coast occur when this great North Pacific low extends well eastward overlying the continent west of a line drawn from San Francisco to Calgary (Canada). At the same time the great continental high area apparently recedes to the southeast. On the other hand, the pressure distribution characteristic of a dry winter on the California coast is marked by the prevalence of the continental high over the entire country west of the Rocky Mountains."

Our winter rain storms (barring an occasional one coming in from the ocean unheralded) have their origin off the coast of Vancouver, and curiously enough are attended in the great valley by *south* winds. The storms diminish in intensity as they travel south, tapering off as they approach Southern California. The table will show this graphically, from which will be seen also the great variations of rainfall within the State, and even within the great valley. In 1904, for example, the rainfall at Eureka, Humboldt County, on the immediate coast, was 64.47 inches, and at San Diego but 6.61. At Crescent City, Del Norte County, adjoining Humboldt (farther north), the rainfall reached 107.61 inches. At Redding, Shasta County (interior), the rainfall was 56.87 inches; at Red Bluff, forty miles south, 33.96 inches; at Sacramento, 20.99 inches; Fresno (center of San Joaquin Valley), 13.33 inches; Bakersfield (extreme southern point of valley), 6.68 inches. In the

Sierra Nevada Mountains the rainfall increases about one inch for every one hundred feet elevation.

The direction of the coast valleys exerts striking influence upon rainfall and temperature, dependent upon the facility for the trade winds to reach them. The climatic and agricultural character of the foothills, up to 2,000 or 2,500 feet, is much the same as in the valley. Even higher fine deciduous fruits are grown. Still higher are the lumbering camps, mining, and thousands of cattle and sheep are herded in summer where in winter the mountains are deeply covered with snow. Illustrative of the characteristic variations of climate it may be stated that in the vicinity of Truckee, Nevada County, elevation 5,819 feet, the temperature (January 23d) was 12° below zero and the snowfall for the year was 200.5 inches. At Rocklin, Placer County, thirty miles west, elevation 249 feet, the lowest temperature was 28° above. All the natural ice consumed in California was made near Truckee while oranges were being gathered for market around Rocklin.

TEMPERATURE.

I have prepared the following table from the "Annual Summary, California section of the Weather Bureau," for 1904. It shows not only temperature of points, but also rainfall, elevation of points above the sea, clear and cloudy days. I have taken illustrative points in Northern and Central California, the coast country and the mountains. It will be noted that while the annual mean temperature of the Pacific Coast does not differ greatly from the annual mean of the Atlantic Coast, the average summer and average winter here and on the Atlantic are wide apart, and the extremes between the highest and lowest temperature are very great. It is this exemption from extremes of temperature that constitutes the charm, and healthfulness as well, of the Pacific Coast.

In the interior, especially in the great valley, the seasons show greater extremes of temperature, but, as already suggested, the dryness of the air renders these extremes less felt than on the coast where the air is more moist. The limit of winter cold is the test of what may be grown rather than the average temperature. And so we find citrus fruit flourishing from the north to the south end of the great valley, and orange-growing is a leading industry in several counties of that valley. In Southern California both the heat and the cold are comparatively milder, although the readings of the thermometer do not much differ from points north of the Tehachapi. It is shown by the table that there were 186 clear days in San Francisco, as against 187 in Los Angeles during the year, although there were nearly three times as many rainy days in San Francisco. For abundant sunshine, resort must be had to the interior. For example, Red Bluff, in the north, had 210 clear days, and Riverside, in the south, 255. In truth, the California of "Sunshine, Fruit and Flowers" is pretty near the whole State, below high mountain elevations.

CLIMATE UNCHANGING.

As far back as we have any recorded history, and behind this, embracing traditions coming through the early Mission Fathers, we learn of the same equability of temperature, the same balmy atmos-

phere, the same luxuriance of vegetation. Our soil may require renewing by fertilization, but our climate is as constant as the sun. The conditions which have produced the result are themselves unchanging, and so must be the result.

CLIMATOLOGICAL DATA FOR THE YEAR 1904.

STATION.	COUNTY.	Elevation, in feet.	TEMPERATURE. (degrees Fahrenheit.)			PRECIPITATION. (inches.)		No. Rainy Days.	SKY.			Region of the State
			Annual Mean	Highest	Lowest	Total Rainfall	Total Snowfall		Clear Days	Partly Cloudy Days	Cloudy Days	
Auburn	Placer	1,360	62.3	102	30	47.55	1.0	64	205	63	98	Northern.
Chico	Butte	193	62.4	108	27	30.39		72	227	50	89	
Red Bluff	Tehama	307	62.8	108	29	33.96		82	210	75	81	
Sacramento	Sacramento	71	60.1	102	32	20.99		78	205	78	83	
Placerville	El Dorado	1,820	55.5	98	14	52.21	4.5	89	237	13	116	
Napa	Napa	60	57.5	110	29	30.73		73	190	95	81	
Marysville	Yuba	67	61.1	109	29	26.90		65	228	62	76	
Willows	Glenn	136	62.5	105	28	23.27		44	215	50	101	
Vacaville	Solano	175	61.1	109	28	34.92		80	216	118	32	
Woodland	Yolo	63	64.4	104	32	24.37		50	238	37	91	
Bakersfield	Kern	404	64.4	111	22	6.68		28	287	38	41	Central.
Fresno	Fresno	293	63.7	109	28	13.33		45	229	54	83	
Porterville	Tulare	461	64.1	112	25	10.77		39	215	115	36	
Stockton	San Joaquin	23	58.8	104	27	16.86		61	260	56	50	
Hanford	Kings	349	62.3	108	20	10.11		32	263	53	50	
Merced	Merced	173	62.6	110	20	12.84		34	280	0	86	
Eureka	Humboldt	64	51.9	81	32	64.47		129	87	99	180	
San Francisco	San Francisco	155	56.4	101	38	24.72		83	186	83	97	
S. Luis Obispo	S. Luis Obispo	201	59.3	106	30	22.62		54	211	76	79	
Santa Barbara	Santa Barbara	130	61.4	95	33	20.82		41	164	134	68	Coast.
San Rafael	Marin	56	58.0	110	30	51.41		68				
Healdsburg	Sonoma	52	59.5	113	27	62.33		86				
Monterey	Monterey	15	55.2	98	32	18.34		44	219	12	135	
Watsonville	Santa Cruz	23	61.1	101	29	21.10		57	118	95	153	
San José	Santa Clara	95	59.6	106	29	16.12		51	269	11	86	
Oakland	Alameda	36	57.9	99	33	33.06		83	156	99	111	
Bodie	Mono	8,248	38.3	86	14	20.10	127.5	41	208	79	79	
Independence	Inyo	3,907	59.9	97	19	2.62		19	194	96	76	Mountain.
Quincy	Plumas	3,400	49.7	93	5	61.42	76.5	85	172	107	87	
Sisson	Siskiyou	3,555	50.6	107	8	55.11	150.5	85	217	4	145	
Summit	Placer	7,017	45.9	76	6	76.54	498.0	85	23	8	119	
Truckee	Nevada	5,819	42.2	88	12	40.19	200.5	79	167	0	199	
San Diego	San Diego	93	62.4	94	36	6.61		34	250	57	59	
S. Bernardino	S. Bernardino	1,054	63.7	110	25	10.24		38	233	96	37	
Riverside	Riverside	851	63.1	110	27	6.63		34	255	63	48	
Chino	S. Bernardino	714	64.6	103	20	8.89		19	175	62	129	
Los Angeles	Los Angeles	293	63.9	97	35	11.88		30	187	127	52	Southern.
Anaheim	Orange	134	68.0	104	28	9.13		21	149	120	97	
Cuyamaca	San Diego	4,543	49.3	85	9	26.81	9.0	52	240	91	35	
Claremont	Los Angeles	1,200	64.3	107	30	12.54		35	271	59	36	
Barstow	S. Bernardino	2,105	66.8	109	30	.80		4	313	8	45	
Azusa	Los Angeles	540	64.6	104	26	13.68		29	307	23	36	

IT IS HEALTH-GIVING.

California is a universal sanitarium. The climate of the coast is invigorating, stimulating and delightful, neither hot nor cold; the laborer knows no fatigue except from physical exhaustion resulting from over-taxed muscles. The brain-worker yields only to failure of mental powers. In the interior valleys, in midsummer, the temperature is higher, and there is discomfort at times while working in the harvest fields and at the desk and behind the counter. But the dryness of the air robs the thermometer of much of its terror. The *sensible* temperature, *i. e.*, the temperature we in fact experience or *feel* in the valleys, is less irksome at 100° or 110° than in regions of greater humidity of the atmosphere where the reading is from 85° to 95° . Sunstroke here is unknown. It is the common experience of persons coming into almost any part of the State that they increase in weight and strength, are less troubled with nervous affections, sleep and eat well, and improve in health if ailing from any cause.

SOURCE OF HAPPINESS.

The variety of temperature and climatic conditions existing in the mountains, valleys, and on the coast, and the celerity and ease with which our inhabitants may change their immediate surroundings, constitute one of the great charms of California life. Thousands of families residing in the valleys find their way into the mountains or to the seacoast and have most delightful camping-out experiences; and this they may do in a few hours or a day or two at most with their own conveyances. Our valleys and mountains lie so related to each other that no spot can be found devoid of scenic beauty. There is no dull monotony in the farmer's life—as there is from necessity in the lives of those who reside on the great plain regions of the West, few of whom are ever permitted to enjoy the inspiring and elevating means of recreation and rest from labor which are a part of our life here.

SOME PECULIARITIES.

Degrees of latitude cut little figure in determining the readings of the thermometer, which is not at all true on the Atlantic Coast and in the West. The above table tells the story from official sources for 1904, and is valuable as covering the whole distance and intermediate points from San Diego, near the south line of the State, to Redding, at the extreme north end of the Sacramento Valley—eight degrees of latitude apart.

The fact that latitude has little to do with our climate is a remarkable feature. It is not true of Italy, for there is a great variation there between the temperature north and south. It is not true of France or elsewhere along the west coast of Europe. We believe this to be a peculiarity unique and found only on this coast. This peculiarity is further attested by the fact that in all this vast region the same fruits are grown. Within a radius of 50 miles around Oroville, which is 150 miles north of San Francisco and 650 miles north of Los Angeles, there were more than one thousand carloads of oranges raised last year and shipped out of the State, and they ripen earlier than in the south. Elevation has much more to do with temperature than latitude, for in

high altitudes we find snow. Our mountain summer climate is extremely delightful and is destined to draw many Eastern people to the numerous charming retreats in the Sierras and the Coast Range.

ECONOMIC VALUE.

But after all is said, it must be conceded that climate is our greatest resource because of its high economic value. The unthinking speak of climate as an attraction rather than a resource, but it is a resource because by its influence we are enabled to so marvelously diversify and increase the number of our agricultural products; and often, too, all these products may be grown on the same body of land. It is a resource, because man's labor here can be profitably employed every day in the year; because there is no month when vegetation in some form is not growing, and because it furnishes ideal conditions for the growth of irrigated crops. There is no time when all nature is at rest or plant life is sleeping. In the field, orchard, garden, factory, and in the mines; on the stock farm and in the dairy, *every day* is a day of *productive labor*. We commence shipping fresh deciduous fruits in May and there is no cessation until December. In November we begin to ship citrus fruits and they overlap the deciduous fruits and continue in fact the year through.

Prof. E. W. Hilgard justly sums up the matter thus: "Taken as a whole, California corresponds in its climatic features and adaptation to the Mediterranean region of Europe and Africa—a grand *Riviera*, with a partial background of the desert as well, where the date palm and the ostrich find a congenial home, and alluvial plains equaling in richness the famed delta of the Nile."

ALAMEDA COUNTY.

Alameda County fronts the bay of San Francisco for a distance of 38 miles, with an average width of 25 miles, extending to and beyond the summit of the Contra Costa hills, comprising numerous beautiful valleys, besides the broad Alameda Valley, which last is bounded by the waters of the bay on the one side and the Contra Costa hills on the other, and is one of the richest and most fertile valleys in the State. Among the most important of the smaller valleys are Livermore, Sunol, Castro, Amador, and Moraga, all richly endowed by nature with most productive soils, where flourish the grape, olive, fig, orange, and most of the semi-tropical fruits, and beautified with perennial flowers. The Contra Costa hills are well adapted to the cultivation of the olive.

The principal stream, Alameda Creek, rises in the Mount Diablo range, near Livermore Pass, and running through a cañon in the Contra Costa range, empties into San Francisco Bay, supplying water-power for a number of mills on the way. It is navigable for schooners and light-draught vessels for several miles. There are other creeks crossing the county and emptying into the bay, two of which furnish water for the city of Oakland. By the construction of a high dam at a narrow gorge in the hills, San Leandro Creek is made to form Lake Chabot, half a mile in width by 2 miles in length. The range of hills extending the whole length of the bay-front, at a distance from the bay ranging from 5 to 10 miles, reaches its highest altitude at Mission San José, at the southern end of the county, in Mission Peak, the highest point being 2,275 feet above tide-water. The country around Haywards was once a great grain-growing region, but its special adaptability for fine fruits has caused large tracts to be set out in orchards. This district is one of the great fruit-raising regions, many millions of pounds being shipped annually.

SOIL.

The soils immediately along the bay in Alameda Valley and the marshes formed by the overflow are heavy, but very fertile when reclaimed. Then comes a broad belt of rich, black adobe that is crossed by deposits of alluvium made by shifting channels of streams running down from the Coast Range. In the Niles region are lighter loams. About Livermore are uplands, bench and valley lands. Between the latter two classes the variation in potash, lime, and phosphoric acid accounts for difference in grape crop. Mission San José is characterized by gravelly, upland, adobe soil, and was evidently chosen by the padres of the old Spanish mission for its exemption from frost, caused by its slight elevation above the surrounding valleys. The Pleasanton section consists of agricultural and grazing lands. The soil is a very rich sediment, producing hay, grain, potatoes, hops, and

beets in abundance. At Alvarado the surrounding country is a fine farming and fruit region, and gardening and dairying are largely carried on. The fertile, alluvial soil is finely adapted to fruit-growing.

The average rainfall of the county is about 30 inches.

FRUIT CULTURE.

Alameda County was among the first to begin the planting of orchards and vineyards, but it called for much experiment to determine to what particular fruits different sections were best adapted; after fifty years of trial those questions are now pretty well settled. This county is divisible into three sections—the cherry district, the apricot district, and the vineyard district.

From Oakland to Haywards is the home of the cherry; nowhere on the coast does this fruit grow to greater perfection, and of the many hundred acres devoted to it, a majority have been very profitable, excepting of course in years when frost and untimely rains strip the trees of blossoms and young fruit, causing an almost total failure. This does not often occur, and in an ordinary year the cherry crop is good for a profit of a quarter of a million dollars. During the last seven years there has been no time when Royal Ann cherries, the favorite canning variety, did not command five cents a pound, and that means a good profit.

The apricot section includes all the region east and south of Haywards, but the center is at Niles, and this region is as favorable for apricots as the San Leandro region is for cherries. While the apricot is grown in nearly all fruit-producing regions of California, there are few, if indeed any, where it comes to the perfection which it attains in the vicinity of Niles. The Alameda apricot is high colored and the flavor exquisite. One of the most popular varieties, the Alameda Hemskirk, was originated here. The other varieties preferred are the Blenheim and the Moorpark. A first-class apricot orchard is easily worth \$500 per acre, and some could not be bought for \$750 or \$800. There are a few specially good pieces of land which without trees are worth \$400 to \$500 to the right parties, because in orcharding, as in other lines of business, there is as much in the man as in the opportunity. Apricot trees yield from twelve to twenty tons an acre, worth from \$20 to \$30 a ton. Thousands of carloads of apricots are shipped annually from this county.

While cherries and apricots are the king and the queen of fruits, there are others which do well, among them being the Bartlett pear. The plum is another fruit which thrives, and the smaller fruits and berries find no more congenial home anywhere.

In Alameda County are the largest currant patches in the United States. The size of an average currant farm varies from twenty to forty acres. Local canneries pack a great number of cases of this fruit, and thousands of chests of currants are shipped away each year.

It is generally known that the culture of raspberries requires a rich soil and an abundance of water, so that where a healthy raspberry patch is seen the fertility of the soil is evidenced. In Alameda County raspberries frequently attain a diameter equal to that of a quarter of a dollar and a height of over an inch.

Almonds, chestnuts, English walnuts, pecans, beechnuts, and hazelnuts are extensively cultivated.

Both oranges and lemons grow abundantly. Lemons ripen every day of the year. Land suitable for growing lemons can be bought for \$100 an acre. No irrigation is required. Young lemon trees can be bought for thirty cents each. One hundred of these trees are usually planted to an acre.

Olives grow admirably. Ripe olives find a ready market for immediate consumption, or they are converted into oil that is sold at from \$3 to \$5 a gallon. Over sixty varieties of olives are cultivated in California. In Alameda County the greater part of the production is of the Mission olive. This is an excellent and hardy variety. Eighty per cent of it is flesh, in which there is twenty-five per cent of oil.

In this county orchardists operate under especially favorable conditions. No irrigation is necessary. Trees grow throughout the year, some varieties yielding two crops annually. Throughout the horticultural sections of the county one sees, on either side of the well-kept roads, orchards, berry patches and vineyards, among which may be seen handsome and comfortable homes.

VEGETABLE INDUSTRY.

Alameda is par excellence a vegetable-producing county. It has led in this industry for a long time, and the area devoted to vegetables has been increasing at a rapid rate, since the profit in peas, potatoes, tomatoes, rhubarb, asparagus, and several other vegetables is large enough to tempt the owners of the best soil to go into the business.

The hillside region produces the earliest vegetables in the State, or as early as any, and the potatoes and peas grown here commence coming into market even before spring, for the winter rains are all that are needed to bring forward the crop in this belt, which is practically frostless. It is found very profitable to grow certain vegetables on the deep, rich valley lands, which, although they do not produce so early, bear much larger crops. No very accurate figures on the acreage devoted to vegetables can be obtained, but fairly trustworthy estimates have been made by many persons who have opportunities to know. One of these is that there are 8,000 acres devoted to vegetables in the county, not including sugar-beets, which would add 4,000 or 5,000 acres more. The most important crops are peas, potatoes, tomatoes, cucumbers, and summer squash. A large part of the vegetable business is done between Haywards and Elmhurst, although a great many tomatoes are grown in other parts, including Livermore Valley. In former times the vegetable business was largely in the hands of Portuguese and Italians, who conducted it in a small way, on account of lack of capital, but the wealthier American farmers have taken it up in wholesale fashion since they find that it pays better than fruit. A crop can be obtained the first year after planting, while it takes five years to secure a producing orchard. A great many vegetables are also grown between the rows of trees.

The tomato region extends along the bay shore from Mount Eden to Elmhurst, and the tomatoes produced in this region are preferred by the canners because they contain more substance and not so much waste; but tomatoes are also grown in other parts of the county. Some of the tomato fields are very large, tracts of 100 acres not being uncommon. The time of the tomato harvest is between the 10th of August

and the end of October, although frequently the crop is practically all in before the 1st of October. To secure the best land, if he is farming on rented land, the tomato-grower must pay from \$16 to \$20 an acre, while a fair price for the product is \$7.50 per ton, and the yield is about nine tons to the acre. A large grower will ship three carloads, twenty tons to a car, each night. Frequently seventy or eighty pickers will be employed on a single ranch.

The potato crop is of increasing importance, since it has been found that there is good money in the big Burbank potatoes and other commercial varieties. The best soil will produce from 75 to 80 sacks to the acre, although record yields of 150 sacks have been produced.

The growing of peas for canning has assumed importance, due to the circumstance that the canning syndicate, which operates on the plan of specialties, putting up in each of its canneries the products grown best in that particular locality, has made this the pea-canning center. The San Leandro factory has canned peas at the rate of 1,200 cases per day. Each case contains twenty-four cans.

One of the prosperous agricultural industries is the growing of rhubarb for the California and Eastern markets. At first the local market only was supplied, but experimental shipments were made to the East, and since then this branch of the business has become important, with a large increase in the acreage as a consequence. San Leandro is the center of the industry, and it is there that success in the business of Eastern shipping has been worked out. The home and foreign shipments taken together average a net return of a dollar a box. When the plant sells at such a rate the profits are large. It will pay ten per cent interest on land worth \$1,000 per acre. The vegetable land around San Leandro has sold as high as \$700 per acre, and \$500 has been refused by owners of choice land. Rhubarb may be planted either in open ground or between orchard trees. Some farms have it ready for shipment as early as the middle of February.

Three and a half tons of peas are grown from an acre. These peas are sold for \$30 a ton, and thousands of carloads of them are shipped from the county annually. Asparagus, which is cut from April to July, produces \$400; pickle onions, \$400; peppers, \$240; garlic, \$280; potatoes, \$100; sugar-beets, \$75; squashes, \$60, and sweet corn, \$50 an acre.

HOP FIELDS.

The hop industry is chiefly located near Pleasanton, and during the picking season employment is given to some 2,000 pickers. The product of the Pleasanton hop fields for several seasons has been purchased by Guinness, the London brewer and manufacturer of pale ale, exported to all parts of the world. Pleasanton hops command a premium in the London market. While an augmented force is required during the hop-picking season, the cultivation of hops and other products on the ranches in the vicinity of Pleasanton requires the services of a great number of employes throughout the year, and is a source of large revenue to the town. The crop last year from the Livermore Valley alone was 707,621 pounds of dried hops. The Pleasanton yards are the largest hop yards under one wire in the world. Over sixteen million pounds of cable and of trellis wire are used for the network that spans the twenty-foot poles to sustain the weight of the full-grown vines.

BEET-SUGAR INDUSTRY.

California was the first State in the Union to manufacture beet-sugar on a commercial scale. In Alameda County it has been manufactured for the past thirty-three years. Within her borders is located not only the pioneer beet-sugar factory of this country, but also one of the largest factories in the world. The annual production of beet-sugar in California exceeds that of any other State. In the year 1902 the factories produced 80,000 tons of sugar. The product of the land used for this industry is annually worth \$7,200,000. In this State are eight factories engaged in the industry. The amount invested in these factories, including working capital, is \$20,000,000. Beets here average over 14 per cent sugar of 88 per cent purity, and they yield an average of 15½ tons to the acre. The planting season extends from the first of February to the middle of May. This provides a long period of activity for the factory, which begins operations in August, and has continuously maturing crops of beets to handle. Few factories are so favorably located as this pioneer of the industry, since it is certain of a good crop of beets each year. In 1902 there were in Alameda County over 5,000 acres planted to beets. This land produced 48,970 tons of beets, the value of which was \$220,365, or an average of over \$43 an acre. These beets were grown by four hundred individual growers.

GRAPE-GROWING AND WINE-MAKING.

While Alameda is not classed as a viticultural county, it has about 8,000 acres of vines, and some of the best wine in the State is made. The Livermore Valley and the hilly region adjacent are recognized by experts as among the best districts of California for the production of high-class wines. Of the estimated acreage of 8,000, about 6,000 are in the Livermore and Pleasanton districts, in Murray township, and about 1,000 in Washington township. Outside of these townships the area devoted to grapes is nominal. Practically all the vines are of wine varieties, there being not more than 100 acres of table grapes. Wine vineyards are the more profitable. The majority of these vineyards are planted to those varieties of grapes which produce the highest type of wine, and as a consequence the yield is much smaller than from more common varieties. From two to three tons per acre is the average yield of the best. On the hill slopes, where the choicest grapes are grown, a yield of two tons, or even of one and one half, per acre is considered satisfactory. The deeper valley soils produce a larger crop, but the wine is not so fine. Even where only two tons per acre are produced the profit is fair if the grapes can be sold at \$25 or \$30 per ton. In Livermore district the wine industry is really only in its infancy. The area in vines is but a small fraction of what it will be some day, for there are thousands and thousands of acres of land just as good as any which is now utilized. The present vineyards, being practically all on resistant stock, are permanent, and there will be no backward step. Last year six hundred carloads of wine were shipped from the county. At many vineyards the wines are stored in tunnels dug in the solid sandstone. Of the four gold medals awarded American wines at the Paris Exposition, two were awarded to wines of Livermore Valley. Since that time the Alameda County wines alone have been

awarded ten gold medals at different expositions in the United States and in foreign countries. Because of the perfect weather in the Livermore Valley during vintage time, grapes ripen well every year, and thus a uniform grade of wine is insured. In France, because of variations of climate, fine wines are made only in certain years, while at Livermore they are made every year. When one puts to his lips a glass of the Château d'Yquem Souvenir of the California vintage, one wonders with Omar

* * * what the vintners buy
One half so precious as the stuff they sell.

The first requirements for the production of a fine quality of wine are a suitable soil and a favorable climate. These, of course, must be supplemented by skillful handling of the product of a select quality of grapes from the time it leaves the vine until it has been aged and clarified. The commendation of the more fastidious of connoisseurs, as well as the numerous medals that have been awarded the wines of Alameda County when in competition with those of both America and Europe, have established beyond question the fitness of the soil and the climate of Alameda County for the production of the highest grade of wine. At the Cresta Blanca, Giersberg, Mont Rouge, Ruby Hill, Olivina, and Dos Mesas vineyards in the Livermore Valley, over one hundred and twenty-five varieties of grapes are cultivated. At Irvington the largest winery in the world is situated.

SALT PRODUCTION.

The average annual output of salt recovered from San Francisco Bay, in Alameda County, is 100,000 tons, including both coarse and fine salt, varying according to the length of the season. The recovery of salt by solar evaporation was begun in 1857, but did not become an important industry until in the seventies. Since then it has steadily grown until at present the evaporation vats and refineries extend for about fifteen miles along the bay shore from Newark to Russell station, the available salt lands covering about 8,000 acres. The market has gradually extended beyond the local demand, until Central and Northern California, the Hawaiian Islands, Washington, Oregon, British Columbia, the Philippine Islands, and Siberia are included. These markets consume about 115,000 tons of coarse and fine salt annually, outside producers furnishing from 35,000 to 40,000 tons of that amount. The Alameda County makers are each year improving the quality of fine salt. The salt recovered from San Francisco Bay has a lime basis, and produces a better quality of fine salt than that from the Great Salt Lake in Utah, which has a soda basis. Alameda County salt has been tested and proven to be adapted to the manufacture of muriatic acid, caustic soda, soda crystals, hyposulphide, glauber salts, sodium sulphide, chloride of lime, and soda ash. These by-products will become a part of this growing industry. The fishing industries of the northern coast procure their salt from the beds of Alameda County. Oakland harbor is the winter quarters of the fishing fleet. In the spring these vessels load with salt, and in the fall return with cured fish. By analysis, the salt of Alameda County is shown to be superior to any commercial salt now in use.

STOCK-RAISING AND DAIRYING.

Though Alameda is not properly a stock-raising county, it has a large quantity of fine stock and makes much fine butter. The condition of this industry shows how advantageous is diversified farming, and how all the resources of the land and situation are utilized. On the lands unsuited to fruit the dairy industry is becoming more and more important. There is a good deal of hilly land where fruit trees can not be cultivated with profit. Formerly the best done with this was hay, and at \$7 to \$8 a ton there was little for the farmer. People have begun to learn that they can double their profit by turning the hay into milk, and the dairy industry has a steady growth. This industry has been stimulated by the establishment of creameries. Farmers in this district who have kept careful account of their income through a number of years say that a cow will return between \$45 and \$105 gross a year. On irrigated land one cow is kept to the acre; on unirrigated, one to about two and a half acres, the proportion varying with the land. The near market offered by San Francisco and the bay cities operates to great advantage.

The poultry interests are very extensive. All classes thrive well. The county has many advantages for the raising of poultry, among others being the nearness to the two large markets of Oakland and San Francisco. It is estimated that the returns from this industry amount to \$1,000,000 per annum.

MINING AND MANUFACTURES.

The manufactures and mineral productions of Alameda County are not inconsequential. The Tesla Coal Company, besides developing the coal fields, has opened beds of clay and reefs of limestone, from which cement is made. And here is found an excellent quality of sand for glass-making, clay equal to that imported from Europe by Eastern manufacturers for making sanitary ware, and an immense bed of clay suitable for making firebricks and other refractory articles. In the county there is located one of the largest and most modern plants for the manufacture of firebricks. It may be added that there is also the item of Portland cement. In that valley hundreds of thousands of barrels are annually sent to the markets of the world. The Phoenix Quicksilver Mining Company has a vein of ore 60 feet in width and very rich. This company is constructing a 40-ton Scott furnace on its property. In the same section the Martel Mining Company has begun operations upon what has been pronounced by experts the largest single deposit of magnesite known in the world. There is actually a mountain of it, so that it can be quarried like stone. A few miles southeast of Livermore are considerable deposits of chromic iron. These mines annually produce hundreds of tons of high-grade ore. The Corral Hollow Cañon coal veins are abundant. Railroads have been built to these mines from both Stockton and Oakland, and thousands of tons of coal are mined and shipped annually.

Hematite is common in this county, and is used here extensively in the manufacture of paint. Veins of this ore carry gold in quantities varying from \$1 to \$4 a ton. Copper ore is found in the foothills.

An extensive plant to manufacture steel wire has been constructed in East Oakland, and large iron and copper reduction works are projected.

More than ten years ago ship-building firms moved to Oakland, and began the extensive building of coast and river vessels. Their operations extended widely, especially in connection with the Alaskan traffic of late years. One firm has purchased thirty-eight acres of property on the water-front, and has a ship railway capable of handling vessels of several thousand tons. The steamers of the San Francisco, Oakland and San José Railway were recently built at an Oakland shipyard, where another steamer is now being constructed for the same company.

Oakland's manufacturing industries embrace several hundred establishments, and represent manufactures of cotton, flax, jute, leather, iron, steel, wood, oil, borax, magnesite, and many other materials.

One of the principal Pacific Coast affiliations of the Standard Oil Company has its refinery in Oakland. The Western Meat Company has its main feeders in Oakland. The chief refinery of the Pacific Coast Borax Company is located at Alameda, an immediate adjunct of Oakland. Up to a few years ago the largest part of the demand for borax in the United States was supplied from this refinery. Its capacity of one thousand tons of refined borax a month requires for its operation a force of one hundred men.

Newark contains a carshop of Carter Brothers. The town of Niles, a few miles farther east, has the famous California Nursery, which supplies fruit trees to all parts of the Pacific Coast. Outside of Oakland there are extensive fruit and vegetable canneries at Haywards; an oil refinery and pottery at Alameda; iron works and furniture factory at West Berkeley; sugar refinery at Alvarado; wineries at Irvington, Mission San José, Warm Springs, and Livermore; agricultural machinery and traction engines at San Leandro; brickyards at Pleasanton; and a number of minor establishments of other kinds at other points.

CITIES AND TOWNS.

Alameda County contains between thirty and forty towns and villages, a half score of these being incorporated cities. The City of Oakland occupies a favorable position, being almost opposite the entrance to the Bay of San Francisco. It is the county seat, and has a population of over 100,000. Berkeley has a population of 25,000, and Alameda 20,000. The population of Oakland has increased 23 per cent in two years, and its postoffice receipts 30 per cent in the same period. It has a public library of 70,000 volumes. A granite post-office building, costing \$300,000, has recently been erected by the Government. The city is the terminus of all railroads entering the State. It lies on the protected side of San Francisco Bay and is the natural clearing-house for the wares and products of the State that go eastward, and the distributing point for Eastern productions that are bound across the Pacific Ocean. Eleven banks, which have never known a failure, have deposits amounting to \$22,600,000. In 1870 the city's real estate was assessed at \$6,000,000; since then the valuation has increased to nearly \$60,000,000. In 1904, 1,450 buildings, of average cost of \$5,000 each, were erected in the city, and the suburban growth was proportionally large. Seven theaters contribute to the public amusement. The east- and west-bound freight handled at the port of Oakland in 1903 amounted to 4,648,994 tons.

The University of California, with its 3,000 students and 400 instructors, is located at Berkeley and can be reached from any part of Oakland for a five-cent fare. In addition to this great educational institution and to over twenty public schools, there are a number of colleges, seminaries, and parochial schools.

GENERAL STATISTICS.

Area, 840 square miles, or 537,600 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	459,394
Value of country real estate	\$16,151,350
Of improvements thereon	3,719,600
Of city and town lots	39,825,475
Of improvements thereon	30,407,375
Of personal property	15,744,220
Total value of all property	108,896,373

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle—Beef	2,200	\$66,000	Colts	250	\$2,500
Stock	3,000	75,000	Mules	400	20,000
Thoroughbred	4,000	160,000	Sheep—Imported or fine	550	1,600
Cows—American	6,500	130,000	Common	4,000	8,000
Graded	600	15,000	Lambs	1,500	1,500
Common	3,500	52,500	Goats—Angora	20	40
Calves	5,000	25,000	Common	175	175
Swine	3,800	15,200	Poultry (dozen)	10,000	30,000
Horses—Thoroughbred	600	120,000	Hay	---	100,000
Standard-bred	3,000	90,000	Wool	---	1,000
American	3,000	60,000	Lumber	---	210,000
Common	1,000	15,000			

Number of acres sown for crop of 1904:

Wheat	30,000
Oats	1,600
Barley	45,000
Corn	725
Hay	36,275
Sugar beets	4,500

Number of fruit trees growing in spring of 1904:

	Bearing.	Non-Bearing.		Bearing.	Non-Bearing.
Apple	55,000	800	Prune (French)	145,000	22,000
Apricot	100,000	8,000	Prune (other kinds)	2,100	400
Cherry	82,000	19,000	Lemon	1,200	100
Fig	200	---	Orange	2,300	100
Olive	4,300	1,000	Almond	79,000	4,000
Peach	86,000	1,100	Walnut	2,000	300
Pear	66,000	4,000			

Value of grain assessed in storage:

Wheat	\$25,000
Oats	5,000
Barley	50,000
Corn	1,500

School statistics:

Total number of census children, 1904	34,939
Number of teachers employed	668
Number of school houses	100
Number of school districts	54
Amount expended for public school purposes	\$721,250 68

ALPINE COUNTY.

Alpine is one of the mountain counties, and its principal industries are mining and lumbering. It has but a small population, the last census placing it at 509. Its cultivated lands will reach 10,000 acres.

The county is a succession of mountain ranges, with high and precipitous peaks. Silver Mountain is one of the highest peaks, having an altitude of 10,000 feet. Round Top is another towering peak; it is 10,600 feet high. There are numerous small lakes, the waters of which are clear and cold; many of them contain mountain trout. Of these are Blue and Caples lakes, in the western part. The county is bountifully supplied with brooks, creeks, rivulets, and rivers, many of them heading up in the mountains, fed by the numerous lakes and the melting snow, which keep them running through the summer. The Carson River heads in the southern part and flows from south to north through the county. It is fed by numerous streams: the East Fork of Carson River, the West Fork of Carson River, and Wolf, Silver, Monitor, Smith, Mogul, and Indian creeks.

Among the mountains are numerous valleys. The largest and most noted are Diamond, Hermit, Pleasant, Hope, Faith, and Charity. Diamond Valley lies in the northeastern part and contains some very rich, productive ranches, producing wheat, barley, hay, oats, and potatoes. The three sister valleys—Faith, Hope, and Charity—are located in the northwestern part, at an altitude of 7,500 feet above sea-level. The valleys are inhabited only during the summer, and then by stock-raisers and dairymen. The dairy interest in these three valleys is of considerable importance, and more than 50,000 pounds of butter of excellent quality is produced annually. Pleasant Valley is near the town of Markleeville, where considerable hay is cut and marketed to the residents thereabouts. There are many other small valleys, where sheep and cattle are grazed during the summer. The nutritious bunchgrass, which grows so luxuriantly in those mountainous regions, is of excellent quality, and stock fattens rapidly upon it.

The entire western section is a wild mountainous region, whose grandeur of scenery vies with the Alpine regions of Europe. From November until late in June the region is wrapped in a mantle of snow, varying in depth from two to fifty feet; during the remainder of the year it forms a vast mountain pasture for thousands of sheep and cattle that are driven there from the lowlands of the State to feed during summer and fall. The greater part of the surface of this mountainous region, as well as the lower and eastern section, is covered with forests of heavy and valuable timber. All the coniferous trees common to the western slope grow to a large size on the mountain sides. There are cut annually 750,000 feet of lumber.

In the northeastern part farming is carried on to a considerable extent. Upper Carson, Diamond, and Dutch valleys are the chief seats of this industry. In the elevated valleys among the mountains, summer dairying is an important industry. Carson Valley, extending into the northern part of the county, contains some of the most productive and valuable agricultural lands in the State.

The many beautiful lakes high up among the mountains are favorite summer resorts. The Blue Lakes, especially, are a famous rendezvous for summer pleasure-seekers. In many parts of the county are mineral springs, both hot and cold.

In the valleys the soil is a heavy alluvium, rich and fertile and yielding heavy crops where cultivated. Some very excellent apples, pears, and small fruits are produced, but owing to remoteness and lack of transportation facilities, little finds its way to market, most of the output being used for home consumption.

Markleeville, the county seat, is located on the west bank of Carson River, and is reached by stage via Carson City.

There are at least sixty irrigation ditches in operation. The Blue Lakes Water Company has four large reservoirs in the western part of the county. These are of great value and constitute an important part of the plant of the Standard Electric Company. The Union Water Company has two large valuable reservoirs in the southern part of the county, from which the Utica Mining Company at Angels, Calaveras County, gets its water. Two companies of Carson Valley farmers own and control at least twenty valuable reservoir sites in the central part of the county, upon eleven of which more or less work has been done in the construction of dams and in which water has been stored and utilized.

The mining industry, so long dormant, is giving promise of large results.

GENERAL STATISTICS.

Area, 575 square miles, or 368,000 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	52,592
Value of country real estate	\$219,485
Of improvements thereon	175,937
Of city and town lots	1,235
Of improvements thereon	2,420
Of personal property	57,164
Total value of all property	460,829

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle—Beef	82	\$1,640	Colts	43	\$955
Stock	737	11,055	Sheep	16	32
Cows	249	4,980	Swine	73	165
Calves	445	3,115	Poultry (dozen)	77	231
Horses—American	76	3,070	Hay	---	1,300
Common	147	2,965			

Number of acres sown for crop of 1904:

Wheat	200
Oats	50
Hay	500

Number of fruit trees growing in spring of 1904:

	Bearing.	Non-Bearing.
Apple	1,700	200
Apricot	75	20
Prune (French)	120	50

School statistics:

Total number of census children, 1904	78
Number of teachers employed	3
Number of school houses	3
Number of school districts	3
Amount expended for public school purposes	\$2,232 99

AMADOR COUNTY.

Amador County is located between the Cosumnes and Mokelumne rivers, and extends from the San Joaquin and Sacramento valleys on the west to the summit of the Sierra Nevada Mountains on the east—a distance of more than 75 miles. Its altitude ranges from 300 feet above sea-level in the western portion to something over 9,000 feet in the eastern end.

MINERAL RESOURCES.

The resources of the county are numerous and varied. For many years it stood among the leading gold-producing counties, and at present has perhaps the greatest number of dividend-paying mines (quartz mining being specially referred to). Gold production in 1904 was \$2,060,573. Copper is mined in considerable quantities. The western portion is underlaid with immense beds of soft or fuel coal. Many thousands of tons are shipped to different parts of the State. Alongside of the railroad are unlimited beds of the finest potter's clay. There are many other sources of wealth, such as fine building stone, roofing slate, and beautiful marble.

AGRICULTURE AND STOCK-RAISING.

The western portion is composed of rolling hills, interspersed with beautiful little valleys, the land of which is adapted to all kinds of agricultural products—wheat, barley, oats, corn, potatoes, broomcorn, and alfalfa. All kinds of vegetables grow in profusion. The rolling lands, which constitute the greater portion of the county, are composed principally of a gravelly, or red loam, soil, and covered more or less with oak timber and an undergrowth of brush and wild grasses, which makes them well adapted for the raising of stock—one of the leading industries of the county. Horses, mules, sheep, hogs, and cattle are raised in considerable numbers, especially cattle, of which many fine herds are owned in the western portion of the county, where they are kept during the fall, winter, and spring without other feed than the natural products of the soil. In the summer they are driven up near the summit of the Sierra Nevadas, to graze along the mountain sides, just below the rim of the melting snow.

The production of hay, grain, alfalfa, and vegetables is limited to the demands of home consumption. Where suitable soils are selected the yield is large.

DAIRYING AND POULTRY.

Dairying is another important industry. Ione, in the western part of the county, and at the railroad terminus, has the leading creamery in this part of the State, turning out daily hundreds of pounds of butter, which commands the highest market prices. It also has the leading flouring-mill in this part of the State, with a capacity of 100 barrels of flour per day, furnishing a home market for grain.

Poultry-raising is an industry that is carried on to a considerable extent, and at remunerative prices. Chickens range in prices from \$3 to \$5 per dozen; turkeys, from 12 to 18 cents per pound; eggs in winter, from 25 to 35 cents per dozen, and in summer from 15 to 25 cents.

FRUIT-GROWING.

Fruit-growing is carried on in all its branches. While there are yet but few large orchards and vineyards, nevertheless it has been demonstrated that the climate and soil of Amador County are equal to any in the State for the growing of apples, peaches, pears, plums, prunes, quinces, berries in great variety, and grapes in particular. Oranges grow to perfection; as yet the quantity is limited, but the quality is unsurpassed. The olive has been experimented with in the foothills to a sufficient degree to prove its absolute success.

LUMBERING—POWER.

The central portion of the county is covered with great forests of pine, spruce, fir, and hemlock, in which are located some extensive mills that employ scores of laborers in the cutting and hauling of lumber to supply the mines that are situated twenty-five miles below.

One other valuable enterprise is the plant of the Standard Electric Power Company. It is located about seven miles east of the town of Jackson, and furnishes power and light not only for Amador County, but also for outside points. The plant, which represents a cost of something like \$6,000,000, is run by water power, the supply coming from the never-ceasing streams and melting snowbanks up near the summit of the Sierra Nevada Mountains, the water being caught and retained in immense reservoirs.

Amador County has an ample rainfall, the average precipitation being about 23 inches. The farmers have not found it necessary to adopt a general system of irrigation, although the supply of water is ample, and to spare, if properly husbanded in large reservoirs, for which there are many available sites.

Prices of land have a wide range, governed by quality of soil and location, and by the amount and character of the improvements. Alfalfa land, or land that is already in a high state of cultivation, is held at from \$100 to \$300 per acre; yet there are thousands of acres now used for grazing purposes, and well adapted to the growing of grapes, olives, figs, oranges, etc., that can be had at from \$5 to \$40 per acre.

GENERAL STATISTICS.

Area, 568 square miles, or 363,520 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed.....	266,809
Value of country real estate.....	\$2,529,002
Of improvements thereon.....	807,262
Of city and town lots.....	273,280
Of improvements thereon.....	753,983
Of personal property.....	654,321
Total value of all property.....	5,157,826

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle—Beef	50	\$1,250	Colts	297	\$3,712
Stock	11,872	118,720	Mules	281	8,430
Cows—American	31	620	Sheep	5,748	8,622
Common	2,564	51,280	Goats	2,620	2,620
Calves	751	3,755	Poultry (dozen)	52	156
Oxen	24	720	Hay	---	2,650
Swine	3,162	7,905	Lumber	---	8,880
Horses	3,042	76,050			

Number of acres sown for crop of 1904:

Wheat	6,500
Oats	2,150
Barley	3,560
Corn	600
Hay	3,450

Acres of grapevines growing in spring of 1904:

	Bearing.	Non-Bearing.
Table	73	..
Wine	45	7

Number of fruit trees growing in spring of 1904:

	Bearing.	Non-Bearing.		Bearing.	Non-Bearing.
Apple	4,690	950	Prune (French)	1,230	1,340
Apricot	1,320	45	Prune (other kinds)	230	60
Cherry	640	100	Lemon	15	5
Fig	470	25	Orange	370	65
Olive	165	55	Almond	3,140	520
Peach	13,720	340	Walnut	90	35
Pear	6,215	70			

School statistics:

Total number of census children, 1904	2,389
Number of teachers employed	65
Number of school houses	46
Number of school districts	43
Amount expended for public school purposes	\$38,516 14

BUTTE COUNTY.

Butte County occupies a position in the northeast portion of the Sacramento Valley. One half of the area may be termed foothill lands, and of the remainder one fifth may be denominated as mountainous, leaving about one third of the entire area as fertile valley lands. The mountains are heavily timbered, giving place to important lumbering interests; the foothills are covered with oak and smaller growth, while the valley lands have, with the exception of the adobe soil, splendid growths of mammoth oaks. The locating of the Government Experiment Station in Butte County stamps it as one of the very best spots in the United States.

The county is so situated that it has all the advantages of cheap and ready transportation. The Sacramento River, along its western boundary, affords communication by water for vessels at all times of the year, while the California & Oregon Railroad traverses the center of the county its entire length; a branch of the same line extends to Oroville from Marysville; thus giving all the more important parts of the county ready communication with the markets of the coast and the seaport at San Francisco.

Chico is the metropolis, and is on the California & Oregon Railroad, in a rich agricultural and horticultural section. It is an incorporated city, and has a population, with suburbs, of fully 7,000. It is the educational center of the northern half of the State, being the location of a State Normal School, possessing a splendid building, thoroughly equipped, and with over a score of instructors, who, acting under the direction of President C. C. Van Liew, have given to this institution a wide and favorable reputation among the educators of the West. There are between four and five hundred pupils in regular attendance. The public schools consist of three buildings, with another to be erected soon, and a new high school. Chico has wide, tree-lined avenues, and a complete sewer system. Nine or ten religious denominations are represented.

Oroville, the county seat, is situated at the terminus of the Northern California Railroad, running from Marysville, 28 miles distant. It is a prosperous, growing place of 3,500 people. It has excellent schools, including a high school with three instructors. A new high school building has just been erected. Oroville is the center of the orange- and olive-growing district. The largest olive-pickling plant in the State is located here, and the olive oil manufactured in this section is of such high grade that three gold medals were awarded for purity and excellence, to as many different manufacturers, at the St. Louis Exposition. Soil and climate are especially well adapted to the production of figs, which are grown with much profit. Deciduous fruits and grapes do exceedingly well on the foothill lands east of Oroville. Mining is a very important industry, and the largest gold-dredging field in the

United States is here. The amount of gold taken out by these machines is enormous, and they have added very materially, during the past few years, to the town's prosperity.

Oroville will be a very important point on the Western Pacific Railway. This company has purchased a large tract of land at the edge of town for a yard and depot site, and has acquired rights of way for thirty or forty miles through the mountains northeast. The route of the railroad lies through a very rich country, the resources of which have been undeveloped through want of railroad facilities.

Biggs and Gridley are on the California & Oregon Railroad in the valley proper, and in the midst of fertile farms and great orchards. Both have excellent public school facilities, and the latter a union high school. Their population is about 1,000 each. The building of the Butte County Canal to irrigate lands in the vicinity of these towns, which is now in progress, means much for their welfare and insures their future growth.

CLIMATE.

The climate of the county is similar to that of all the interior parts of California, with the exception that proximity to the Sierra Nevada Mountains induces a more abundant rainfall than have many of the other interior counties, thus rendering a failure of crops practically unknown, and reducing the expense of farming and fruit-growing to a minimum, because of the absence of irrigation requirements. In the higher parts of the county during the winter months some snow falls—just enough to insure to the numerous streams crossing its area living water during the long summer. In the foothills the climate is more delightful, no snow falls and frost comes but seldom. The rainfall is abundant and a "dry" year is unknown. It varies from about an average of 25 inches per annum in the valley to considerably more in the foothills and mountains.

WATER SUPPLY.

Irrigation is not generally practiced in the growing of grain or fruit, except citrus fruits; but no other county possesses the natural facilities that Butte does. The Sacramento River runs along its western boundary, while in the eastern section the Feather River bisects the county, with enough water to irrigate the whole of the lands that are adapted to fruit; Butte Creek, another large stream, runs through its center, while Big Chico, Pine, Mud, and numerous smaller but never-failing creeks run through thousands of acres of most fertile lands. The building of the Butte County Canal, above spoken of, is the first move which has been taken to make the waters of any of these streams available for irrigation of valley lands. But without these supplies nature has provided in the valley portions immense subterranean reservoirs, easily accessible by wells of from 12 to 20 feet depth, which countless pumps can never exhaust nor lower. With cheap power, which the county now in a measure possesses (it being traversed by several electric power lines), the irrigation of all its lands adapted to fruit, stock, or garden is not a problem of any consequence. In the eastern section of the county, where the growing of oranges and olives has assumed great proportions, irrigation is generally practiced, and a shortage of water supply is never known. Many of the irrigating canals

were originally constructed for mining purposes, but with the passing of the necessity for such use they have been converted into means for cheaply irrigating the lands.

THE SOIL.

The soil of the county varies with location. In the hill section it is mostly of a red, gravelly quality, which experience has shown is best adapted to citrus fruits and olives; in the valley proper it is divided into three qualities: adobe, which is devoted solely to grain, and which in favorable seasons produces immense crops; the bottom lands along the creeks and rivers, where vegetables and fruit and grain do well; and the black loam lands which prevail about Chico, unequalled for fruit and grain. In the county there is scarcely a foot of land which can not be made to produce abundantly of some marketable product. Even in the mountains are many little valleys where hay and grain, and fruit and stock, provide plentiful livings for families who work their lands to the best advantage.

AGRICULTURE.

The products of Butte County are many and varied, ranging from the orange, lemon, and olive of the semi-tropics, to the apple and fruit and grain of more northern climes. To these direct products of the soil must be added the great stock interests, also the mills which convert the timber of the hills into lumber which finds its way all over the West. In the valley portions grain has been one of the chief, and for many years was almost the sole, product grown. Tens of thousands of acres are yet devoted to this industry, and in wheat, barley, and hay, Butte is one of the foremost counties of the State.

The vast expanse of country reaching from Chico, Dayton, Nord, and Durham on the north, past Nelson, Biggs, and Gridley to the county line on the south, and from the edge of the foothills on the east to the Sacramento River on the west, is as fertile and beautiful a body of land as the sun shines on, in a measure farmed, but capable of supporting ten times its present population. This is the great grain-growing section of the county, though much of its territory has in later years been turned from wheat fields into orchards. Much of this land had never seen a human being but twice a year—once at plowing and seed-time, and again at harvest. The immensity of the holdings prevented thorough working, but happily the cutting up of the large ranches and the tendency to smaller holdings have been inaugurated. The average output of grain—wheat and barley—is estimated to be from 35,000 to 40,000 tons annually. The most of this goes out of the county by rail and water. A large part of the barley is fed to stock at home, and much of the wheat is converted into flour in the three mills within the county. The growing of hay is another important industry within the section named, and many hundreds of carloads are annually shipped out, besides that used for home consumption.

HORTICULTURE.

Butte County in fruit production has reached that stage where it is to be classed among the first in the State. According to the Assessor's report for 1904 there are nearly one million bearing fruit trees within the county, besides probably a third more to be classed as non-bearing. The figures are far too low.

The natural home of the peach is in the rich valley lands, with other important orchards in the vicinity of Oroville and in the adjacent foothills. The Rancho Chico orchards at Chico and the immense orchards at Rio Bonita and elsewhere along the Feather River constitute the largest single holdings devoted to this fruit in the county, and at least two of these plantings rank among the largest in the world. In Butte County during the harvest season hundreds find employment in the orchards, drying-yards, and canneries. The quality of the fruit is of the best, and in years of average yield a peach orchard is a handsome source of profit to the owner. It is largely to this fruit that the owners of small tracts in the sections of the county named have been and are planting their lands.

In orange-growing, Butte occupies a unique position among the counties. Geographically it is classed as one of the northern, and yet climatic conditions are such that it has forged to the front as one of the chief of the orange-growing counties. The chief orange-growing sections are about Oroville, Palermo, and Thermalito, along the edge of the foothills, though the fruit does well in all parts of the county, and is successfully grown in all valley parts. Butte County annually sends large quantities of oranges to Los Angeles and other southern counties, for the reason that the fruit here ripens from six weeks to two months earlier than in the south, and before the holiday season it is practically all disposed of, thus being first on the local and Eastern markets and netting shippers high prices. The fruit is clean, free from smut or rust, and there is a never-failing supply of water for irrigation. There are large packing-houses at Oroville, Palermo, and Thermalito, and competition among buyers is keen long before the season opens. Most of the fruit goes to the East. Planting is going steadily on, for it has been demonstrated that large profits accrue to the grower and that by reason of its early ripening the Butte County orange does not come in competition with the sections of the State where the largest production is had.

Olive-growing is an assured success, and is among the county's first industries. The olive seems to do equally well in almost all parts of the county. At Chico there is a large acreage in the fruit, and at Palermo, Oroville, and Thermalito are immense orchards. At all of these places there are olive-oil mills and pickling plants, which annually turn out products that have achieved a wide reputation for excellence, and the demand is greater than the supply. Pure olive oil and pickled olives, manufactured from fruit grown in the county, are shipped all over the United States.

Prune-packing from the large orchards in the vicinity of the line of railroad, and especially at Chico, Durham, Biggs, and Gridley, has assumed mammoth proportions. There is a coöperative prune warehouse at Chico, where is stored and from whence is shipped the principal product. The fruit is heavy in sugar, of the best marketable size, and affords handsome incomes to the many growers. About Paradise, Pentz, Wyandotte, and Bangor, in the foothills, are many fine orchards.

Mention should be made of the excellent apples produced in the foothills and mountains; the several thousand fig trees, which find a natural home here; and the great yearly output of apricots, cherries, pears, and almond and other nut crops.

FRUIT SHIPMENTS.

The average shipments for the past five years give an understanding of the great importance of the fruit crops of the county. The figures below convey that information:

	Cars.
Cured prunes	225
Cured peaches	250
Cured apricots	30
Cured pears	32
Cured apples	15
Almonds	40
Oranges	400
Table grapes	25
Green fruits (miscellaneous)	175

To the above must be added the miscellaneous shipments of olives and olive products (aggregating many cars), small fruits and berries, which go largely in less than carload lots, the large quantities sent to the neighboring mining towns by wagon, and the home consumption. But other than this there are several hundred carloads of green fruits that are packed at the local canneries. These canneries are important factors in the county's prosperity, affording a home market for the fruit grown, and giving employment to many hundred men, women, and girls during the summer months. Thus the small grower has a ready market for his products, and employment for his family during the years before his orchard comes into bearing. The mining camps in Butte and adjacent counties are an important market also, and large quantities of fresh and dried fruits are consumed there each year.

DAIRYING—POULTRY-RAISING.

Dairying has not received the attention its importance and the adaptability of the soil and climate warrant, although there are creameries at Chico, Biggs, and Oroville. Numerous private dairies in various parts of the county attest the value of the dairy herd, and with the cutting up of the larger ranches there will be more attention paid to this industry. Alfalfa is grown with great success, and many are turning their attention to this crop, with the result that the dairying interests will benefit thereby.

There is a steadily growing interest in the raising of poultry. Many land-owners have turned their attention to the raising of chickens, turkeys, and ducks, principally the former. The climate, soil, and feed conditions are such, together with the ever inadequately supplied market, that the greatest inducements exist for the further development of this industry.

LIVE STOCK.

The raising of cattle, sheep, and hogs has ever been an important occupation in Butte County, and numerous farmers have come to the realization that the devoting of as many acres of their lands as is possible to the pasturage of stock is an industry that pays better than grain-growing. The foothills and mountains afford, during the summer season, abundant grazing grounds, while in the other seasons the lowlands and stubble fields of the valley fatten for the market cattle and sheep. Many cars of cattle, sheep, and hogs are shipped each year from the county to outside markets, and many hundred head are driven in from the ranges in the north end of the State to be fattened for

market. Stockmen are gradually improving their breeds by the introduction of better stock, and the high prices obtained have placed this industry among the most prosperous of all the varied ones of the county. The tendency is toward a reduction of the large herds owned by a few to the general ownership by the many of a few head, or as many as their lands will support. This tendency will result in more stock in the aggregate and of better breeds. Large bands of cattle and sheep are herded during the summer in the mountain meadows, which are well watered and clothed with rich natural grasses. A large amount of timothy hay is raised in the mountain meadows, and the dairy interest is very extensive and profitable, the best of products being turned out under these favorable conditions.

LUMBER INDUSTRY.

The lumbering interests of the county were never in a more prosperous condition than during the past year. The mountains of the county abound in fine timber, much of it being sugar-pine of the best grade. The Diamond Match Company, the largest concern of its kind in the world, looking west for new timber land, located about 15,000 acres of valuable forests in Butte County. It has built a railroad from Chico to tap its holdings, and is now engaged in taking out the timber. This company manufactures not only matches, but all kinds of building material. The Sierra Lumber Company is also a large concern with headquarters at Chico. The most of its lumber is floated by means of V flumes many miles in length to Chico; from whence it finds rail transportation to market, and is also converted into boxes and building material at its large factory. Eastern buyers have lately acquired large tracts of timber land in the vicinity of Lumpkin, tributary to Oroville, and the immense forests of sugar-pine and other valuable timber which lie along the North Fork of Feather River are awaiting the coming of the railway, when the companies now holding them will begin cutting on an elaborate scale. At this time small mills are being operated in the mountains northeast of Oroville. Lumbering will continue to be for many years one of the most valued of the county's resources, affording profit to the producers and employment to many men.

DREDGE MINING.

According to a recent report of the State Mining Bureau there are seventeen companies in the Oroville district, operating 28 dredges. Their total amount of holdings is 5,343 acres, and in addition there are about 2,000 acres that will probably be mined. The operations are on the Feather River. The total cost of building these dredges was about \$1,550,000. In addition, machine shops, drills, offices, etc., would make the total outlay for equipment so far nearly \$2,000,000. The gold yield from the 25 dredges that operated in the district in 1903 was \$1,329,998. The gold is comparatively fine, easily amalgamates, and runs about \$18.50 per ounce. It is comparatively even in its distribution, and the probable yield is about \$60,000,000. Electric power is used and water is abundant. The Feather River Exploration Company has an area holding of 850 acres. It installed the first successful dredge ever operated in California, and began work in March, 1898. Since then the company has had constructed four other dredges.

The Lava Beds Dredging Company has 700 acres, and two dredges. The Oroville Gold Dredging Company has 66 acres, and operates one dredge. The Central Gold Dredging Company has 150 acres, and one dredge. The Indiana Gold Dredging and Mining Company has 175 acres, and owns two dredges costing \$50,000 each. The Kia Ora Gold Dredging Company has 153 acres, and since it began work in May, 1899, has dredged 40 acres. The Cherokee Dredging Company has 200 acres, and since it began operations in October, 1902, with one dredge has worked 16 acres. The Pennsylvania Dredging Company has 152 acres, and one dredge. The Butte Gold Dredging Company has 85 acres, and a dredge costing \$50,000, with a capacity of 47,640 cubic yards per month. The American Gold Dredging Company has 275 acres. It began operations in November, 1902, with one dredge, and has since built another. The El Oro Dredging Company has 220 acres, and has so far worked five. It has one dredge with a capacity of 75,000 cubic yards per month. James H. Leggett began operations on his holdings of 70 acres in March, 1904, with one dredge, and so far 5 acres have been worked. The Vilorio Syndicate owns 200 acres, and has one dredge. The Oroville Gold Dredging and Exploration Company has 600 acres, and two dredges. The Boston and Oroville Mining Company has 650 acres, 100 of which have been worked; it operates three dredges. The Boston and California Dredging Company has 300 acres, and since March, 1902, has worked about 60 acres; it operates three dredges. The Marigold Dredging Company owns 467 acres, and since January, 1900, has worked 50 acres with one dredge. The Feather Valley Gold Dredging Company owns 220 acres, but has not yet commenced active operations.

OPPORTUNITIES FOR HOMESEEEKERS—PRICES OF LAND.

Opportunities in Butte County for intending settlers were never so good as now. The fruit-growing industry, both citrus and deciduous, has passed the experimental stage, and the profits are easily ascertained and assured. The county offers unexcelled chances for the man of small means with a family to acquire land in small tracts, and, while his plantings are in the non-productive stage, there is work for him and his family, either for others or in the production of poultry and small fruits and berries, sufficient to afford a handsome livelihood.

In the eastern part of the county, about Oroville, Palermo, Thermalito, and Wyandotte, and along that line of foothills extending to Pentz and Paradise where citrus fruit-growing is most in vogue, lands in small tracts with abundant irrigation facilities are offered for sale at prices ranging from \$15 to \$100 per acre, according to location and desirability. Bearing groves can also be purchased, though of course the price of these is much higher. In the rich valley sections, especially adapted to deciduous fruits, nuts, poultry, and small stock-raising, with dairying opportunities, some of the richest lands in the known world are now on the market. A large part of the John Bidwell rancho, known all over the United States for its richness of soil and beauty and healthfulness of location, was lately subdivided and sold in small tracts. This ranch was a Spanish grant of over 20,000 acres, made before the American occupation, and until General Bidwell's death in 1900 was held intact. Nearly 2,000 acres of it are in bearing orchards, and the balance was

given up to grain and stock. Most of it is beautifully timbered with oak, and its soil is capable of producing every product known to the State. Other tracts of small acreage about Chico are also on the market, and at Durham, Nelson, Biggs, and Gridley there are also opportunities to buy, in any desired tracts, lands of the highest quality.

GENERAL STATISTICS.

Area, 1,764 square miles, or 1,128,960 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	891,287
Value of country real estate	\$9,057,952
Of improvements thereon	1,204,475
Of city and town lots	1,026,160
Of improvements thereon	1,595,435
Of personal property	2,659,324
Total value of all property	16,872,164

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle—Beef	350	\$12,250	Colts	720	\$14,400
Stock	7,435	125,395	Mules	1,945	77,800
Cows—Graded	1,020	25,500	Sheep	37,000	92,500
Common	1,015	20,300	Goats—Angora	560	1,680
Calves	1,670	13,360	Common	820	1,640
Swine	2,670	4,505	Poultry (dozen)	1,210	3,630
Horses—Standard-bred	175	17,500	Hay	---	3,150
American	2,840	84,320	Lumber	---	90,500

Number of fruit trees growing in spring of 1904:

	Bearing.		Bearing.
Apple	6,530	Prune (French)	73,125
Apricot	10,700	Prune (other kinds)	15,430
Cherry	7,340	Lemon	930
Fig	10,200	Orange	321,430
Olive	113,725	Almond	19,320
Peach	127,420	Walnut	875
Pear	20,995		

Value of grain assessed in storage:

Wheat	\$30,450
Barley	12,300

School statistics:

Total number of census children, 1904	4,677
Number of teachers employed	117
Number of school houses	78
Number of school districts	76
Amount expended for public school purposes	\$84,090 85

CALAVERAS COUNTY.

Calaveras County is almost directly east from San Francisco, and distant about 130 miles. It is triangular, its longest side being 54 miles, and its base 32 miles.

The western part of the county consists of rolling hills and small valleys, the hills being covered with a sparsely scattered growth of oak or pine timber. The eastern portion is mountainous, and contains magnificent forests of sugar and yellow pine, spruce, fir, and cedar. In this section are found the *Sequoia gigantea*, or Big Trees. These trees are the largest and most noted in the world, being classed as one of the seven natural wonders.

The Mokelumne River extends along the northern boundary of the county, and tributary to this is the South Fork of the Mokelumne, with numerous branches. Extending along the southern boundary is the Stanislaus River, with numerous small tributaries. Running through the county midway between the boundary streams is the Calaveras River, with its tributaries, the Jesus Maria, San Antone, Middle Fork, and South Fork. These streams and their branches are tapped at various points, and their waters distributed through 600 miles of ditches to different parts of the county. Springs abound in all sections.

The rainfall is ample to insure good crops, the annual average being about 20 inches.

MINING—SOILS.

Calaveras is strictly a mining county. The great Mother Lode of the State runs through the county. West of the Mother Lode is the copper belt, extending from Copperopolis to Campo Seco. Still west of the copper belt a lead of quartz runs from Knights Ferry to a point below Campo Seco; this lead has been prospected with excellent results. There is also what is called the "East Belt," extending from West Point to Murphys. The mining towns furnish an excellent market for the farmers.

There are many varieties of soil. All, however, are impregnated to a greater or less extent with granite, slate, limestone particles, volcanic ash, and iron sulphides. In the northeastern part is a granite soil; following this comes the red loam of the foothills, then the sandy alluvial soil of the plains, next the black sandy loam of the bottom lands. In the granite belt the vine and the more hardy fruits, such as the apple, pear, and plum, thrive; while on the red loamy hillsides is found excellent land for fruit and vine culture. The plains are largely given to grain and orchards. The rich river bottoms grow, without irrigation, fruits of all descriptions, together with large tracts of corn, beans, and melons.

WATER SUPPLY.

In the southeastern portion of the county the Union Water Company's 90 miles of ditches take 10,000 inches of water from the North Fork of the Stanislaus River, at a point about 8 miles from the extreme eastern boundary. In addition, the company's reservoirs hold in store an amount of water sufficient to supply 500 inches a day for twelve months. This water is distributed over a large territory. The Table Mountain ditch takes 500 inches of water from San Antone Creek. The Clark ditch takes water from the South Fork of the Mokelumne, near the Big Trees. It extends thence westerly over a belt of country about 32 miles long. Joining this system on the north is the West Point ditch, taking 400 inches of water from the Middle Fork of the Mokelumne River at a point 6 miles east of West Point. Following the Clark ditch into the valleys is the Mokelumne and Campo Seco Canal and Water Company's ditches. One ditch takes 2,000 inches of water from the South Fork of the Mokelumne River $2\frac{1}{2}$ miles northeast of Glencoe. The company's reservoir near Railroad Flat gives an additional 300 inches of water for three months. This canal system supplies Mokelumne Hill, Gwin Mine, Campo Seco, Valley Spring, Burson, Wallace, and Camanche. The Ide & Terwilliger ditch takes about 500 inches of water from San Antone Creek. The Emery Gold Mining Company has a large reservoir 3 miles east of El Dorado. The Salt Spring Valley reservoir furnishes a large supply of water. The San Domingo Company's ditch takes the waters of San Domingo Creek. These ditches are used principally for mining purposes; they serve to show what can be done by a system of intelligently conducted irrigation works, supplied from storage reservoirs, for which numerous sites exist and to supply which there is abundant water.

The county is well furnished with electric power; that of the Standard Electrical Company on the north and west, and the Utica Electrical Company on the east and south. Many quartz mills are run by electric power.

AGRICULTURE—HORTICULTURE.

Calaveras produces both citrus and deciduous fruits.

In the citrus belt, which embraces the western part of the county, the orange, lemon, citron, and olive thrive in places with great luxuriance. Citrus fruits are not grown extensively, but where grown are a success. At Campo Seco are orange trees over thirty-five years old, and which continue to bear remunerative crops annually. At Jenny Lind, Burson, Poverty Bar, Valley Spring, and Mokelumne Hill oranges and lemons are grown, though not in large tracts.

Olives do well without irrigation, there being several large orchards in full bearing in the western part of the county.

In the eastern part, where the rainfall is greater and the summers cooler, fine apples and potatoes are grown. This district is known as the "apple and potato belt," and large crops of excellent quality are produced, selling at good prices. Deciduous fruits, such as the apple, pear, peach, nectarine, apricot, cherry, plum, and prune, are grown in all parts of the county. In over one half of the county the fig crop is certain and abundant every year.

For nut-bearing trees, Calaveras has congenial surroundings. In Vallecito, Douglas Flat, and West Point the English walnut is grown

to perfection. In the western part there are several large almond orchards, and these nuts also grow to perfection.

The local markets consume most of the fruit. The remainder, both dried and green, is shipped outside. Small fruits do well, but all raised are sold in local markets.

Small orchards are found all over the county.

Grapes of excellent quality are grown, except in the extreme eastern part. Most of the crop is made into wine.

A greater part of the grain sown is cut for hay, and sold locally; but considerable quantities are allowed to mature into wheat, corn, oats, and barley.

Garden truck is raised in large quantities for home consumption. The mining towns furnish an excellent market for all that is produced.

LIVE STOCK AND OTHER INDUSTRIES.

The increase in the value of cattle has stimulated this industry. There are over 20,000 head of cattle, mostly in large bands. In the summer these are driven to pastures in the high Sierras.

Some attention has been given to dairy products, and among the herds may be found some of the finest cattle in the State.

The increasing demand for horses has stimulated this industry. Fine-blooded horses are reared in several parts.

Hogs are raised in large numbers.

The sheep industry is doing well. Calaveras wool always brings the top figure.

Angora goats are raised in several portions of the county. They are hardy, increase rapidly, and are excellent food.

There are several sawmills; two near West Point, one north of El Dorado, and two near the Big Trees. These mills furnish nearly all of the lumber used.

In the northwestern part is the farm where the pyrethrum plant is grown and buhach manufactured therefrom.

The price of land varies in the different localities, ranging from \$5 to \$50 per acre.

GENERAL STATISTICS.

Area, 990 square miles, or 633,600 acres. United States reserves, 126,726 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	467,960
Value of country real estate	\$3,098,640
Of improvements thereon	1,201,425
Of city and town lots	188,620
Of improvements thereon	629,615
Of personal property	898,630
Total value of all property	6,258,470

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle—Beef	100	\$3,000	Colts	500	\$5,000
Stock	12,000	180,000	Mules	150	7,500
Thoroughbred	10	400	Swine	—	4,000
Cows—American	10	300	Sheep	18,000	36,000
Common	1,500	30,000	Lambs	10,000	5,000
Calves	4,000	20,000	Goats	1,000	1,000
Oxen	20	400	Poultry (dozen)	1,000	2,500
Horses—Thoroughbred	6	1,200	Hay	—	1,000
Standard-bred	10	750	Lumber	—	15,000
American	20	1,000			
Common	2,000	40,000			

Number of acres sown for crop of 1904:

Wheat.....	1,500
Oats.....	100
Barley.....	2,000
Corn.....	50
Hay.....	10,000

Acres of grape vines growing in spring of 1904:

	Bearing.	Non-Bearing.
Table.....	50	50
Raisin.....	25	10
Wine.....	1,200	500

Number of fruit trees growing in spring of 1904:

	Bearing.	Non-Bearing.		Bearing.	Non-Bearing.
Apple.....	6,000	4,000	Prune (French).....	200	200
Apricot.....	2,000	1,000	Prune (other kinds)...	800	100
Cherry.....	500	200	Lemon.....	50	50
Fig.....	400	200	Orange.....	250	250
Olive.....	5,000	1,000	Almond.....	800	300
Peach.....	4,000	1,000	Walnut (English).....	500	500
Pear.....	500	100			

School statistics:

Total number of census children, 1904.....	2,631
Number of teachers employed.....	73
Number of school houses.....	60
Number of school districts.....	57
Amount expended for public school purposes.....	\$47,492 67

Mineral statistics:

Value of gold mining claims.....	\$1,850,000
Value of copper mining claims.....	125,000

COLUSA COUNTY.

Of the entire area of Colusa County, approximately one half is of the Sacramento Valley, one third are arable hills, one tenth interior valleys, and the balance mountainous. A range of hills runs north and south through the county, parallel with the Coast Range, which forms the western boundary. Between these is a series of smaller valleys. Stony Creek, that heads within 20 miles of the south boundary, is separated by a small divide from the waters of Cache Creek. It thence runs northerly, skirting the base of the mountains, to the northern boundary of Glenn County; then breaks through the range of low hills and flows southeasterly across the valley to the Sacramento River, which skirts the eastern boundary, and runs on a slight ridge higher than the lands lying west of it; the smaller streams, which only run in wet winters from the hills below, empty into the trough thus formed. This trough begins six or seven miles south of the mouth of Stony Creek, and, gradually widening, becomes a tule basin near the lower end of the county.

SOIL.

Along the river, bordering the hills, and in many of the smaller valleys, the soil is a loose, rich, sandy loam, easily worked, retaining moisture and very fertile. In some places it is adobe, a light or heavy clayey soil, producing excellent crops. The foothill soil is rich, mellow, easily worked, and possesses every element of adaptation to the production, in perfection, of all fruits known to temperate or semi-tropic countries. That of the main valley is alluvium, and has given Colusa the distinction of being for years one of the banner wheat counties.

AGRICULTURE AND HORTICULTURE.

The main part of the valley is devoted to wheat production. Before the segregation of Glenn County on the north, Colusa in one year produced 7,250,000 bushels of wheat for export. Grain farming is conducted on a colossal scale. Combined harvesters, drawn by traction engines, cut a swath of forty feet; the grain, in sacks, being thrown off at the rear. The same engines, in plowing season, drag twenty-four ten-inch plows, doing in twelve hours the work of one hundred mules for the same time.

All vegetables, grain, and fruits are raised without irrigation, but the Sacramento River carries sufficient water (and it can be used) to irrigate the whole Sacramento Valley. With irrigation, more than one crop of vegetables or hay can be grown in one season.

All the temperate and semi-tropic fruits grow successfully side by side. There is a wide range of adaptability in the soil and climate. Prunes are a favorite crop; next peaches, pears, and apricots; also cherries, plums, nectarines, almonds, walnuts, and other nuts, olives, grapes for raisins, for table use, and for wine, and apples in the higher

altitudes. Citrus fruits are also successfully grown. The raisin grape thrives abundantly near College City, Colusa, and other points. The fruits are marketed by green shipments to Sacramento and the East, and at the local canneries. Much of it is dried.

LIVE STOCK INDUSTRIES.

Dairying and poultry-raising are profitable and there are several up-to-date creameries with skimming stations. It is an ideal locality for these industries.

The cattle, horses, and sheep raised are very numerous and of fine grades. The hog product is quite large.

TIMBER AND MINING.

The scattering oak along the streams and in the foothills is used for fuel. The pine, spruce, and cedar in the mountains are not so readily accessible as in other districts, nor so valuable, and have not, therefore, been much encroached upon.

This is not in general a mining county, though in the Coast Range there are deposits of gold, cinnabar, copper, and chromic iron. A good quality of sandstone is found, and a fine cement in unlimited quantities. In the southwestern part there are surface indications of oil and natural gas, and near Sites salt springs are found.

PRICES OF LAND.

The prices of unimproved land range from \$10 to \$50 an acre, according to the location and fertility and nearness to rail and river transportation.

Colusa is the county seat, with a population of over 1,600. Other growing towns are Maxwell, Williams, Arbuckle, College City, and Sites. Near the last-named place are located the sandstone quarries which furnished the stone used in building the new ferry building and hall of justice in San Francisco; this stone is of a very superior quality.

GENERAL STATISTICS.

Area, 1,080 square miles, or 691,200 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	601,536
Value of country real estate	\$8,602,382
Of improvements thereon	575,433
Of city and town lots	283,495
Of improvements thereon	607,865
Of personal property	1,663,704
Total value of all property	12,416,102

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle	9,527	\$186,035	Sheep	41,142	\$85,633
Cows	1,875	55,165	Lambs	4,698	4,705
Calves	5,234	56,619	Goats	2,670	4,100
Oxen	4	100	Poultry (dozen)	2,054	6,615
Swine	13,518	38,690	Hay	---	960
Horses	3,314	106,315	Wool	---	640
Colts	824	17,530	Lumber	---	5,800
Mules	4,035	180,310			

Number of acres sown for crop of 1904:

Wheat.....	116,500
Oats.....	1,255
Barley.....	200,520
Corn.....	200
Hay.....	14,500

Acres of grape vines growing in spring of 1904:

Table.....	Bearing.	40
Raisin.....		350
Wine.....		50

Number of fruit trees growing in spring of 1904:

	Bearing.	Non-Bearing.		Bearing.	Non-Bearing.
Apple.....	4,600	1,220	Pear.....	26,095	575
Apricot.....	14,580	3,100	Prune (French).....	72,400	100
Cherry.....	600	250	Lemon.....	300	20
Fig.....	3,475	100	Orange.....	3,650	250
Olive.....	2,450	1,000	Almond.....	16,220	600
Peach.....	11,000	1,500	Walnut.....	1,410	150

Value of grain assessed in storage:

Wheat.....	\$200,960
Oats.....	420
Barley.....	93,345
Corn.....	1,435

School statistics:

Total number of census children, 1904.....	1,858
Number of teachers employed.....	59
Number of school houses.....	38
Number of school districts.....	38
Amount expended for public school purposes.....	\$20,364 32

CONTRA COSTA COUNTY.

Contra Costa is one of the central counties, its shore line being within 14 miles of San Francisco. It possesses unusually good traveling facilities, both by rail and by steamer. The county has 70 miles of water-front, nearly all of which is upon deep water, navigable by all vessels engaged in commerce. Over three fourths of its area is cultivated, the balance being used for grazing. The only mountain of any size is Mount Diablo, which is 3,896 feet in height and almost in the geographical center of the county.

TOPOGRAPHY.

About two thirds of the area is rolling and hilly. Lying between the hills are some of the most fertile and beautiful valleys in the State, which are drained and watered by many streams, the banks of which are bordered by oak, sycamore, laurel, willow, etc., while the hills are dotted with oaks, many of which are of large size.

The farming lands in the eastern section are between the foothills and the San Joaquin River. This section is 23 miles in length and from 3 to 6 miles in width, and embraces about 60,000 acres of arable land. The soil is, generally speaking, of a rich alluvial nature, and produces wheat, barley, alfalfa, fruit, and vines. To the northward and between the uplands and the San Joaquin River is a body of tule lands, embracing some 50,000 acres, a large portion of which has been reclaimed, and is some of the most productive land in the State, being a rich deposit of sediment and decomposed vegetation. Alfalfa, asparagus, potatoes, beans, etc., are produced on the largest scale on such lands, the asparagus being shipped East by the carload during the early spring.

The average rainfall is from 18 to 23 inches, which is ample for all purposes of agriculture, horticulture, etc.

SOILS.

In a report on the soils of Contra Costa County, based on samples taken from one of its principal valleys, Professor Hilgard says:

"This specimen represents the prominent soil features which lie around the landward and northern and western base of Mount Diablo, bordered by outlying spurs of the Contra Costa range. The plains are dotted with large white oaks, which are especially thick near the borders of the streams. Close to the latter we generally find streaks of black, heavy, loamy earth; but farther away the soils are mostly lighter, both in color and texture, and more or less intermingled with gravel. Sometimes gravel ridges of greater or less width indicate the course of ancient channels, and gravel evidently underlies a considerable portion of the plains, facilitating drainage. This is most important, as the prevalent character of the soil is that of clay loams. Regarding the

soil specimen under examination, while it is taken to the depth of twenty inches, wells dug in the neighborhood show no change of tint to the depth of sixty feet, showing an enormous accumulation of an evidently alluvial soil-mass. The sample sent is a brownish-gray loam, which, on wetting, softens quickly and without change of tint. The coarse portion consists mostly of flattened particles of hard shale and quartz, well rounded on the edges. Chemically the soil shows a large supply of potash and lime, and as regards the latter, there can be no doubt that it is a general characteristic of the soils of Contra Costa County, since lime is abundant in the rocks on the flanks of Mount Diablo, as well as on the Contra Costa range. On the banks of Walnut Creek, the lower portion of the black loamy earth, just above the gravel that underlies it at some five feet depth, is full of white gravel or lime concretions. The proportion of phosphoric acid in any case would be counted above deficiency. But the determination of its solubility shows that practically all of it is in the available state. The soil has a good supply of humus, and therefore of nitrogen. Its power of absorbing moisture is high, and with its depth, constitutes a safeguard against drought and hot winds. Its fruit product can not fail to be both abundant in quantity and high in quality, and its best general adaptation would seem to lie in the direction of pears, apricots, grapes, almonds, peaches, etc."

The above description of soil relates particularly to the Ygnacio Valley, but the soils of the connecting valleys—Alhambra, Diablo or Clayton, San Ramon, Briones, and Lafayette—are similar.

In depth, the soil throughout the county shows a remarkable continuity of rich alluvial deposits underlaid by limestone or clay. There is an occasional change to a coarse sandy and gravelly heavy loam of black or brown tint. It has great power for enduring drought, and is easy to work, giving large returns. The soil in the uplands is in character similar to that of the lowlands, and being drier, is for some purposes even better.

Irrigation is not required to insure crops. The abundant rainfall, the absence of evaporating heat, and the moisture-laden breezes from the ocean, furnish abundant humidity for all forms of vegetable life without recourse to artificial irrigation.

FRUIT CULTURE.

The many beautiful valleys and the rolling hills are strikingly similar in general characteristics to the gentle slopes of sunny France. Scattered in all directions are numerous small vineyards and orchards, that produce rich results. Beyond and around the northern and western base of Mount Diablo is an uninterrupted body of splendid farming land. There are plains dotted with white oaks, and streams bordered with cottonwood and willows. The wild-oat hill lands, when exposed to the south, are well adapted to olive culture; and there is fruit land all over the county, and no irrigation is required. Among the fruits produced, each embracing superior varieties, are the pear, plum, prune, apricot, cherry, peach, quince, fig, apple, nectarine, pomegranate, olive, persimmon, orange, lime, lemon, date, grape, strawberry, raspberry, gooseberry, blackberry, currant; and among nuts, the pecan, filbert, almond, walnut and chestnut. Over 8,000 acres of land are devoted to these fruits, and fruit-growing has proved successful and remunerative

AGRICULTURE.

Grain-raising is very prominent in this county. The chief product of the eastern section is wheat, although much barley, hay, alfalfa, and fruits and vines are grown. Alfalfa around Byron yields 7 to 10 tons per acre per annum, without irrigation, and is worth from \$9 to \$12 per ton in San Francisco, according to the season. A very large acreage is planted to wheat, oats, barley, and hay.

The raising of sugar-beets is a growing industry.

Vegetables of all kinds are raised very profitably and on an extensive scale; one tract of land of 2,000 acres is used entirely for the production of asparagus for early Eastern shipment. Potatoes, beans, etc., are also a prolific and profitable crop, especially in the central portion.

Natural feed is abundant, both on the hillsides and at a higher elevation, affording the finest kind of pasturage both summer and winter.

DAIRYING—STOCK-RAISING.

Stock-raising is a leading industry, as the reclaimed lowlands for summer grazing, and the rolling hills for winter, close together, create conditions whereby a failure is impossible. The stock farms have produced some of the most famous trotting and pacing horses, such as W. Wood, Agatata, Diablo, Lou Dillon, Cricket, and W. W. Foote. In addition to the raising of horses, much attention is given to blooded cattle, sheep, and hogs.

Large dairies are conducted, and in the western end the product mostly shipped to the cities is milk, while in the central and eastern parts butter is the main production. Low freight and express rates give unusual advantages.

POULTRY-RAISING.

Contra Costa County is well adapted to poultry-raising. Feed can be obtained cheaper than in other sections where the industry is thriving. The central part of the county is only a few hours' drive from Oakland and suburbs—a great advantage to the poultryman, as he is able to place his products on the market from his own wagon. The demand for eggs is always greater than the supply, and so it is with poultry, which fact, together with nearness to market, is an undisputable advantage to the poultry-raiser. One desiring to live in the country several miles from town can buy land at from \$25 to \$50 per acre. The market for poultry produce lies at every door. Peddling wagons run a distance of sixty to sixty-five miles, gathering up the products of the poultry farm, paying cash.

MINING AND MANUFACTURING.

The only important mining industry is the coal mines of Mount Diablo, although some little mining for precious metals has been done.

The terminus of the Santa Fé Railroad is located at Point Richmond, and many substantial improvements in the way of wharves, etc., on a very extensive plan, have been constructed.

Port Costa, the shipping point for the bulk of the grain raised in California, has warehouses for storing over 160,000 tons of grain, with a dock frontage of 2,500 feet, affording facilities for loading from eight to ten large ocean ships at the same time.

At Pinole are located large stockyards; near Vallejo Junction is the largest smelting works in the State; at Vallona are extensive lumber yards, where ships from Oregon and Puget Sound discharge. At Crockett are flouring-mills of the capacity of 10,000 barrels a day; also agricultural works.

GENERAL STATISTICS.

Area, 750 square miles, or 480,000 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	451,300
Value of country real estate	\$9,416,210
Of improvements thereon	2,786,160
Of city and town lots	1,619,400
Of improvements thereon	1,245,935
Of personal property	3,810,425
Total value of all property	21,025,826

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle—Beef	120	\$6,000	Mules	471	\$23,550
Stock	5,620	89,920	Sheep—Imported and		
Thoroughbred	55	3,850	graded	4,100	12,300
Cows	1,875	55,165	Common	3,860	7,720
Calves	5,234	56,619	Lambs	2,500	3,750
Swine	3,472	17,350	Goats	100	200
Horses—Thoroughbred	3	1,500	Poultry (dozen)	4,320	10,800
Standard-bred	225	38,750	Hay		27,720
American	4,904	220,680	Lumber		150,500
Colts	115	1,380			

Number of acres sown for crop of 1904:

Wheat	35,670
Oats	14,650
Barley	28,960
Corn	550
Hay	58,420

Acres of grape vines growing in spring of 1904:

	Bearing.	Non-Bearing.
Table	820	105
Raisin	60	10
Wine	1,460	800

Number of fruit trees growing in spring of 1904:

	Bearing.	Non-Bearing.		Bearing.	Non-Bearing.
Apple	9,450	955	Prune (French)	32,450	6,530
Apricot	47,265	4,360	Prune (other kinds)	8,515	1,415
Cherry	8,725	850	Lemon	330	75
Fig	2,560	620	Orange	1,100	130
Olive	18,275	4,375	Almond	147,825	50,875
Peach	25,935	3,565	Walnut	3,450	2,430
Pear	64,125	16,180			

Value of grain assessed in storage:

Wheat	\$116,645
Barley	113,740

School statistics:

Total number of census children, 1904	4,897
Number of teachers employed	110
Number of school houses	60
Number of school districts	55
Amount expended for public school purposes	\$22,998 77

DEL NORTE COUNTY.

Del Norte, as its name implies, is at the far north. It is situated in the northwest corner of the State. A county of scenery unsurpassed in its grandeur, its vast redwood forests, its clear winding streams, its green fertile fields, its giant redwoods, its mountains laden with precious ores, and its rich dairy lands make it one of the most desirable places for the homeseeker.

LEADING INDUSTRIES.

Chief among Del Norte's industries are the dairying interests. Scattered throughout the coast portion modern, well-equipped creameries have been built in recent years, where the product of thousands of cows is turned into butter. This industry, with the coming of better facilities for shipment, will place Del Norte in the foremost rank as a butter-producing county. Farming is carried on to a considerable extent. However, the products of the farm are used in the local market and consumed on the dairy farm. A large portion of the soil is especially adapted to the culture of the apple, there being a total absence of the codling-moth pest. Pears, plums, cherries, and small fruits and berries of every description bear luxuriantly. On the Klamath River, in the southern part of the county, as well as on the Smith River, in the northern part, large, well-equipped salmon canneries are operated with great success, both streams abounding in a superior quality of the fish.

TOWNS.

The center of trade lies in Crescent City, the county seat, a town of 1,500 inhabitants, nestled on a crescent-shaped beach, where the products of the county come for shipment, generally finding their market in San Francisco, the products in the main being lumber, butter and from the farm.

Smith River is a small town in the center of the beautiful valley of the Smith River, where such business is carried on as is usually conducted in a farm and dairy district.

Requa, a small town near the mouth of the Klamath River, is a trading post for that district.

ARABLE LANDS.

The arable portion of the county is confined generally to the coast portion, commencing at its northern boundary and extending through its entire length, excepting a few miles to the southward of Crescent City. The arable land may be divided into three classes: First, that formed by the disintegration of sands, which with the aid of fertilization and rotation produces good crops, and is especially adapted to the growth of apples, an industry as yet in its infancy. Second, those lands formed by the constant washing of rich vegetable matter and the

detritus carried by streams from the mountain sides and distributed in the valleys to a great depth, known as sediment lands. Third, marsh or lake lands, a large area of which borders on Lake Earl, at times partly inundated by the overflow of the lake, but which by a system of reclamation will constitute the most valuable land in the county for dairying purposes.

TIMBER.

The redwood timber belt, comprising 200,000 acres, commences at the north boundary line and extends in an unbroken forest to the southern boundary of the county. It can be reasonably said that no grander or finer forest exists in the world. Its immensity can be better imagined when it is stated that a single tree yields sufficient clear lumber to build a modern cottage and finish it from cellar to garret, or more particularly, when it is stated that from a tract consisting of 160 acres there have been taken 27,802,121 feet, or an average of 173,763 feet per acre, and this is an average of the whole tract. East of the redwood belt are large tracts of sugar-pine and fir.

MINES AND MINERALS.

For many years it has been known that deposits of valuable ore lie in the hills of Del Norte, but not until recent years have those with means to develop mines turned their attention to this county. Modern appliances for carrying on development work have proven that great quantities of gold, copper, chrome, and cinnabar exist. Among the mines worthy of attention are the Monumental group at Shelly Creek, where a large force of men is employed, and each day demonstrates that they contain quantities of ore rich in gold. The copper mines at Low Divide, the cinnabar mines at Rockland, and the placer mines at Big Flat and Hayne's Flat, together with innumerable smaller locations, are being worked, and all give promise of becoming great producers when capital will be enlisted toward their development.

HARBOR.

Covering the entire expanse of coast line from Humboldt Bay to the Columbia River, the roadstead at Crescent City is the only point affording opportunity for a haven of refuge, and with assistance from the United States Government in the construction of a seawall from the United States lighthouse, to the westward of Crescent City, to an outlying rock, a distance of 2,000 feet, Crescent City harbor will be made a safe and secure refuge for the innumerable water-craft now plying along the coast, there being no shoals to create the mountainous seas usually encountered at the entrance of bay harbors. The tide at this point, having a rise and fall of six feet, ebbs and flows over a strip of sand beach fronting Crescent City and extending a distance of six miles. The present shipping is carried on over a wharf or pier, built on wooden piles, extending out to a depth of sixteen feet at low water. At this point, under existing circumstances, only light-draft vessels, with a carrying capacity of 300,000 or 400,000 feet of lumber, can safely anchor during the winter months; but, by reference to the United States chart, it will be seen that westerly from Whale Island, comprising some four acres, there is a depth of four fathoms—figures which show the depth at the average of the lower low waters—thus assuring an outlet by water for the resources of Del Norte County.

AS A RESORT.

Few counties on the Pacific coast afford a more varied opportunity for the pleasure-seeker, or those in quest of rest and recreation. This point may be reached from Grant's Pass, in Oregon, the nearest railroad point, thence by stage road over mountain and through dale, the entire journey replete with grand scenery. Along the line, and about 18 miles east of Crescent City, is the picturesque resort known as Gasquet, where the streams abound in mountain trout and the mountain sides afford an abundance of deer, grouse, and quail; it is then an easy ride through the gigantic redwoods to the coast. Lake Earl, about two miles north from Crescent City, is a beautiful body of water several square miles in extent; it abounds with fish, wild duck, and geese. About one mile north of Crescent City is the famous pebble beach where beautiful agates of every hue, and of value as settings for jewelry, are washed up from the sea.

RAILROAD POSSIBILITIES.

Del Norte County is almost devoid of railroad facilities, there being but fifteen miles in operation. However, the wonderful resources of the county have attracted the attention of the railroad corporations, and they have made a survey from the Southern Pacific system in Grant's Pass, Oregon, to Crescent City, this being the only natural pass from the great valleys of the interior to the coast.

GENERAL STATISTICS.

Area, 1,546 square miles, or 989,440 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed.....	209,338
Value of country real estate.....	\$2,457,815
Of improvements thereon.....	150,014
Of city and town lots.....	61,370
Of improvements thereon.....	139,860
Of personal property.....	292,452
Total value of all property.....	3,108,946

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle.....	828	\$12,420	Colts.....	62	\$1,095
Cows—Graded.....	11	390	Mules.....	21	735
Common.....	2,930	58,600	Sheep.....	1,481	2,220
Calves.....	880	7,040	Goats.....	60	90
Swine.....	680	1,570	Poultry (dozen).....	200	600
Horses.....	479	16,975	Lumber.....	---	52,000

Number of acres sown for crop of 1904:

Wheat.....	50
Oats.....	810
Barley.....	35
Corn.....	100
Hay.....	1,400

Number of fruit trees growing in spring of 1904:

Apple.....	8,900
Cherry.....	600
Peach.....	300
Pear.....	650
Prune.....	1,500

School statistics:

Total number of census children, 1904.....	678
Number of teachers employed.....	20
Number of school houses.....	15
Number of school districts.....	16
Amount expended for public school purposes.....	\$11,366 80

EL DORADO COUNTY.

El Dorado County, the old "Empire County," is situated about the middle of the eastern tier of counties.

It is a county of hills and valleys, extending from the low foothills in the west to the summit of the Sierras in the east. There are no broad tracts of prairie land, nor great plateaus. The soil is fertile, and supports a large variety of agricultural and horticultural products.

Large forests of the finest sugar and yellow pine, fir, and spruce cover the mountains. There are at least fifteen sawmills in operation that manufacture between 40,000,000 and 50,000,000 feet of lumber yearly.

Fruit-raising, lumbering, stock-raising, dairying, poultry-raising, bee-culture, farming, slate-quarrying, mining for base and precious metals, and the manufacture of wines and brandy are among the industries.

That famous summer resort, Lake Tahoe, is partly included within the boundaries of the county, and a number of other summer resorts have their quota of pleasure-seekers every summer. Tourists and campers find the mountains of this county an ideal place to spend their time.

PLACERVILLE.

Placerville, the "Hangtown" of early days, is the county seat. It is on the western slope of the Sierra Nevadas, at an altitude of about 1,800 feet, and was, till a short time ago, the terminus of a branch of the Southern Pacific system. It has about 2,500 inhabitants. It has a good grammar school, and will shortly have the new county high school within its limits. Religious denominations are well represented. Business and residence places are lighted by electricity from the American River Electric Power Company, whose plant is on the South Fork of the American River, about four miles from town.

In 1903 there were 1,095 cars of freight shipped into Placerville and 1,041 cars of freight shipped out.

FRUIT-GROWING.

Fruit-growing is one of the oldest industries, and as it has been systematized during late years, promises to be of more importance in the future. Apples, peaches, pears, plums, prunes, and grapes are grown, and owing to their superior flavor and splendid shipping qualities find a ready market in the East. A number of medals were granted El Dorado fruit displays at the St. Louis Exposition. With the climate, soil, and irrigating facilities, this industry will become one of El Dorado's best.

During the year 1903, 118 cars of green fruit and 40 cars of grapes were shipped from the county.

WATER.

The water supply is sufficient for all needs. There are several ditch systems that bring water from the snows of the Sierras, notably the El Dorado Water and Deep Gravel Mining Company's system, commonly known as "The Big Ditch," with about 240 miles of ditch, and the California Water, Mining and Irrigating Company's system, with 160 miles of ditch. Besides these, there are many smaller systems, aggregating from 500 to 600 miles, that distribute water to all parts of the county.

LUMBER.

The Sacramento and Placerville Railroad has been extended by the El Dorado Lumber Company 7 miles to the new town of Camino, where there is located a box factory and the company's planing mill, lumber yards and dry kiln. From this point the company's narrow-gauge road runs about 25 miles into the timber belt. The Caldor and Diamond Railroad is a lumber road built last year, and runs from Diamond Springs 30 miles into the timber belt. These two roads ship out between 35,000,000 and 40,000,000 feet of lumber yearly, while the output of the smaller lumbering concerns will aggregate probably over 5,000,000 feet.

MINERAL RESOURCES.

It was at Coloma that James W. Marshall, in January, 1848, made his famous discovery of gold. Since then mining has been one of the leading of El Dorado's industries. Ancient river channels have proved an abundant source of wealth in the past, and with modern methods cheapening the cost of mining, will produce much more. Many hydraulic mines are in operation. Quartz mining is still in its infancy. Geological surveys show that the gold-bearing formations of the counties south run into and across El Dorado, and there is ample evidence of the existence of both precious and base metals in the innumerable mineral veins and deposits.

Cinnabar and copper are found in several localities, and in several places prospects of the latter metal are being developed.

Slate-quarrying is an important and rapidly growing industry. The manufacture of slate for roofing and other purposes is conducted on a large scale. Sixty-eight cars of slate were shipped out in 1903, and the amount was much greater in 1904. The quarries at Slatington are being extended, as the capacity of the plant is not equal to the demand. The quality of the slate is equal to the best produced in the East. Many Government contracts have been filled from these quarries.

Limestone and marble of good quality are found, and a large quantity of lime is manufactured.

CATTLE AND DAIRYING.

The ranges of the mountains are ideal pastures, and thousands of cattle spend the summer there, migrating in the winter to the lower country till the snows of the high altitudes have melted and the feed started again. Dairymen go with their herds, and all summer the dairy products are sent out of the hills. This is a growing industry,

and as modern methods displace the old and unsatisfactory ones, it is becoming more profitable.

The population of El Dorado County is about 10,000.

With the abundant rainfall irrigation is not necessary in most sections, though irrigation increases the productive capacity of the land.

The educational system is composed of over sixty common schools, and a high school was at the last election voted for by the people, and will open during the fall of 1905.

GENERAL STATISTICS.

Area, 1,891 square miles, or 1,210,240 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	642,170
Value of country real estate	\$2,147,185
Of improvements thereon	675,395
Of city and town lots	158,015
Of improvements thereon	433,390
Of personal property	846,420
Total value of all property	4,775,890

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle—Beef	120	\$3,000	Colts	210	\$3,150
Stock	4,240	84,800	Mules	20	400
Cows	2,750	68,750	Sheep	5,000	10,000
Calves	3,250	32,500	Goats	1,100	1,100
Horses—Thoroughbred	15	1,500	Swine	890	3,560
Standard-bred	10	500	Poultry (dozen)	1,035	5,175
American	30	1,050	Hay	---	720
Common	1,680	50,400	Lumber	---	46,235

Number of acres sown for crop of 1904:

Wheat	1,080
Oats	1,260
Barley	1,540
Hay	9,450

Acres of grape vines growing in spring of 1904:

	Bearing.	Non-Bearing.
Table	340	---
Raisin	140	---
Wine	1,900	220

Number of fruit trees growing in spring of 1904:

	Bearing.	Non-Bearing.		Bearing.	Non-Bearing.
Apple	28,140	5,090	Prune (French)	16,020	150
Apricot	1,800	500	Prune (other kinds)	90,000	2,500
Cherry	3,600	890	Lemon	150	---
Fig	1,450	300	Orange	1,200	850
Olive	1,900	500	Almond	2,000	600
Peach	114,270	19,000	Walnut	500	200
Pear	68,000	34,150			

School statistics:

Total number of census children, 1904	1,886
Number of teachers employed	69
Number of school houses	66
Number of school districts	64
Amount expended for public school purposes	\$34,282 05

FRESNO COUNTY.

Fresno extends across from the high Sierras to the mountains of the Coast Range, and in this center of the valley every form of industry in any of the counties that make the watershed of the San Joaquin is found in a greater or less degree.

Its mountains contain lumber and minerals and fine scenery; its level plains grow cereals and fruits, and vines and vegetables; it raises cattle, and its western borders overflow with petroleum. But in addition to this diversity of interests, it has, as a great mainstay, the raisin industry, with Spain as its only competitor.

IRRIGATION FACILITIES.

The average rainfall is 10 inches, and therefore cereals can be successfully grown without irrigation. Fresno is a wonderful example of what irrigation has done and can do. The San Joaquin River forms the northern and eastern boundary line, but the stream is not so well located for irrigation purposes as is Kings River, which, rising in the Sierras, passes south, and then west and north, in a wide curve, through the center of the farming district, carrying through the summer a volume of water equal to 8,500 cubic feet per second.

There are 300 miles of main canals, 1,000 of branch canals, and 5,000 of distributing ditches. The region is a network of streams of water, that is drawn off on the vineyards, deciduous or citrus fruit orchards, or alfalfa fields. The cost of water is low, the annual charge being about 65 cents an acre. The perpetual water-right, included with the purchase price of the land, is about \$6.25 per acre.

AGRICULTURE.

Though great as the raisin and fruit industry is, wheat is grown on vast areas, especially in the western section, the ranches running in the thousands of acres and the product in good years amounting to millions of bushels, a considerable portion being worked into flour in Fresno, where one mill has an annual capacity of 140,000 barrels. Barley is grown in large quantities and so is alfalfa, though the greater part is fed to stock, of which hundreds of carloads are exported yearly. There are six creameries and many skimming stations, and butter and cheese are exported. One creamery in Fresno City produces 6,000 pounds of butter daily. An unlimited market for dairy products, with the fact that one acre of alfalfa will keep one cow in green feed, offers the farmer of limited means an opening for immediate and profitable returns. Sheep by the thousands roam over the foothills, the wool clip in seasons amounting to about 15,000,000 pounds.

FRUIT CULTURE.

Deciduous fruit shipments, green and dried, represent several million dollars. There was an increase of almost 100 per cent in 1904. Citrus fruit growing is a developing industry, representing about \$100,000 and growing yearly. Watermelons are exported in hundreds of carloads. The vineyards cover about 84,000 acres, most of which are in raisin grapes, and the remainder in wine or table varieties. Last year the acreage planted to raisin grapes was increased 10 per cent. There are over a dozen large wineries, one of which, owned by the California Wine Association, ships 250,000 gallons a year. Excellent port, brandy, sherry, and angelica are made, as well as other varieties. This product is valued at over \$1,000,000.

At the head of the long list of valuable products stands the raisin, with a tonnage of 4,000 carloads. When a vineyard is in full bearing it produces about 4,000 pounds of green grapes to the acre, which will dry to over one ton of raisins. The average product of five-year-old vineyards is a ton of raisins to the acre. The California raisin has possession of the American market, and is extensively shipped abroad.

OTHER INDUSTRIES.

The growing of nursery stock is a remunerative occupation. Honey is produced in considerable quantity, and more so with the increased production of alfalfa. Alfalfa honey equals in quality clover honey of the East. Gold is mined in the mountains, and 50,000,000 feet of lumber cut annually, most of which is floated down in flumes. There are large planing mills and many lumber yards in the city of Fresno.

DAIRYING.

The growth of the dairy business dates back less than six years, when smaller interests merged and became what may be properly called a large clearing-house for butter-fat. Before this, dairying was conducted in a desultory way by ranchmen who gave their time to grain, vineyards, or other possessions, and, these permitting, the cows received attention later on. Now the farmers find it advisable to attend to their cows. Thirteen skimming stations are established, and are buying cream in Kern County as well. The farmers deliver their milk at the skimming stations, and the butter-fat being removed, the skimmed milk is returned to them, worth from 20 to 30 cents per 100 pounds for feeding swine. The average price paid for butter-fat is 21½ cents per pound. This makes it possible to realize an average of \$5 per month per cow during the milking period. With sixty acres and forty cattle, a farmer can have milk the year round, which will give him some cash every month and none of the troubles incidental to the other industries; but the higher the grade of stock the better the returns.

The calves and hogs fed on the skimmed milk are as much a part of the dairy product as the cream itself. These calves and hogs as by-products of the dairy average in value \$19.35 to each cow. The market for Fresno County butter is two thirds at home in the San Joaquin Valley, and the prices have ranged from 17 to 30 cents per pound.

WOOL-GROWING.

Along the river bottoms of the Kings and San Joaquin, sheep-raising flourishes. Here, between October and April, scores of bands of sheep, averaging in number all the way from 500 to 1,000, are herded every year. The section is fertile and rich in herbage, upon which the animals thrive until the dry season sets in, when they are driven into the mountains. The section around Firebaugh, 45 miles west of Fresno, is the chief sheep-shearing station. There are usually three shearings a year, from April to August, and this season is a particularly busy one. The work is done almost exclusively by Portuguese, Mexicans, French, Spanish, and Italians.

During the last few years there has been a marked falling off in the production of wool, due to the subdivision of large tracts and the restriction of pasturage areas.

STOCK-RAISING.

The raising of hogs, cattle, horses, and mules has advanced both as to numbers and as to quality in breeding. From 5,000 to 7,000 hogs are annually shipped to Honolulu. These average in weight about 150 pounds, and are fattened for the most part on alfalfa. Only for about a month immediately prior to shipment is it necessary to feed grain so as to produce the required condition for transportation. Large numbers of cattle are being received continually from Arizona, to be fattened and either slaughtered here or reshipped to San Francisco and elsewhere. Thus the number of beef cattle is being added to as rapidly as it is diminished by the demands of the local and northern markets, and there are between 50,000 and 75,000 head always on hand. The facilities for fattening beef cattle are unsurpassed, and prices for the dressed meat or for the fattened cattle on the hoof are always good.

Gratifying results are being attained by horse-breeders who have given their attention to the improvement of the blood lines in the various classes. Thoroughbred, standard-bred, and high-class draft stallions have been brought into the county, and great interest is manifested among horsemen in raising the grade of the runner, the trotter, and the work horse. Some of the best roadsters in the State are in Fresno, and very promising youngsters in the running line are also attracting attention, while the production of the heavier breeds has met with equal success.

In a general mention of the varied resources there must be consideration of the mule. In this valley he finds an environment peculiarly adapted to his exacting requirements, and speedily attains the highest degree of mulish perfection. So widely has his reputation spread that Great Britain sent her agents across the sea to acquire him for use in her warfare against the Boers of South Africa.

FRESNO CITY.

The city of Fresno, in 1904, grew at a pace unexcelled in its history. During the year fully 500 new dwelling-houses were erected. Wages were high and work plenty, and as a result the city flourished. The city trustees used large quantities of oil on the streets. During 1904 eight blocks of asphalt streets were put down. The linear measure-

ment of cement sidewalk built would reach into miles. Lighting facilities have been increased. The present population of the city is 21,000, a very material growth over the figures of 1903. Two notable projects are under way. One of these is the building of an electric road into the Yosemite, and the other the erection of a Government building. The Government edifice will be the best building in the county. In 1904 the county erected a \$150,000 hospital. It is in the old mission style and fully equipped.

GENERAL STATISTICS.

Area, 5,940 square miles, or 3,801,600 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	1,763,870
Value of country real estate	\$16,793,753
Of improvements thereon	2,774,409
Of city and town lots	4,193,573
Of improvements thereon	4,262,841
Of personal property	5,206,145
Total value of all property	37,330,783

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle—Beef	2,425	\$60,635	Sheep—Imported.		
Stock	28,056	420,490	Graded	477	\$3,580
Cows—American	71	4,765	Common	98,866	197,733
Common	23,480	536,097	Lambs	51,116	30,058
Calves	11,548	80,834	Goats—Angora	93	275
Swine	11,950	35,848	Common	837	1,674
Horses—Thoroughbred	27	4,380	Poultry (dozen)	6,605	13,210
American	46	2,645	Hay		10,150
Common	10,965	294,203	Wool		7,380
Colts	1,426	28,350	Lumber		136,350
Mules	1,765	51,425			

Number of acres sown for crop of 1904:

Wheat	68,475
Oats	425
Barley	38,765
Corn	1,065
Hay	12,365

Acres of grape vines growing in spring of 1904:

	Bearing.	Non-Bearing.
Table	1,315	350
Raisin	52,900	2,810
Wine	27,630	2,110

Number of fruit trees growing in spring of 1904:

	Bearing.	Non-Bearing.		Bearing.	Non-Bearing.
Apple	8,000	2,600	Pear	1,040	480
Apricot	27,000	560	Prune (French)	2,600	960
Cherry	60		Lemon	160	
Fig	14,000	160	Orange	1,200	400
Olive	1,100		Almond	200	10
Peach	20,000	16,000	Walnut	25	30

Value of grain assessed in storage:

Wheat	\$24,095
Oats	150
Barley	10,645
Corn	335

School statistics:

Total number of census children, 1904	11,836
Number of teachers employed	285
Number of school houses	128
Number of school districts	122
Amount expended for public school purposes	\$292,534 89

GLENN COUNTY.

Glenn County was separated from Colusa by Act of the Legislature of 1891. It is one of the Sacramento Valley counties, located on the eastern slope of the Coast Range, on the western side of the valley, and extends from the summit of the Coast Range to the Sacramento River.

TOPOGRAPHY—SOILS.

Between the Sacramento River and the first low hills on the west are more than 300,000 acres of level land. Just west of this is a belt of low, rolling hills, in which 75,000 acres are in cultivation. The steeper hills cover about 150,000 acres that are principally used for grazing. The hills protect many rich valleys which yield abundantly. In the narrow valley of Stony Creek are 50,000 acres of farming land, with about an equal amount of grazing land between the valley and the mountains proper. The higher mountains are by no means a wilderness, but abound in cozy homes of hardy mountaineers and pleasant summer residences of dwellers of the plain, drawn thither in pursuit of deer and trout. Stony Creek rises in Colusa County, 20 miles south of the county line, and flows north through a narrow valley until it has traversed two thirds of Glenn. Here it receives the water of Grindstone Creek, which carries about an equal volume, and together they force their way through the ranges of hills that parallel the mountains. From here the course is northeast till it passes the last of these barriers at a point in Tehama County, one mile north of the county line, and 14 miles west of the river. It then turns and flows southeasterly till it reaches the Sacramento River 9 miles south of the north boundary line of Glenn County, and due east from the point where it breaks through the first range of hills.

There is not a foot of desert land, nor an acre of submerged land in the county, if we except the beds of the running streams. Every part is fertile and productive. Stony Creek is the last stream on the west side of the valley that empties directly into the river. Those north of it have not sufficient volume to build up the valley as fast as the river does, consequently the river is flowing on a slight elevation, or ridge, the land sloping gently down to the west for a few miles to the bottom of the "trough," and from there gradually rising to the base of the western hills. This "trough" has its beginning about half way between the north and south boundaries of Glenn County. Before the days of the levees, the overflow from the river at flood time used to rush back to this "trough" and on to the south, adding fertility to the soil and building up the land by depositing its sediment. Consequently the land between the river and the bottom of this depression is known as river land and is the richest to be found. All the 40,000 acres east of the river and over 80,000 acres on the west side are of this character. The country between this depression and the hills is known

as plains land, and is also very fertile. It varies in character from the gravel of a narrow strip near the middle of the plain, to the richest black adobe. There is also a large area of black adobe of slightly different character, in that it contains a large percentage of organic matter. Near the north side of the Glenn ranch and extending back to the middle of the plain is a large body of a reddish clayey soil that is recognized as being the best wheat land in existence. Just north of Willows, Willow Creek has built up a broad belt of alluvial soil closely allied to that along the Sacramento River, and has carried it across the plains from the hills to the river land. Just north of this, near the center of the plain, is a great bed of whitish clay soil which produces abundant crops of cereals. These six soils are of almost equal value for grain-growing and are held at about the same prices. Besides these there are smaller bodies of different grades, such as gray gravel, red gravel, white silt, etc., each being the soil par excellence for some particular crops, as alfalfa, citrus fruits, grapes, etc. Back among the hills are many small valleys containing several hundred acres with soil similar to the best along the western rim of the plain.

IRRIGATION FACILITIES.

Many acres of land are irrigated by ditches from Stony Creek, by pumping from the Sacramento River, and from wells. About one third of the deciduous fruit orchards are irrigated, and all the orange and lemon. All the lands are excellent for irrigation. Stony Creek, in the late fall, furnishes but little water to the irrigators on the plains, although those in the foothill valleys along its course have water enough, as does everybody in the spring and early summer. Few streams anywhere offer better facilities for the storage of water than this one does. Butte Creek, at the southeastern boundary of the county, is a living stream, carrying a large volume of water from the Sierras. The Sacramento River, which at all seasons carries sufficient water to irrigate the whole valley, is tapped near the north line of the county by the Great Central Canal. This canal was begun about fifteen years ago by the Central Irrigation District, which comprised 52,000 acres in Glenn County and over 80,000 in Colusa County, all being plains land lying west of the trough. But owing to some defect in the organization and a consequent legal tangle, the ditch was not completed. Two years ago it came into possession of the Central Canal and Irrigation Company, which is now about ready to deliver water to these lands. Not content, however, with furnishing water for this vast area, the company has already a big ditch down the river which will serve 50,000 acres in Glenn County, including the famous Glenn and Packer ranches, and much more in Colusa County, including the great ranch of the late Senator Boggs. This is all land of the richest quality, lying east of the trough and outside of the limits of the old irrigation district. Water has already been turned into this big ditch, and lateral ditches are now being made to those who hold water-rights and are wanting water for next season's irrigation. To him who does not find a canal ready to deliver water to his land, or who wishes to be complete master of the source of his supply, the water beneath the soil is an easy solution of the problem of irrigation. There are several well-defined strata of water-bearing gravel beneath every bit of the valley lands. The

water is reached at a depth of from 12 to 30 feet, and the flow is abundant. To raise the water windmill, horse-power, or gasoline engines are employed.

The Geological Survey, after investigations along Stony Creek, reported many excellent reservoir sites, three of which were carefully measured, with the following results: Briscoe reservoir, with a capacity of 14,630 acre-feet, can be constructed at a total cost of \$122,000; East Park, capacity 25,000 acre-feet, cost \$165,400; Millsite, capacity 45,750 acre-feet, cost \$698,000. This cost includes a liberal estimate for land damages.

SOIL PRODUCTS.

Farming and stock-raising are the principal industries. Until within a few years the whole arable section was devoted to the production of wheat. This commodity being unprofitable, except on a large scale, forced the smaller farmers into diversified farming, dairying and stock-raising. It has been demonstrated satisfactorily that the smaller the farm the greater the profit per acre. The river land can be purchased in small tracts at from \$25 to \$100 per acre.

There are some extensive stock ranges in the hills, where the land has never been disturbed by the plow. In these ranges are many fertile valleys that could be converted into homes. This land is worth from \$4 to \$20 per acre. The irrigated land, when sold alone, brings about \$100 per acre. This land produces at least four crops of alfalfa hay each year, of two or three tons per acre, worth \$4 or \$5 in the field.

All fruits grow to perfection. In the preparation of this article we have used much material from an interesting one that appeared in the San Francisco "Call" of January 3, 1905, written by Isidore J. Proulx, of Willows. In concluding that article Mr. Proulx wrote: "Peaches, pears, and prunes yield from \$200 to \$300 per acre, and begin bearing the third and fourth year. No other fresh fruit is so easily handled as Bartlett pears, nor any other so easily dried as prunes. All the finest canned peaches in the world's market come from the Sacramento Valley. Here one can have a home of his own, with his cows and pigs and chickens furnishing him with fresh milk, butter, meat and eggs, and in his own back yard in proper season can gather apples, apricots, almonds, cherries, figs, plums, prunes, pomegranates, grapefruit, grapes, lemons, limes, loquats, oranges, olives, peaches, pears, persimmons, quinces, walnuts, blackberries, and strawberries. He can from his own garden get the best and tenderest of vegetables, and be always at home with or near to his wife and children."

LIVE STOCK AND POULTRY.

Many persons derive a handsome living from poultry. Flocks of 500 to 600 turkeys are not uncommon. Chickens are the money-makers all over the county. Eggs always bring a fair price, averaging about 25 cents a dozen. Chickens, turkeys, ducks, and geese bring good prices. This industry is particularly safe and profitable, on account of the absence of epidemics among the fowls, the mild winters and dewless summers being conducive to longevity of the fowls.

Cattle, sheep, and hogs are the chief revenue-producers. The high prices prevailing for the past three years have placed stockmen in an enviable position.

Less than twenty years ago the Angora goat was a rarity in Glenn County. Now between the north fork of Stony Creek and the south fork of Elder Creek there are more than 15,000. The portion of the county devoted to their production is immediately along the base of the Coast Range, or of foothills, a country that is unfit for anything else but wild animals. The Angora is by nature fitted to climb over rocks and in brush and rough mountainous localities to procure food where other domestic animals would not succeed in living. The long silky mohair is valuable for various purposes, and is coming into use more and more each year. Angora mutton or venison is far superior to the Mexican or old American goat, and by many considered better than sheep mutton. It has sold in the markets at about the same price as sheep. It is the practice of the Angora owners to keep them on the foothills for about eight months—from October to June—then move them to the summit of the mountains for about four months, during the hot season. By so doing the herds have green-growing feed the year through, and the cool climate of the higher altitudes tends to increase the length and fineness of the mohair. This industry is a growing one, and as the Angoras are located where the land without them would be a total waste, it is greatly to the advantage of the county. The demand for stock goats is greater than the supply.

EDUCATION.

The schools of Glenn County are up to the high standard. There are thirty-seven districts, employing forty-seven teachers, besides the two high schools, one of which is at Willows, the other at Orland. Two new districts have recently been formed on the Glenn ranch, made necessary by the settlement of these lands. The rights of children are well protected. As soon as fifteen of school age are brought together in a new locality a school is equipped for their instruction. There are more than a dozen fine church buildings in the county—four at Willows, three at Orland, two at Butte City, while Germantown, Elk Creek, Newville, and Afton have houses of worship.

WILLOWS.

Willows, the county seat and principal town, is located on the railroad a little south of the center of the county. The county buildings, consisting of a splendid, modern courthouse and a jail and hospital, are located here. It has a \$20,000 grammar school building and a fine high school building. The town is lighted by electricity, and has splendid water works. A creamery, centrally located and fitted up in the most modern style and with up-to-date machinery, is one of the industries. The streets are graded, graveled and oiled, and lined on either side with shade trees. The sidewalks in the residence portion of the town are graveled with fine gravel, and in the business portion are paved with concrete. Willows is governed economically, there being no town debt. The population of the incorporated town and its additions is 2,000, and is rapidly increasing.

TRANSPORTATION FACILITIES.

Transportation facilities are excellent. The main line of railroad passes through the county from north to south, with a branch extending to Fruto. Steamboats ply regularly to all points on the river, and

with their barges in tow furnish cheap transportation for the immense crops of wheat, barley, and other produce raised on contiguous lands. The wagon roads are unsurpassed, and are never muddy in the winter and seldom dusty in summer. They are a valuable asset to the farmer, since they permit him to move his produce to railroad or river at a moderate expense. All streams and waterways are crossed by substantial bridges.

GENERAL STATISTICS.

Area, 1,400 square miles, or 896,000 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	\$620,451
Value of country real estate	7,757,688
Of improvements thereon	568,141
Of city and town lots	158,640
Of improvements thereon	206,325
Of personal property	1,336,359
Total value of all property	10,857,733

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle	7,841	\$156,937	Sheep — Imported and		
Cows	1,090	32,695	graded	265	\$1,205
Calves	4,847	48,476	Common	97,504	195,018
Swine	13,091	39,272	Poultry (dozen)	2,100	4,200
Horses	2,362	70,846	Hay		735
Colts	686	10,285	Wool		1,915
Mules	3,661	183,060	Lumber		6,470
Lambs	8,080	16,160			

Value of grain assessed in storage:

Wheat	\$172,430
Barley	16,785
Corn	1,370

School statistics:

Total number of census children, 1904	1,257
Number of teachers employed	49
Number of school houses	33
Number of school districts	37
Amount expended for public school purposes	\$29,231 12

HUMBOLDT COUNTY.

Humboldt County is, with the exception of Del Norte, the most northerly county of California. The sinuosities of the Pacific coast-line extend some 175 miles. From north to south the county extends 108 miles, while in width it averages about 40 miles. Its area may be subdivided into the following classes: Timber land, 925,000 acres; denuded forest (stump land), 52,000 acres; cultivable land, 500,000 acres; grazing land, 600,000 acres; marsh land, 31,285 acres; mineral land, 125,000 acres; waste land, 11,195 acres.

TOPOGRAPHY.

The topographical features of Humboldt are varied and picturesque. The surface is extremely rugged, numerous spurs of the Coast Range intersecting the county in all directions, rising in many places to absolute grandeur.

Besides a number of smaller streams, the county is drained by two rivers of importance. Entering at the northeast corner, the Klamath traverses it for about 30 miles in a southwesterly direction, and there being joined by the Trinity, flows northwesterly 45 miles, and empties into the Pacific Ocean just north of the county line. Entering the county at its eastern line, the Trinity flows about 30 miles, and joins the Klamath. Among the minor streams are Mattole, Bear, Elk, Redwood, Little, and Mad Rivers, and Redwood Creek. Second to the Klamath is Eel River, navigable for small steamers and craft. All these flow in a northwesterly direction, and are separated from each other by a high hill country.

SOILS.

The soil of the bottom lands and on the hills next the coast is black; that on the bottoms is of a sedimentary composition and somewhat argillaceous, while that on the hills is more of a sandy loam. The soil on the interior hills is composed of disintegrated rock, mixed with organic matter and decayed vegetation.

Humboldt needs no irrigation. The annual rainfall averages 46 inches, and crops have never been known to fail for want of moisture.

FRUIT-GROWING.

Fruit of all kinds does well, particularly apples, pears, prunes, peaches, cherries, apricots, and berries. Strawberries and raspberries grow in abundance, and a small area of land in these fruits, well cultivated, brings a generous return. In the vicinity of Eureka two crops of strawberries are produced per year, of fine flavor and great size. Raspberries bear from June to September, and even in December and January are found on bushes grown in the valleys. Cherries, strawberries, etc.,

ripen later than in the warmer sections of the State, thus giving the Humboldt product an advantage in the market.

The yield of all kinds of fruit is generous, and in many instances prodigious, particularly that of apple, plum, and prune trees. Eel River Valley is one of the finest sections on the coast for the production of apples of the most delicate flavor and juiciness. The climate, neither too hot nor too cold, has doubtless much to do with the result.

In the Klamath River country climate and soil are well adapted to horticultural pursuits. Peaches are grown as large as a teacup, and of most luscious flavor. They can not be carried to any market, as they have to be packed on animals, and, from the tenderness of their flesh, are unable to withstand this rough transit. The grapes grown here are of fine flavor and firm flesh. The varieties for table use are particularly good, and the wine made from the wine grape is of good body and flavor.

The principal fruit sections are Camp Grant, McDarmidt, Rohnerville, Blocksburg, Upper Mattole, Arcata, Bottom, Eel River Valley, Garberville, and Phillipsville. All these sections are adapted to the apple, but peaches, prunes, pears, and many other varieties of deciduous fruits do well, while for berries the conditions are perfectly adapted. The favorite varieties of apples are Rome Beauty, Lawver, Stark, Wagner, Arkansas Pippin, Ben Davis, and Bellflower. These find a ready market, being shipped to San Francisco by steamer. The shipment in 1903 was 98,417 boxes.

DAIRYING.

This industry, the second in importance, and perhaps the first in the certainty of returns, has made remarkable advances in the last two decades. Prior to 1880 it was mainly dependent upon the native grasses of the seaward slope, but with the introduction of clover as the staple food for the herds, a complete revolution occurred, and the establishment of creameries with their improved machinery for handling the milk completed the transformation. With few exceptions the dairy ranch to-day is on the deep, rich bottom land or reclaimed marsh land, where clover, green the year round, furnishes the food, with corn and vegetables in their season, which is pretty much all the time. So instead of six or seven acres being required to maintain a cow as under the old system, from one to one and one-half acres is now amply sufficient. The yield per cow is also greater, and the quality of the milk better. There has been great improvement in the herds, which now include the best milk and butter breeds. There are thirty-two creameries and half as many separators; a cheese factory, and a condensed milk and cream works. The output of cheese is nearly all consumed locally. The shipments of condensed milk and cream for 1903 amounted to 1,275,000 pounds, and of butter 4,690,000 pounds. Since 1889, the first year for which a record of shipments was kept, the amount of butter, cheese, and condensed milk shipped from Humboldt has increased each year, until from a total of a little over 1,000,000 pounds in 1889, it reached over 5,000,000 pounds in 1899, and has since increased in the same ratio. The local consumption for a population of 30,000 is supplied in addition to the exports. By reason of having green feed at all times, the shipments are continuous throughout the year, thus enabling butter

producers to reap the advantage of high prices at times when other sections are non-productive. And the cool, equable climate being ideal for butter-making, the quality of the product is superior, and it commands top prices. The returns from this industry average about \$100,000 per month, which amount is distributed among the owners of our dairy herds. The area devoted to this industry is steadily increasing.

STOCK-RAISING.

This is an important industry, as the excellent pasturage furnishes the most favorable conditions. The large ranges in the eastern portion are dotted with countless herds of sheep and cattle, and every farm and dairy in the region nearer the coast adds its quota. Hogs are raised in large number, and each creamery has a drove of them being fattened on the skim milk and other waste products. In addition to the local consumption of meat the ranges furnish an average annual shipment of 4,000 head of beef cattle, 3,500 sheep, and 3,500 hogs. Of cattle, about half as many more are driven out overland of which no record is kept; while the number of sheep so driven out of the county is in excess of that shipped by steamer. The total weight of live stock shipped by steamer is in excess of 6,000,000 pounds annually, and valued at upwards of \$300,000.

WOOL.

The wool industry is a very important one. The total shipments of wool for the twelve years ending December 31, 1903, aggregated nearly 10,000,000 pounds, or an average of over 800,000 pounds annually. In quality Humboldt wool is the choicest on the coast. The stock is good and the wool clean. The abundance of feed throughout the year prevents the sudden stoppages in wool growth that weaken the fiber grown under less favorable conditions.

AGRICULTURAL.

Humboldt County does not occupy a prominent position agriculturally for the reasons that the percentage of level land is small (and hillsides, however fertile, can never be profitably farmed in competition with level plains), and much of the best agricultural land has found a more profitable use for pasturage and dairying. For this latter reason the production of the principal grains is less than it was twenty years ago. Humboldt has the banner record for the production per acre of oats and corn, according to the United States census reports. At the Chicago World's Fair, wheat grown "on the hills" of Humboldt took first prize, and showed the record yield per acre—from 60 to 100 bushels for various samples. All the other crops of temperate climes grow in like proportion. As a rule, any vegetable product that is suitable for cultivation here, will grow thriftier, larger, and more to the acre than in almost any other locality. And all this without irrigation, for as an adjunct to agriculture, the irrigating ditch is unknown. The principal agricultural crops are hay, oats, potatoes, peas, barley, wheat, corn, lentils, seeds, etc. Oat hay is grown universally throughout the county and is mostly used for local consumption. Oats is the principal grain product, and in addition to the local consumption, about 2,500,000 pounds are exported annually. Potatoes are produced largely, and figure

among the exports at from 3,000,000 to 5,000,000 pounds annually. Field peas, dried, are an important product, averaging 750,000 pounds of annual exports. Barley, wheat, corn, lentils, and seeds are regular elements in the products, but occupy a comparatively unimportant place, because the land has been found more valuable for other purposes. Failure in crops of any of these products is unknown; phenomenal yields per acre are an every year occurrence; and the average yield per acre in most of them is at least double that of the State at large.

THE LUMBER TRADE.

The manufacture of redwood lumber is the most important industry. With a supply of standing timber estimated at over 45,000,000,000 feet, the greater part of which is fairly accessible, the question of a cessation, or even a pronounced decline, is a matter of remote future consideration. The annual export of lumber of all kinds is above 250,000,000 feet. This is the product of ten large plants, which are operated nearly continuously, and whose aggregate daily capacity is from 700,000 to 1,000,000 feet. Some half a dozen smaller plants, limited in capacity, saw almost entirely for the local trade. Two additional large mills are now being erected, and two or three of the operating plants have been largely increased and improved during the past two years. The export mills represent an invested capital of from \$3,000,000 to \$5,000,000, and the logging plants operated in connection with them, including short logging railways, more than half as much more. These mills and the logging operations in connection therewith, furnish nearly steady employment for from 2,000 to 3,000 men.

Of the subordinate branches of this industry, the most important is the making of shingles. Operated either in connection with sawmills or separately, there are 40 shingle mills, whose output is upwards of 700,000,000 shingles annually, and whose maximum capacity is considerably in excess of that figure. The number of men employed in this branch of the lumber industry is about 1,200. Redwood shingles are a superior article, and in the last few years combined efforts to introduce them in the Eastern market have been quite successful, so that now nearly one half of the total output, either kiln- or air-dried, is disposed of east of the Rocky Mountains.

HARBORS, COMMUNICATION, AND TRAVEL.

Humboldt County is without direct rail connection with the outer world, but this disadvantage is more than made up by its possession of the only safe and commodious harbor, accessible to vessels of all but the deepest draft, between San Francisco and the Columbia River. Humboldt Bay is 14 miles in length and from one half mile to 4 miles in width. It has a tidal area of 28 miles and 35 lineal miles of navigable channels. It is situated near the center of the coast line of the county, and extends nearly parallel therewith, being separated from the ocean by two narrow peninsulas of sand. Being so completely landlocked, this harbor is of the utmost importance to a coast so barren of good harbors as is the Pacific; but its usefulness has in the past been seriously impaired by shifting sandbars which obstructed its entrance, and by the shallowness of some of its inner channels. In 1889 the General

Government began improving the entrance to the harbor by extending two jetties of rock, one on each side of the channel, so as to confine the waters to a permanent way. This work was completed in September, 1899, at a cost of more than \$2,000,000; and has resulted, according to the report of the U. S. Engineer in charge (for the fiscal year 1898-9), in maintaining a "24-foot least depth of channel, fully 1,350 feet wide, on the bar." The survey of the channel over the bar, made by the U. S. Engineer Corps in May, 1903, shows the channel at all points to be in excess of 30 feet in depth at mean low tide, with a width throughout of from 500 to 600 feet. Prior to this, \$81,000 had been expended in dredging the inner channels of the bay; and in 1899, the Eureka waterfront channel was dredged for a distance of 8,900 feet, 200 feet wide, to a depth of 15 feet at low tide, at a cost of \$50,000.

Communication with San Francisco is quick and regular. The Pacific Coast Steamship Company's fine steamers Pomona and Corona each make regular six-day trips alternately, making an arrival or departure every other day; carrying the United States mails, passengers, and freight. The steamer Eureka makes regular five-day round trips with the mails, passengers, and freight; and the steamers North Fork and Arctic, carrying lumber, miscellaneous freight, and passengers, make round trips about every eight days. From three to ten other steam schooners are engaged with more or less regularity in the lumber trade, and nearly all of them have accommodations for a limited number of passengers. Some of these run to Southern California ports. A line of steamers makes regular trips between San Francisco and Portland, Oregon, calling at Eureka and Coos Bay, Oregon, each way. A fleet of from twenty-five to fifty sailing vessels is constantly engaged in the lumber trade, carrying cargoes to the California ports on the Pacific; to Mexico, Central America, South America, the Hawaiian Islands, Australia, and China. An average of nearly four vessels cross the bar every day.

Trinidad, 18 miles north of Humboldt Bay, is a deep open port, well sheltered from all winds except those from the south to the west. Considerable shipments of shingles, shakes, bark, wool, etc., are made from this point, principally during the summer. Shelter Cove, near the southern boundary of the county, is an open roadstead affording excellent shelter from the northerly winds of summer. Extensive shipments of wool, tanbark, ties, bolts, etc., are made from this point in the summer months, and quantities of stores and merchandise for southern Humboldt are landed there.

There are eleven distinct lines of railroad, with an aggregate length of 150 miles. All of them either directly or through connections terminate at tide water on Humboldt Bay. Two enter the city of Eureka, and another connects with the city by a steam ferry service. Four transport passengers, freight, and produce, and the others are built chiefly to transport logs, lumber, and other forest products.

Good wagon roads connect all points of any importance. The road north along the coast gives connection with Crescent City, the county seat of Del Norte County (100 miles north of Eureka), and there are two roads giving overland connection with Mendocino County—one in the interior leads to Ukiah, the northern terminus of the S. F. & N. P. Railway (183 miles south of Eureka); the other is along or near the coast.

MANUFACTURES.

But little attention has been paid to manufactures aside from that of lumber. There are three tanneries: one at Arcata, one near Eureka, and one near Rohnerville. The bark is furnished by the near-by forests; the hides are mostly brought from San Francisco. The annual average value of the leather exported is about \$75,000.

In 1901 a woolen mill was erected and put in operation at Eureka. It has been very successful; operates steadily, usually on overtime, and employs about 65 hands. The larger portion of its product is shipped to the Eastern market, and the amount so shipped is of a value of about \$150,000 annually.

There is one fruit cannery located at Fortuna, and a preserving and canning plant at Eureka.

There are four sash and door factories and planing mills in Eureka, and one each at Samoa, Arcata, and Fortuna. These are important branches of the lumber business, and their product is largely exported.

At Arcata there is an extensive stave factory which prepares staves and barrel-heads for shipment to San Francisco.

SHIPBUILDING.

Shipbuilding has for years been a most important industry. A quality of pine excellently adapted to this purpose is plentiful throughout the forest region, and the bay shore offers abundant yard-room for the purpose. The most important yard in this line is that of the H. D. Bendixsen Shipbuilding Co., at Fairhaven. No less than 120 vessels of all kinds were launched from that yard up to January 1, 1904.

So far as the records are obtainable, a total of 163 vessels have been built here, of rigs and character as follows: Ocean-going vessels—schooners, 114; barkentines, 10; brigs, 3; steamers, 12. Bay vessels—steamers, 13; schooners, 10; sloops, 1. Total, 163. Tonnage, 39,967. The aggregate value of these vessels, exclusive of the machinery of the steamers, is estimated to be not less than \$3,000,000. In the early period of this industry, the vessels built, being almost wholly intended for coasting traffic between shallow harbors, were of light draft and small size; indeed, all those built prior to 1888, numbering a little over 100, did not average to exceed 200 tons net. But since that time, with the improvement of coast harbors and the gradual movement of Humboldt-built vessels into other than the coast trade, and especially since the introduction of the "steam schooner," their size has been rapidly increased.

In 1892 there was launched from the Bendixsen yard the barkentine "Jane L. Stanford," of 922 tons net, up to that time the largest sailing vessel ever built in California. The three sailing vessels launched in 1898 averaged over 500 tons net; the five launched in 1899 averaged almost exactly 650 tons; the seven sailing vessels launched in 1900, 1901, and 1902, averaged 781 tons net; and on January 2, 1904, there was launched from this yard the five-masted schooner "Crescent," of 1,443 tons gross and 1,334 tons net, this being the largest wooden sailing vessel so far built on the Pacific Coast.

MINING.

Humboldt is not without mining interests. In the northeastern portion, along the Klamath and Trinity rivers, placer mining for gold is the leading industry. While no excessively rich "strikes" have been noted, "pay ground" is unlimited in extent, and water abundant for profitable working. The annual output is about \$75,000. The beach sands south of the mouth of the Klamath and also near Little River have long been worked with fair success.

Granite and sandstone are plentiful for building purposes. A granite quarry near the mouth of Mad River furnished the rock for building the Seal Rock Lighthouse tower near Crescent City. Mineral paint has been produced in commercial quantities from a point near Ferndale. Lime is burned at Jacoby creek. Mineral waters are plentiful, and one of them—"Humboldt Water"—is an article of commercial export. As the result of a prospecting well sunk at Briceland (a small town near Garberville) some years ago, that place has since been lighted and heated by natural gas.

FISHING INDUSTRY.

Fishing is quite an important industry, salmon being the principal variety; although halibut, rock-cod, flounders, perch, sea-trout, shad, herring, etc., are plentiful, and are nearly always to be obtained in the local markets. Reliable figures of the export of fish, kept each year since 1888, show that the average annual shipment amounts to 1,200,000 pounds, of a value of \$32,500.

EDUCATIONAL.

The public schools stand high in efficiency. In design and general appearance, the buildings range from the ordinary rural school house to the fine and costly buildings in the towns and cities. They are so distributed over the county as to give practically every one good school facilities.

GOVERNMENT INTERESTS AND OFFICES.

The United States Government maintains in Eureka a custom house, land office, and weather bureau. On the north spit, near the entrance to Humboldt Bay, is located an efficient life-saving station, and the Government also maintains a system of harbor lights. At Trinidad, on Table Bluff, just south of Humboldt entrance, and at Cape Mendocino, are well-kept light-houses, the Mendocino light being one of the most important on the coast. At Price Creek, near Grizzly Bluff, a Government fish hatchery is maintained. On both sides of the Trinity River, in the northeastern portion of the county, is the Hoopa Indian Reservation, covering a tract about seven and a half miles square. A battalion of the State Naval Reserve is maintained at Eureka.

CITY OF EUREKA.

Eureka has 11,111 inhabitants, according to an official city census taken January 1, 1904. It is the county seat and principal business center. It has about three miles of water frontage on Humboldt Bay. Its streets are broad, well drained and graded, and many of them are

either graveled, macadamized, or paved with bitumen. There is a sufficient water supply; an excellent volunteer fire department; electric light and power, and gas plants; the usual proportion of schools, including an accredited high school, a private preparatory school, and an active and progressive business academy; churches, and benevolent and secret associations and societies. An electric trolley street railroad has five and one quarter miles of road now in operation, and is rapidly extending its system to cover all the more important thoroughfares. Ocean-going steamers, local railroads and ferries, the telegraph and telephone, furnish means of communication, with the world.

GENERAL STATISTICS.

Area, 3,507 square miles, or 2,244,480 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	1,503,162
Value of country real estate	\$13,880,790
Of improvements thereon	1,120,240
Of city and town lots	3,613,139
Of improvements thereon	2,069,285
Of personal property	2,835,143
Total value of all property	24,089,483

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle—Beef	3,171	\$63,420	Colts	768	\$16,695
Stock	18,099	190,050	Mules	341	10,315
Thoroughbred	14	895	Sheep—Imported and		
Cows—American	240	6,000	graded	443	1,840
Common	17,897	375,840	Common	71,076	106,856
Calves	10,791	53,955	Goats	1,400	2,195
Swine	5,284	13,889	Poultry (dozen)	2,237	5,575
Horses—Thoroughbred	8	4,000	Hay	—	1,270
Standard-bred	650	42,325	Wool	—	725
American	5,312	153,078	Lumber	—	175,200

School statistics:

Total number of census children, 1904	7,609
Number of teachers employed	174
Number of school houses	33
Number of school districts	104
Amount expended for public school purposes	\$132,963 61

INYO COUNTY.

By W. A. CHALFANT.

Inyo, the third largest county, has the most diversified topography in the State, or in fact in the nation, claiming as it does Mount Whitney, the highest elevation, and Death Valley, the lowest depression. The Sierras, which form its western border, here attain their greatest altitude, there being many towering peaks scarcely inferior to Whitney itself. This great natural wall is impassable for ordinary travel, so that the traveler to or from Inyo must pass through western Nevada, if making the trip by rail, or by the southern route stage 120 miles between the railroad at Mojave and that at Keeler, on the shore of Owens Lake.

SOIL CONDITION.

With exceptions not worthy of note in a brief review, all the agricultural land is contained in Owens Valley. This valley is about 100 miles long; at its northern end it is about 15 miles wide, narrowing to 2 miles half way down its length, where a spur of the Sierras almost divides it, and south of that broadening to an average of 6 to 8 miles. Of its area of 500,000 acres, the Reclamation Service estimate that 200,000 acres can be made valuable agricultural land. Almost this amount is under claim of some kind, but less than one fourth is cultivated. The Service estimates that 60,000 to 80,000 acres of new land can be made useful.

The soil of Owens Valley is especially fertile. Fruits attaining maturity are of quality second to none, in either size or flavor. Grains and garden produce of all kinds are grown to perfection.

The honey industry is of steadily increasing importance. The product is of superior quality, and invariably commands the highest market prices.

The valley is especially adapted to stock and dairy interests. The purity of the air and water, richness of the natural and cultivated grasses, mildness of climate, and fine mountain ranges for summer use, are all factors of importance. The shipments of live stock to outside markets is increasing annually. There are now six or seven creameries in operation, while Tonopah and other markets easily reached are supplied with fresh milk from this valley. Poultry-raising is also beginning to be managed in a systematic way, and is becoming an important source of revenue.

IRRIGATION.

The abundance of water is a notable feature of the valley. There are many streams from the Sierras tributary to Owens River. Under present use, these waters are largely diverted, reaching the river principally by seepage. Notwithstanding, the river half way down the

valley usually contains fully as large a volume of water as at the northern end, due to the returned waters and to springs along its course. Irrigation being the sole dependence for crops, almost a score of ditches and canals of varying sizes have been taken out, principally from Owens River. In the mountains are many lakes, feeding the streams. The summer flood waters have been largely wasted. One company has spent considerable sums in a storage plant near Bishop, and an association of citizens is doing similar work at Big Pine. Of overshadowing importance in this connection is a project now being investigated by the Reclamation Service for the conservation of flood waters of Owens River and other streams. The engineers in charge estimate that with proper use there is water enough for all the arable land of the valley. Every report thus far submitted in the investigation has been favorable, and as the various Government representatives who have been in charge during the two years of work have unreservedly expressed their hopes of seeing it completed, that result is confidently expected.

MINING.

The rapid descent and large volume of several of the streams offer great possibilities for development of electric power. Two companies for this purpose are already at work, the point of the delivery of the power to be Goldfield and Tonopah, some 80 miles to the eastward. One plant of this kind has been in operation for two years, furnishing light and power for the incorporated town of Bishop.

Inyo County became known first through its mining interests, which have produced millions, but which have in recent years been dormant to a large degree. A healthy revival is in progress at this time; many promising discoveries have been made, and properties long idle are being developed in a way promising permanency and large returns. Text-books on California mineralogy credit Inyo with having the largest variety of minerals of any county. About 150 different substances have been listed, including all the common metals in large quantity and many rarer ones. While not the most important, probably the most unique in local mineral production is the soda plant on the shore of Owens Lake, where the highly mineralized water of the lake is evaporated and the salts thus obtained gathered for refining. Marble, slate, and building material are included in the make-up of this well-favored county.

The greatest drawback is that of communication. As previously mentioned, the county is wholly cut off from western California by the Sierras. The natural outlet and market are to the southward; a rail line to Los Angeles would promptly make this section tributary thereto. The Southern Pacific acquired the railroad which now runs into Inyo from the north, with the announced intention of extending it to Mojave, thus reaching the southern metropolis, but at this time there is no indication of any early effort in that direction.

The grand scenic attractions of the county have been painted by Bierstadt and described by many travelers who have ventured into the Sierra fastnesses. When communication is opened so that the trip can be made with comfort and without too great a loss of time, the county will unquestionably have many summer visitors on this ground alone—saying nothing of those to whom natural resources of more material moment appeal more directly.

VARIED RESOURCES.

Inyo's great area offers so wide a variety of attractions for home-seekers and others that to do it justice in a brief review is absolutely out of the question. It is an almost unknown land to many Californians, though investigators agree as to the magnitude and variety of its natural resources. With proper development, Inyo will move far up in the scale of relative importance among the counties. Principal among its industries will be stock-raising, dairying, fruit-growing, farm and garden produce, honey production, and mining of many substances—a comprehensive list, truly, but one from which no item can be omitted, while others might be added. Each of these has passed beyond the stage of experiment or question, while leaving the field open for development in other industries.

GENERAL STATISTICS.

Area, 10,224 square miles, or 6,543,360 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	203,721
Value of country real estate	\$1,021,983
Of improvements thereon	379,718
Of city and town lots	114,132
Of improvements thereon	175,643
Of personal property	638,194
Total value of all property	2,505,139

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle—Beef	40	\$1,000	Horses—Standard-bred	21	\$2,100
Stock	16,905	202,860	American	1,625	48,750
Thoroughbred	50	2,500	Common	1,875	28,125
Cows—American	1,360	34,000	Sheep	14,000	35,000
Graded	143	3,575	Goats	3,000	4,500
Calves	4,160	24,960	Poultry (dozen)	568	1,704
Swine	950	2,850	Hay		4,000
Colts	200	2,000	Lumber		1,000
Mules	180	4,500			

Number of acres sown for crop of 1904:

Wheat	5,000
Oats	2,000
Barley	600
Corn	5,600
Hay	13,000

Acres of bearing grape vines growing in spring of 1904:

Raisin	120
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Number of bearing fruit trees growing in spring of 1904:

Apple	19,985	Pear	5,300
Apricot	395	Prune (French)	1,325
Cherry	200	Prune (other kinds)	2,200
Fig	60	Almond	200
Peach	5,300	Walnut	375

School statistics:

Total number of census children, 1904	909
Number of teachers employed	24
Number of school houses	21
Number of school districts	19
Amount expended for public school purposes	\$18,759 41

KERN COUNTY.

DATA BY CHARLES P. FOX,
Secretary of Board of Trade, Bakersfield, Cal.

Kern County comprises the southern part of the San Joaquin Valley and the greater part of the semi-circle of mountains which inclose it on all sides except the north.

ARABLE LANDS.

The greater portion of the arable land lies in the amphitheater formed by the Sierra Nevada and the Coast Range, joined by the San Emidio Mountains. In this area there are about 2,000 square miles, consisting of the bordering foothills and the lower portion of the valley known as the "delta"—the latter being very fertile and productive, about 150,000 acres of which are covered by the irrigating systems. About 55,000 acres of this area are in alfalfa.

The portion of the Mojave Desert embraced within the county lying east of the Sierra Nevada Mountains has an elevation of about 1,800 feet. It is only a desert by reason of the scanty rainfall and the absence of water for irrigation. The Tehachapi Pass, being a low depression between the San Joaquin Valley and the Mojave Desert, has an elevation of 5,302 feet; the Tejon Pass 5,285 feet, and Walker's Pass, 3,964 feet. The foothills bordering the base of the mountains and sloping down to the valley have an elevation of 800 feet up, and are mostly valuable for grazing purposes. Being in the thermal belt, wherever water can be obtained this portion of the valley is suitable for the cultivation of lemons, oranges, and other tropical fruits, beets and all kinds of vegetables for early shipment to Eastern markets. Formerly, before the waters flowing into the valley were diverted into artificial channels and used for irrigating purposes, the overflow formed Kern and Buena Vista lakes, and the swamp and overflowed lands along Buena Vista a slough to Tulare Lake. Since the development of irrigation works, these lakes and bordering swamp and overflowed lands have disappeared. Buena Vista Lake, being now limited by a system of levees, is used as a reservoir in which are stored the surplus waters of Kern River which, during flood periods, are not used in the irrigating canals. This reservoir has an area of 25,000 acres, and has a holding capacity of fifty billion gallons.

IRRIGATION--WATER SUPPLY.

There is a very elaborate and well-constructed system of irrigation, by means of which all of the water, except in flood periods, is diverted upon the agricultural lands, with profitable and satisfactory results. Upon this system of canals and distributaries has been expended, in construction, over five millions of dollars. It consists of over 1,100

miles of laterals and 300 miles of main canals—these main canals varying from 10 to 32 miles in length, and from 10 to 80 feet in width on the bottom, with capacities varying from 20 to 900 cubic feet per second. The Kern Valley Water Company's canal, used as a wasteway in flood periods, leading through the low lands toward Tulare Lake, is 175 feet in width, and has a capacity of about 6,000 cubic feet per second. The canal leading into the reservoir is 4,000 feet in width, with a capacity of 6,000 cubic feet per second.

The only resource in water worth mentioning is Kern River, which rises among the highest peaks of the Sierra Nevada Mountains, in the northeastern part of Tulare County. This river flows through 35 miles of one of the grandest cañons of the Sierras. It enters the valley a few miles above the city of Bakersfield, and has a catchment area of 2,383 square miles. The river has a mean discharge of about 900 feet, and a discharge of about 3,000 feet during the principal irrigating season, from the 1st of May to the 20th of July.

In the lower portion of the valley artesian water is obtained at a depth of from 300 to 900 feet. In some localities the wells discharge as high as 5 cubic feet per second. In other localities only a small flow can be obtained. What is known as the "Artesian Belt" covers about 100,000 acres.

In all portions of the delta lands, and in some localities in the high lands, an abundant supply of surface water can be had at from 12 to 40 feet. By means of cheap power this water can be raised to the surface for irrigation at a trifling cost. The irrigation systems in use are supplemented by wells and pumping plants and are capable of raising 100 cubic feet of water per second—a sufficient amount to irrigate 640 acres of alfalfa. These plants are operated by electricity transmitted from a power plant in Kern River cañon, by gasoline, by distillate or by steam generated with crude oil. By whatever method the energy is developed, it is cheap.

The irrigated portion of the valley is adapted to the production of a great variety of fruit, all kinds of cereals, and particularly to the growth of alfalfa, which produces as high as ten tons of hay per acre in one season. Alfalfa as a forage plant is unsurpassed, and will grow continuously for fifteen years without reseeding. It will maintain two cows to the acre.

HORTICULTURE.

Kern County sends out to market apricots, peaches, pears, plums, prunes, nectarines, apples, quinces, pomegranates, olives, figs, grapes, raisins, almonds, English walnuts, oranges, lemons, and all kinds of berries and melons; celery, asparagus, cabbage, cauliflower, sugar-beets, potatoes, corn, pumpkins, and all other vegetables of whatever variety.

The oranges and lemons raised in Kern County are equal to any produced in the State. Scale is entirely unknown. There is much unoccupied orange, fruit, and vegetable land available at a low price and on easy terms.

There are many mountain valleys where cereals are produced without irrigation, and well adapted to the raising of the hardier kinds of fruit, which always finds a ready market at remunerative prices. These mountain valleys furnish homes to a great number of people, who utilize the mountain lands for grazing and dairying purposes.

AGRICULTURE—DAIRYING.

Cereals are largely produced, both in the valleys and on the higher levels. Wheat-growing is the leading industry of Tehachapi. Barley, oats, hay, and rye are raised to some extent, and Indian corn is extensively cultivated in the valley, growing to an astonishing size. Alfalfa is the standard feed crop, growing on the irrigated lands with unsurpassed luxuriance, and yielding from three to six crops a season, of two tons at each cutting to the acre.

Cattle, horses, sheep, and hogs can be pastured with profit during the entire year on alfalfa. Either green or cured for hay, the nutritive qualities of alfalfa are surpassed by few other plants, red clover not exceeding it in protein or muscle-forming elements. Farm animals of all kinds relish and thrive upon the dry hay alone, and cows kept upon it demonstrate its value for milk-making in both quantity and quality of product. A proper stand of alfalfa furnishes a great quantity of extremely valuable and much-relished pasturage for swine and horses during a large part of the year.

Among the most profitable industries is the dairy business. The climate is so mild that cattle can be kept out of doors all the time, and by breeding at the right season the cows can be made to give plenty of milk at the time of year when butter is highest. There is no portion of the State that has greater possibilities for becoming the greatest dairy district in the United States than that portion of this county located in what is termed the Kern Delta.

The rich, irrigated soils are well adapted to hops, tomatoes, melons, and all varieties of vegetables.

STOCK-RAISING.

Stock ranks among the greatest sources of wealth, and thousands of head are raised on the rank feed of the plains. In addition to this, there is a large extent of natural range. The best blooded stock is found. The Antrim Stock Farm of Charles Kerr is devoted entirely to the raising of thoroughbred horses. Henry Miller, the leading cattle king of the Coast, is one of the largest landed proprietors, and numbers his stock of all kinds up in the thousands. The Kern County Land Company raises all classes of live stock on a very extensive scale.

The poultry industry, while yet in its infancy, promises to become one of the leading and most remunerative ones.

Raising of swine of pure breeds is profitably and extensively carried on.

TIMBER.

Aside from the heavy growth of oak in the foothills useful for fuel, there are in the mountains large forests of pine, cedar, fir, spruce, and hemlock, extending the entire length of the county, and several sawmills are at work among them.

PRECIOUS METALS.

The county has extensive and valuable mineral resources, producing borax, mica, copper, gold, silver, lead, antimony, iron, sulphur, fuller's earth, lime, gypsum, and petroleum. In the Mojave Desert, in this county, are some of the most productive gold mines in the State, there

being producing mines in Randsburg, Roderick, Goler, and Summit mining districts—all situated in that desert, within the boundaries of Kern County. On Greenhorn Mountain and in the vicinity of Kernville are many producing gold mines, and many very promising ones awaiting development, with indications that discoveries of valuable deposits of gold and silver will be made.

OIL FIELDS.

The daily shipment of oil from the Kern River, McKittrick, and Sunset fields amounts to about 5,000 barrels, produced from wells which yield from 50 to 400 barrels a day. There are many wells which flow continuously. The oil territory is so large that it is not probable the demand for the oil will equal the possible production within a period of fifty years, making it certain that for a long period the county will have the cheapest fuel and the cheapest power of any place west of the Rocky Mountains. At prices at which fuel oil is likely to rule, power can be produced at a rate less than a half cent per horse-power per hour.

RAILROADS.

There are two transcontinental railroads passing through the county, with branch roads running to the Kern River, Sunset, and McKittrick oil fields.

ELECTRICITY.

The power plant at the mouth of Kern River cañon, operated by the Power Development Company, is one of the best equipped and most reliable installations of the kind in the world. It furnishes light and power to the city of Bakersfield, and to many pumping plants in the outlying country. There are other power plants being installed to utilize the water power available in Kern River cañon, which will furnish 18,000 horse-power, and other schemes are in process of development to make available almost unlimited power in the falling waters of Kern River.

CITY OF BAKERSFIELD.

Bakersfield, the county seat and distributing point for the county, is a prosperous and growing city of 8,000 inhabitants, with public library, twelve churches, four school buildings, opera-house, oil exchange, and many finely equipped halls and meeting-places for various fraternal societies. There are four banks, foundries, machine shops, planing mills, tank factories, packing-houses, flouring-mills, refineries, oil plant, gas and electric-light plant, and fine county buildings. There is a system of sewerage, six miles of street railway, and an elaborate water-works plant.

GENERAL STATISTICS.

Area, 8,159 square miles, or 5,221,760 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	2,808,350
Value of country real estate	\$11,462,475
Of improvements thereon	1,300,214
Of city and town lots	1,330,940
Of improvements thereon	1,764,170
Of personal property	4,750,418
Total value of all property	24,857,380

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle—Beef	2,000	\$40,000	Colts	1,500	\$15,000
Stock	55,000	660,000	Mules	1,200	46,000
Cows	1,700	34,000	Sheep	143,000	220,300
Calves	7,000	35,000	Lambs	47,000	23,500
Swine	—	15,000	Poultry	—	6,000
Horses—American	1,500	60,000	Lumber	—	50,000
Common	5,000	120,000			

Number of acres sown for crop of 1904:

Wheat	18,000
Oats	200
Barley	10,000
Corn	1,500
Hay	10,000

Acres of grape vines growing in spring of 1904:

Table	Bearing.
Raisin	100
	1,000

Number of fruit trees growing in spring of 1904:

	Bearing.	Non-Bearing.		Bearing.	Non-Bearing.
Apple	7,000	3,000	Prune (French)	70,000	—
Apricot	20,000	—	Prune (other kinds) ..	1,000	—
Cherry	1,000	—	Lemon	300	—
Fig	1,000	—	Orange	4,000	—
Olive	5,000	—	Almond	1,200	—
Peach	40,000	—	Walnut	100	—
Pear	1,500	—			

Value of grain assessed in storage:

Wheat	\$12,000
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School statistics:

Total number of census children, 1904	4,289
Number of teachers employed	109
Number of school houses	64
Number of school districts	67
Amount expended for public school purposes	\$94,780 11

KINGS COUNTY.

CONTRIBUTED BY HON. JOHN F. PRYOR.

Kings County lies midway between the cities of San Francisco and Los Angeles. It is in the heart of the great San Joaquin Valley. The county is traversed by the Southern Pacific and the Santa Fé Railroad lines. It is settled by people from nearly all quarters of the United States.

Practically the whole surface of the county is level. In the southwest portion there are some mountainous hills that lie contiguous to the great West Side oil fields, of which Coalinga is the center.

Kings County has in its area old Tulare Lake, which on the maps represents considerable territory, but during the past decade the waters of the lake have receded until every section has been filed upon under the law permitting citizens to reclaim swamp and overflowed lands. The result has been that much of the lands of the lake bed have been reclaimed in districts, and in 1904 there were harvested from these lands, once reckoned as permanently water-covered, upward of 800,000 sacks of wheat. Hence that acreage of Kings County heretofore calculated an irredeemable water waste has been brought into the productive acreage of the county agriculturally considered, and when the agriculturist was given access to that part of the county he demonstrated that these reclaimed lands are most productive; that they are not an alkali bed, as had been often stated, but will produce wheat, barley, alfalfa, and all plant growth equal to the best soil of the State. The fact that in 1905 there are 80,000 acres sown to grain on the lands once covered by the waters of Tulare Lake, is a practical demonstration that the lands there are all that the agriculturist can desire.

IRRIGATION.

In no part of the Pacific Coast does irrigation obtain to such a perfect degree and at so low a cost as in Kings County. The irrigation system is made up of about eight different capitalized irrigating corporations, covering with the ditch systems something like 200,000 acres, and the cost of irrigation throughout the county is twenty-five cents per acre annually. The corporations handling the water get the water supply from Kings River, Kaweah River, and Cross Creek, streams that are fed from the unfailing watersheds of the Sierra Nevada Mountains. In addition to these ditch systems, there is the artesian-well system, also fed from the waters that come down from the Sierra Nevada range, and that fall into the sands in the foothills and furnish the inexhaustible reservoir in the valley, which needs only to be tapped with a hole and a casing to give forth every minute of the day and every day of the year the water which has made the desert bloom with whatever is planted. These wells also emit, in many instances, great quantities of

natural gas, and in the reclaimed Tulare Lake region, where fuel is scarce, this gas furnishes material for fuel, light, and power, and it comes from the same hole that furnishes water for irrigation, for stock, and, for domestic purposes.

Kings County was carved out of Tulare County in 1893. At that time the population was 7,325; to-day the population is 14,000. The extended work along the lines of irrigation and reclamation bids fair to help double the population in the next half decade. Recently a great canal enterprise has been undertaken, and is now nearly completed, that will take the flood waters of Kings River and divert them upon arid lands. At the same time the canal will relieve the danger of overflowing the districts that during a series of dry years have been leveed and reclaimed in Tulare Lake bed, which is a basin—a depression in the valley.

The county seat is Hanford, a well-built city of 4,000 people. It has many manufacturing establishments, including an electric light and power plant, gas light and power plant, ice factory, flour and feed manufactory, packing-houses for all kinds of deciduous fruits and raisins, two creameries that do a large butter-making business, a cheese factory, etc. Hanford has four commercial banks and three savings banks, excellent opera-house and fraternal-hall facilities, etc. The educational needs are well provided for, and the grammar school enrolls 700 pupils, while about 300 are in attendance at the high school. The city owns its sewer system, which is quite complete; also its Holly water system for protection against fire. A new Carnegie library, new grammar school building, and a large addition to the high school building, also extensive street-paving enterprises, are now under way. The city is substantially built of brick, and two large brick-manufacturing plants already exist. All the leading religious and civic and fraternal societies are well represented.

The following is an exhibit of the industrial record of the county for 1904, the figures being carefully compiled from the most authentic sources obtainable and are approximately correct:

FRUIT, WINE, AND BRANDY.

The year 1904 was a reasonably good fruit year, and prices were very fair, with the exception of those for raisins and prunes. The fruit and raisin district of this county is confined practically to a territory about eight miles square, and in that district were raised in 1904:

Peaches, dried, 3,600 tons; peaches, sold green, '6,000 tons. The yield to the growers was \$510,000.

Apricots, 1,500 tons; yield to the growers, \$225,000.

Prunes, 3,000 tons; yield to the growers, \$150,000.

Raisins, 6,000 tons; yield to the growers, \$300,000.

Mixed fruits, including nectarines, pears, plums, etc., yielded to the growers about \$50,000.

The above shows a total production of fruits and raisins for the year of \$1,295,000.

There are two large wineries in Kings County—one at Hanford and one at Lemoore. The amount of grapes crushed and made into brandy by these institutions in 1904 returned to the grape-growers approximately \$350,000.

GRAIN INTERESTS.

Kings County has many varied resources, and the grain production for 1904 was:

Wheat, 5,500 tons; yield to the producers, \$154,000.
 Barley, 1,500 tons; yield to the producers, \$31,000.
 Alfalfa seed, 68 tons; yield to the producers, \$17,000.
 Egyptian corn, 625 tons; yield to the producers, \$12,500.
 Indian corn, 555 tons; yield to the producers, \$10,000.

LIVE STOCK AND DAIRYING.

Butter, cheese, milk, and cream produced in 1904, \$200,000.

There are about 250,000 sheep in the county, and the clip for 1904 amounted to 1,000 tons, bringing to the producers \$175,000.

Sheep sold for mutton and stock brought \$175,000.

Cattle shipped out of the county for beef were of value \$160,000.

Hogs and hog products shipped out of the county in 1904 yielded \$190,000.

Horses and mules raised and sold from the county farms yielded \$100,000.

Value of production of poultry (chickens, turkeys, geese, and ducks) and eggs, \$145,000.

HAY, HONEY, WOOL, ETC.

Hay exported, and not included in that used for local consumption, 18,200 tons; yield to the producers, \$127,400.

Honey and beeswax in 1904 yielded \$28,000.

Estimated production of wood for fuel in 1904, \$25,000.

Considerable broomcorn and sorghum are raised in the county.

In addition to the above there are many other items, like apricot pits and by-products, of which no account has been made here.

Add to the above list all the profits from truck farming, etc., and the per capita will be largely swelled. Kings stands near the head of the list in productive capacity among the many good counties of this State.

GENERAL STATISTICS.

Area, 1,257 square miles, or 804,480 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	865,051
Value of country real estate	\$4,522,427
Of improvements thereon	527,877
Of city and town lots	484,495
Of improvements thereon	635,460
Of personal property	1,261,779
Total value of all property	8,226,710

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle—Stock	9,589	\$125,580	Sheep—Imported and		
Thoroughbred	44	1,260	graded	1,700	\$5,100
Cows	5,993	149,400	Common	52,274	104,999
Calves	5,604	35,720	Lambs	8,708	4,403
Swine	15,497	29,429	Goats	86	100
Horses—Thoroughbred	8	1,100	Poultry (dozen)	415	904
American	4,109	104,736	Hay		1,240
Colts	889	13,620	Lumber		11,830
Mules	359	11,850			

Number of acres sown for crop of 1904:

Wheat.....	42,400
Barley.....	3,000
Corn.....	1,320
Hay.....	7,370

Acres of grape vines growing in spring of 1904:

	Bearing.	Non-Bearing.
Raisin.....	6,225	220
Wine.....	560	205

Number of fruit trees growing in spring of 1904:

	Bearing.	Non-Bearing.		Bearing.	Non-Bearing.
Apple.....	2,000	-----	Prune (French).....	77,000	1,800
Apricot.....	81,800	1,300	Prune (other kinds)	4,500	-----
Peach.....	167,000	47,500			

Value of grain assessed in storage:

Wheat.....	\$2,415
Barley.....	2,600
Corn.....	820

School statistics:

Total number of census children, 1904.....	2,803
Number of teachers employed.....	63
Number of school houses.....	24
Number of school districts.....	26
Amount expended for public school purposes.....	\$14,209 47

LAKE COUNTY.

DATA FURNISHED BY THE BOARD OF SUPERVISORS.

By her sister counties, Lake has long been cheerfully accorded the title of "The Switzerland of America," owing to her beauty of scenery. The county is located in the heart of the Coast Range, about 100 miles north of San Francisco, and is about 75 miles long and 25 miles wide. Mount St. Helena guards the southern extremity; Mounts Hull, San Hedrin, and Snow tower at the north; while near the center Mount Konocti rears its head 2,800 feet above the waters of Clear Lake, a splendid sheet of fresh water 25 miles long and from 2 to 10 miles broad. With the lake surface at an elevation of 1,350 feet above sea-level; having a depth sufficient to float vessels of considerable tonnage and draft; receiving in its basin the waters from several streams of considerable flow; stocked with an amazing wealth of native food fishes; bordered by smiling valleys of great fertility, by orchards of luscious fruit, by gently swelling slopes, by rugged mountains, by wild cañons touched with a certain savage beauty; and bearing upon its heaving breast a constantly increasing proportion of the internal commerce of the community, Clear Lake is the pride of Lake County, as well as the source of its name.

TOPOGRAPHY.

Although classed as mountainous, Lake County has a number of very fertile valleys, some of them being of large area. The largest is Big Valley, on the southern shore of Clear Lake, and containing more than 30,000 acres of rich valley soil, producing large crops of all the grains, including corn, without irrigation, besides fruits of all kinds, among them prunes, peaches, and apples; and especially toward the eastern end of the valley, large crops of excellent pears, much sought after by fruit-packers, because of their superior canning qualities. Big Valley is well watered by Kelsey, Cold, and Adobe creeks, which, rising in the mountains, flow in a general northerly direction through the valley, and fall into the lake on its southern side. Scott Valley lies along Scott Creek, west of the lake, and has about 7,000 acres of very rich land, where great crops of alfalfa, grain, hops, and vegetables are produced. Potatoes sometimes yield returns of \$100 or more per acre. Artesian water is easily obtained anywhere in the valley at depths of from 60 to 100 feet. Bachelor Valley contains about 3,000 acres of very productive land. Upper Lake Valley is at the north of the lake, and, with Bachelor Valley and other neighboring regions, is noted for its large crops of beans, which are canned, green, by the local canneries, there being a large and growing demand for the output, which is increasingly difficult to meet by the present supply. Artesian water is

here obtainable in profuse quantities, and with comparatively small outlay of money or effort. Some fine ranches are in Long Valley. Lower Lake Valley, at the south of the lake, is formed by the junction of the Copsey and Seigler Creek valleys, and is an extensive tract. The largest and finest vineyards are found on the slopes of the foothills around this valley. In the southern portion of the county, St. Helena and Putah creeks merge their gorges, spreading out into the fields of Coyote Valley, with its 15,000 or 20,000 acres of fine land. Near Coyote, in fact being a continuation of it, is Loconoma Valley, noted for its fruits, especially grapes. Burns Valley, north of Lower Lake, is not large, but is fertile. Cobb Valley, near the source of Kelsey Creek, is frequently resorted to during summer by visitors and residents, owing to the bracing air, the cold, sweet water, the trout fishing, deer shooting, etc. Morgan Valley is very productive. There are several others, among them being High, Capay, Clover, Donovan, Gravelly, Irwin, Jericho, Jerusalem, Paradise, Rice, Twin valleys, etc., almost all of them having some noticeable characteristic or product. For example, one valley has frost in nearly every month in the year; another valley, not more than a few miles away, grows oranges, figs, lemons, almonds, English walnuts, or other products too tender to endure frosts. The ridges separating these various valleys range from low, rolling elevations to steep and lofty hills.

SOILS.

The valleys exhibit a lasting fertility. Fields are growing luxuriant crops of grain, though annually sown in the same crops for more than a half century. A variety of soils is found throughout the county, and even the valleys show differences. Generally the valleys are rich with alluvium, but in places there are extensive tracts of adobe, black and heavy, and apparently inexhaustible in productiveness. Occasionally a sandy loam is found in the valleys, especially in the neighborhood of the streams traversing the county at short intervals. On the plateau crowning the low foothills which ring the valleys is a lighter soil, but when cleared is capable of raising large vineyards and orchards of peaches, prunes, etc. The rocky hillsides furnish pasture for flocks of Angora goats.

AGRICULTURE—HORTICULTURE.

Wheat, barley, oats, and corn are the principal grains raised. Hops, beans, potatoes, and garden vegetables of various kinds are raised profitably in several localities. Fruits of widely varied nature are grown in gradually increasing quantities, oranges, lemons, figs, prunes, peaches, plums, apricots, apples, and pears being cultivated. The apples have been noted for their excellence for nearly twenty years, a premium being awarded the exhibit of apples from Lake County at the New Orleans Exposition. The Bartlett pears are eagerly sought by the canning companies, a high price being guaranteed by them for a number of years ahead. The planting of pear orchards has been encouraged of late years by the demonstration repeatedly given that this fruit tree is a reasonably certain bearer, and the returns are large, a full-bearing orchard netting from \$50 to \$150 per acre in a year. Strawberries, blackberries, and loganberries are cultivated increasingly, with good results.

LIVE STOCK—DAIRYING.

There are extensive horse and cattle ranges. Dairying is a remunerative occupation, and with railroad facilities this line of production will be vastly increased. The making of cheese is followed with profit in Upper Lake.

OTHER RESOURCES—MINERALS—TIMBER.

Large bodies of sugar and yellow pine, fir, cedar, and oak give employment to several sawmills and furnish the home market a good quality of lumber. The minerals have heretofore been represented by the quicksilver industry, although gold, silver, copper, and oil have been discovered in small quantities. Besides quicksilver, immense quantities of mineral water have been bottled at the many mineral springs and shipped to all parts of the country. The several mineral springs are the sites for as many health resorts, as many as thirty thousand guests being entertained from all parts of the country each summer. Some of them go to the resorts for their health, the bright, clear atmosphere being very beneficial, and the waters frequently having a highly curative property in certain complaints. Others seek the deer, the fishing, and other sports. Among the resorts are Bartlett, Highlands, Adams, Harbin, Zeigler, Witter, and Anderson springs. Blue Lakes, Laurel Dell, Hoberg's, Soda Bay, Glenbrook, Carlsbad, Saratoga, Bonanza, Astorg, England, Howard, and Bynum are among the resorts.

There are several mines from which large amounts of quicksilver have been taken. Natural gas is found. There are large deposits of sulphur and of borax in some parts of the county.

Land ranges in price from \$5 to \$20 per acre for plateau land fit for grapes and some other fruits; \$25 to \$100 per acre for grain land; and from \$75 to \$250 per acre for lands suitable for the raising of canning beans. Good pear land is held at from \$60 to \$100 per acre.

GENERAL STATISTICS.

Area, 1,332 square miles, or 852,480 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	360,857
Value of country real estate	\$1,858,970
Of improvements thereon	506,030
Of city and town lots	158,890
Of improvements thereon	218,195
Of personal property	520,030
Total value of all property	3,300,315

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle—Beef	46	\$1,475	Colts	470	\$10,310
Stock	4,689	89,396	Mules	271	10,875
Cows—American	136	3,400	Sheep	7,593	15,258
Common	1,976	49,380	Goats	6,336	12,642
Calves	3,033	28,738	Poultry (dozen)	2,098	6,062
Swine	5,433	13,996	Hay	—	1,035
Horses—Thoroughbred	12	740	Wool	—	200
Common	2,508	98,642	Lumber	—	2,265

Number of acres sown for crop of 1904:

Wheat	2,670
Oats	1,010
Barley	1,450
Corn	100
Hay	1,805

Acres of bearing grape vines growing in spring of 1904:

Table	20
Wine	290

Number of bearing fruit trees growing in spring of 1904:

Apple	13,645	Pear	16,730
Apricot	1,195	Prune (French)	41,880
Cherry	440	Prune (other kinds)	4,190
Fig	800	Orange	55
Olive	1,320	Almond	5,460
Peach	8,105	Walnut	200

School statistics:

Total number of school children, 1904	1,517
Number of teachers employed	50
Number of school houses	40
Number of school districts	40
Amount expended for public school purposes	\$25,018 97

LASSEN COUNTY.

Lassen County is one of the most northerly of California and lies on the eastern slope of the Sierra Nevada Mountains. There are 375,000 acres of valley land, 325,000 acres of foothill land, and the remainder is classed as mountainous. Population, 4,511.

The county is a succession of mountain ranges and valleys, and the ranges have a general trend to the southeast and northwest. A ridge having an altitude of 8,200 feet, and called Diamond Mountains, makes the dividing line between Lassen and Plumas counties. Diamond Mountains form the southern side of Honey Lake Valley, which extends southeast and northwest a distance of 45 miles, with a width of about 15 miles. In the extreme northwest corner lies Big Valley, a large stretch of agricultural land, extending into Modoc County and comprising in Lassen about 75,000 acres. This valley is watered by Pitt River, Ash Creek, and several smaller streams. Long Valley, lying in the extreme southeast of the county, contains but little agricultural land, and is remarkable for its singular conformation. Its south side is a high and very heavily timbered ridge, while the rise in the north is gradual and the country dry, timberless, and open. This valley is about 40 miles in length, but very narrow, having an average breadth of from 1 to 3 miles between Big and Honey Lake valleys, which are separated from each other and from the main valley by intervening ridges of various lengths. The last named valleys are small, containing but few ranches, and are mostly occupied by the bodies of water from which they take their names. In the eastern central part lies the Madeline Plain, a large level tract of land, at an altitude of 5,300 feet. This plain appears to have been at one time the bed of a lake, and to have been formed to its present condition by some change of nature. It is about 35 miles long and 15 miles wide, and covered with a dense growth of sagebrush.

IRRIGATION FACILITIES.

The precipitation varies with altitude the distance eastward from the Sierra. The Sierra plateau presents no western arresting wall against the moisture-laden clouds from the ocean, and the fall of rain and snow is very heavy, especially the latter. The melting snow supplies the irrigating water in Susan River, Willow Creek, Ball's Cañon Creek, many other streams, and Eagle Lake, providing permanent and liberal irrigation for a vast area.

Extensive systems of irrigation, with reservoirs and canals for the distribution of water, exist in most all portions of the county, insuring at all seasons a sufficient supply of water, and many thousands of acres of heretofore arid lands have been brought under cultivation.

LEADING INDUSTRIES.

Agriculture is confined chiefly to the growing of barley, rye, wheat, oats, and potatoes, and large and certain crops are regularly secured. Alfalfa is extensively grown for hay for the winter feeding of stock; it is cut three or four times in a season, and, under irrigation, will average six tons to the acre. Clover, timothy, and other natural grasses grow very prolifically without irrigation.

Potatoes of excellent quality are grown, the yield being enormous, at times over 200 bushels to the acre.

Stock-raising is one of the leading industries. The ranges are excellent, bunch and other natural grasses furnishing plenty of feed in summer. In winter the climate is somewhat severe, and stock need shelter and feeding. Considerable stock is driven in from adjacent counties during the summer to pasture in the mountains and smaller valleys. The Madeline Plain is noted for its extensive and fine forage range, and horses for general purposes are chiefly raised; they are well known for their hardy and sound constitutions, and are in great demand for the San Francisco and other markets and for army and other purposes.

Dairying is a profitable industry, and five creameries, with skimming stations, are established in the valleys. The Honey Lake and other creamery butter is of a very high grade. Large quantities of butter are shipped to San Francisco and other commercial points, and bring good prices.

The apple-growing industry is rapidly becoming important and profitable. The apples are of a superior quality and are not excelled in flavor or keeping qualities by any grown in the Eastern or Northern States. They find a ready market, and are in demand for export. A very high grade of cider is manufactured.

The production of poultry and eggs is quite large, and considerable shipments of both are made to outside markets.

The N. C. & O. R. R. connects the county with the main line of the Southern Pacific Company at Reno, Nevada.

There are close to 700,000 acres of valuable timber, consisting of yellow and sugar pine, fir, cedar, etc. The lack of railroad facilities retards many possibly profitable industries.

While not, properly speaking, a very prominent mining county, considerable placer and quartz mining has been done at a profit. The quartz mines at Hayden Hill have been worked successfully and now are producing considerable ore.

The county seat is Susanville, at which is located the United States land office of the district.

GENERAL STATISTICS.

Area, 4,750 square miles, or 3,040,000 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	589,308
Value of country real estate	\$2,699,560
Of improvements thereon	402,968
Of city and town lots	91,843
Of improvements thereon	183,165
Of personal property	1,329,610
Total value of all property	5,067,879

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle—Beef	1,002	\$30,060	Colts	480	\$4,800
Stock	34,740	646,920	Mules	103	5,150
Cows	3,060	73,440	Sheep—Imported or		
Calves	18,325	175,725	graded	161	805
Swine	1,965	5,895	Common	38,670	105,925
Horses—Standard-bred	46	4,900	Poultry (dozen)	2,787	5,568
American	2,655	132,750	Hay	---	2,535
Common	4,243	84,860			

Number of acres sown for crop of 1904:

Wheat	40,125
Oats	1,675
Barley	2,640
Hay	5,020

Number of bearing fruit trees growing in spring of 1904:

Apple	48,765	Prune (French)	570
Apricot	300	Prune (other kinds)	1,470
Cherry	1,135	Almond	20
Peach	865	Walnut	460
Pear	1,895		

School statistics:

Total number of census children, 1904	1,093
Number of teachers employed	37
Number of school houses	34
Number of school districts	34
Amount expended for public school purposes	\$25,106 09

LOS ANGELES COUNTY.

BY THE CHAMBER OF COMMERCE, LOS ANGELES.

In wealth, population, and resources Los Angeles is the most important county in Southern California, and ranks next to San Francisco in the State. There are two rivers in the county: the Los Angeles and the San Gabriel. During a large part of the year these are dry beds of sand, what little water they contain finding its way through the porous sand to the bedrock. In the winter they are dangerous streams. The Los Angeles River rises in the western part of the San Fernando Valley, about 12 miles northwest of the city, and flows easterly 18 miles to the Los Angeles Pass. Its stream is fed all along by springs. Two other "rivers," the Pacoima and the Tejunga, join it in the San Fernando Valley. Turning south, it flows through the Los Angeles Pass, and on through the city. In former years its waters flowed through the southwestern part of the city, and out through the cienega district, and emptied into the ocean through La Ballona Harbor. Subsequently the river changed its course, and for years emptied its waters into the lowlands around Compton and Wilmington.

Los Angeles County embraces within its limits a great variety of scenery and climate. Within its territory may be found the climate and scenery of almost every part of the State, from the cool and breezy seashore to the warm inland plains and bracing mountain-tops. Of the area of the county, about four fifths is capable of cultivation, the remainder being mountainous. The shore line is 85 miles in length. Nine tenths of the population is within thirty miles of the ocean.

The population, by the census of 1890, was 101,454; at present it is over 275,000. The assessed valuation of property after equalization is \$170,000,000. The marvelous growth which has been made during the past few years may be seen from the statement that, by the census of 1880, the population was only 33,881, while the assessed valuation in 1882 was only \$20,655,294. Thus, within the space of twenty-four years, the population of the county has increased more than eightfold, and the assessed valuation of property in proportion.

The chief industry is horticulture, the list of products including everything that can be grown in the State, and almost everything that can be raised in semi-tropic countries. The area of land devoted to horticultural purposes is being rapidly extended, as the large tracts are subdivided and improved.

Los Angeles County is well provided with transportation facilities. A dozen lines of railroad center in Los Angeles City, tapping almost every section of the county, while coast steamships call regularly at the leading seaports.

Perhaps the most important enterprise for Los Angeles that has yet been commenced is the big breakwater now being constructed by the Federal Government at San Pedro, for which an appropriation of \$3,000,000 was made by Congress. By means of this breakwater the

depth of water over the bar will be so increased as to permit ocean-going vessels to come to the wharves, and Los Angeles will then be able to compete for its share of the growing Oriental trade. Other improvements, such as dry docks, wharves, and fortifications, will follow the harbor work. Other shipping points of the county are Port Los Angeles, near Santa Monica, and Redondo.

SAN GABRIEL VALLEY.

The San Gabriel Valley, a choice section of Los Angeles County, has the Sierra Madre range on the north. These mountains are grand and precipitous, inclosing the valley like a wall. This valley is the best known of any portion of Southern California. Even before there was any "boom" here worthy of mention, lands in the valley commanded a comparatively high price. As with most attractive sections, the level-headed mission fathers discovered its advantages, and founded the San Gabriel Mission—whose church is still in good preservation—in 1771. Now three railroads traverse the valley, and the land is rapidly being transformed into a succession of small homes and thriving little cities. The valley contains 100 square miles of territory. Under the shadow of the mountains, and separated from the lower plains by symmetrical foothills, the air is dry and bracing, proving beneficial to invalids who can not bear closer proximity to the ocean. The San Gabriel contains some of the choicest fruit land in Southern California, and is largely devoted to the raising of oranges and lemons, as well as deciduous fruits.

Pasadena, a beautiful city of over 15,000 population, is located at the foot of the Sierra Madre range, about seven miles from Los Angeles. Within twenty years Pasadena has grown from a sheep pasture to a city of beautiful homes, with a world-wide reputation. Other settlements in the valley are Alhambra, Monrovia, Duarte, and Azusa, all of which are mainly supported by horticulture.

POMONA VALLEY—OTHER IMPORTANT SECTIONS.

Adjoining San Gabriel Valley on the east is Pomona Valley. Irrigation is cheaply supplied to this section from the San Antonio River, which comes down out of the cañon of the same name, a romantic spot, and a favorite resort for pleasure-seekers. The soil and climate are peculiarly adapted to the culture of citrus fruits, which flourish in great luxuriance. Railroad facilities are very good, and increasing, which has caused the valley to settle up rapidly. It contains a number of flourishing towns, the chief of which is Pomona, one of the most thriving cities of Southern California. For miles in every direction around Pomona extend continuous orchards of oranges, lemons, apricots, peaches, prunes, olives, and other fruit trees, a specialty being made of olive culture.

Other important sections of the county are Los Nietos Valley, a well-watered district, noted for corn, alfalfa, and dairy products; the stretch of country between Los Angeles City and the ocean, over which the city is destined to spread before many years; San Fernando Valley, north of Los Angeles, in which a large amount of fine wheat is raised; and Antelope Valley, an elevated region in the northern part of the county, where land is cheap and, with water, very productive.

TRANSPORTATION FACILITIES.

Los Angeles enjoys railroad competition in the shape of three trans-continental lines. The San Pedro, Los Angeles, and Salt Lake Railroad, the last one of the three to be completed, is now in full operation. This company was organized by a syndicate of capitalists headed by Senator Clark of Montana, who acquired the Terminal Railway as the Pacific Coast end of the new transcontinental line that opened up to Los Angeles a section in southern Utah and Nevada marvelously rich in coal, iron, silver, and other minerals. The line of the Santa Fé system from San Francisco to Los Angeles is open. The coast line of the Southern Pacific to San Francisco by way of Santa Barbara is in operation. Altogether there are a dozen lines of railway centering in Los Angeles. The Pacific Coast Steamship Company runs vessels every few days from Los Angeles County ports to San Francisco and San Diego.

RAPID GROWTH OF VEGETATION.

One of the most attractive features about a home in this section is the wonderful rapidity with which vegetation of all kinds grows, so that instead of having to wait years for a new residence to assume a settled and homelike appearance, the owner only has to wait a few months until his house is surrounded with thrifty plants and climbing vines, while even some trees, as in the case of the eucalyptus, grow to a respectable size from the seed within a year, and can be planted around the lot while less rapidly growing trees are attaining size, thus obviating the bare appearance which attaches to new residences in less favored climates, however beautiful architecturally the buildings may be.

SOILS—PRICES OF LAND.

There is a great variety of soil in Los Angeles County, varying from light sandy loam to heavy adobe. The price of land varies greatly, ranging from \$30 to \$100 per acre for lands adapted to grain, hay, and deciduous fruits, without irrigation, up to \$500 for first-class citrus lands, with an ample water-right. Land may be purchased on easy terms. A great many improved places, with bearing orchards and comfortable houses, are always in the market, there being here, as elsewhere, a considerable number of citizens who are never content to stay very long in one place, even though that place be as near perfection as can be found on earth. For those who have the means, it is often more advisable to purchase one of these improved places than to buy raw land and improve it.

IRRIGATION FACILITIES.

The subject of irrigation is one that troubles many Eastern people who think of coming to settle in California. A mistaken idea prevails to some extent in the East that farming is only carried on in Los Angeles County by means of irrigation, and that without it crops would be a failure. For grains and winter crops irrigation is not employed. Corn is irrigated in some localities, being a summer crop, but is successfully grown in many places without irrigation. Upon some lands, after a crop raised without irrigation has been harvested, another is raised by means of irrigation. On irrigated land two or three crops a year

are frequently raised. With an artificial supply of water, the farmer is rendered independent of the season's rain, while the product of his lands is enormously increased.

SMALL HOLDINGS.

One of the surprises to new arrivals is the small amount of land that is needed to support a family. It is a fact that many families not only make a good living on five acres, or even less, of irrigated land, carefully tilled, but also manage every year to lay something by for a rainy day. In such cases the farmer raises most of the food products that are consumed by himself, his family, and his stock, and always has something to sell when he comes to town. Ten acres are, in fact, about all that one man and his family can attend to, if worked to their full capacity, and as soon as a settler begins to hire help the profits decrease very rapidly. Fruit trees can be planted on the land, between them small fruits, and then again vegetables, until the trees become too large. Under such circumstances there is a constant succession of crops.

COLONY SYSTEM.

A method of settling land in Southern California which offers many advantages is the colony system. These colonies are made up, either here or in the East, among persons who are acquainted with each other, generally being residents of the same section. Each settler owns his ten, twenty, or more acres independently, but by purchasing the land at wholesale, in a block, a great saving is effected. The settlers can also coöperate in purchasing supplies, piping water, canning, drying, and otherwise preserving fruit, making olive oil, and marketing products. Besides, they have the advantage of social life from the start, with schools, churches, library, store, postoffice, etc., which otherwise might be long in coming. They do not feel like "strangers in a strange land," and their holdings will increase in value twice as fast as they would were it settled in a desultory manner.

HORTICULTURAL INDUSTRY.

The development of the horticultural industry during the past few years has been remarkable. The most important horticultural product is the orange. Besides the orange and lemon, the principal fruits raised are the almond, fig, prune, apricot, walnut, peach, pear, and berries.

The shipment of citrus fruits from Southern California points during the past season amounted to 28,000 carloads, of which 25,000 were oranges. A large proportion of these shipments were contributed by Los Angeles County. Deciduous fruits are shipped fresh, canned, dried, and crystallized. An active demand for our dried fruits has grown up in Europe.

Each section, as a rule, has an agricultural or horticultural product of which it makes a specialty, although in some sections almost every crop raised in Southern California is grown. In Los Angeles County the leading center of orange culture is along the foothills of the San Gabriel Valley. Around Pomona, both citrus and deciduous fruits are raised, and a specialty is made of the olive. The lemon is raised at Whittier, in the San Gabriel Valley, and back of Long Beach, as well as in the Cahu-

enga Valley. The olive also flourishes in the San Fernando Valley, and the almond thrives in the Antelope Valley, where they have cold winters and land is cheap. The country around Downey is an all-round farming region, where large quantities of pork, butter, cheese, corn, and vegetables are raised. The walnut does particularly well around Rivera, just south of Los Angeles City. Strawberries are made a specialty at Gardena and at Azusa.

HAY—GRAIN—VEGETABLES—FLOWERS—HONEY.

Alfalfa, which is largely grown for hay, is a most valuable forage plant. It is cut from three to six times a year. Large quantities of wheat and barley are raised. Corn sometimes grows to a height of twenty feet. Pumpkins have been raised weighing over 400 pounds. There is a beet-sugar factory at Alamitos. Los Angeles honey is celebrated all over the country. In the neighborhood of Los Angeles calla lilies, tuberoses, carnations, and other flowers are grown by the acre. Hundreds of acres are devoted to the cultivation of celery, which is shipped East by the trainload. Winter vegetables, such as string beans, tomatoes, green peas, and chile peppers, are shipped to the North and East during the winter, realizing high prices.

DAIRYING—POULTRY—RAISING—OSTRICHES.

Until only a few years ago, most of the butter consumed in Southern California was imported from the North and East. This is no longer the case, a number of creameries having been established during the past few years with most successful results.

Poultry does well in Southern California when it is given the same attention it receives in the East. Eggs always command a good price, seldom falling below 15 cents per dozen, and running from that up to 35 cents or more.

Ostriches are raised for their plumes, and the industry is profitable. There is a large ostrich farm at South Pasadena.

LIVE STOCK.

Southern California is an ideal section for live stock. The horses have been noted for their speed and endurance, from the time of the early Spanish settlers. Some famous thoroughbreds have been raised in Southern California, and it is the opinion of many that this section will one day rival Kentucky as a breeding-ground for fine horses.

GAME AND FISH.

Among the game found in the county are wild geese, ducks, snipe, rabbits, squirrels, foxes, deer, wildcats, California lions and bear, the latter being found in the northern part of the county, within 60 miles of Los Angeles City.

The angler finds plenty of trout in the mountain cañons. In the ocean there is excellent fishing, both with line and seine, and some remarkable catches are made. The yellowtail, ranging from 15 to 80 pounds, is very numerous in the waters of the Pacific. The tuna attains a length of five feet or more, and a weight of from 100 pounds upward. "Jewfish" are sometimes caught weighing 400 pounds.

MINERAL WEALTH.

Although Los Angeles County is chiefly noted as a horticultural section, its mineral wealth is by no means unimportant. Including petroleum, it ranks fourth in mineral products among the counties, and is the only one which leads in five mineral products. Los Angeles is the center of a number of rich mineral fields in Southern California which last year yielded products to the value of about \$16,000,000. The chief of these, exclusive of petroleum and asphaltum, were gold and borax. There were also produced, in smaller quantities, silver, clay, gypsum, granite, cement, lime, and other mineral substances.

PETROLEUM.

One of the most remarkable features of development in Los Angeles County and Southern California has been the greatly increased production of petroleum. For over twenty-five years petroleum has been produced on a limited scale in Los Angeles and Ventura counties, but it is only within the past few years that the industry has assumed great importance. To-day the petroleum industry in Southern California is attracting the attention of capitalists throughout the country. While development has been extended into other counties, Los Angeles still leads in the production of petroleum, having produced in 1904 nearly 2,000,000 barrels. The oil produced in California differs from that of the Eastern States, being of a heavier grade, with an asphaltum base, and it is used almost exclusively for fuel. It has been adopted by most of the leading factories of this section, and is used largely by the railroads. A careful test made with a locomotive showed that oil at \$1 a barrel is equivalent to coal at \$4 a ton.

EDUCATIONAL FACILITIES.

The school facilities of Los Angeles are especially good. Besides the complete system of public schools, private schools and colleges abound in Los Angeles, Pasadena, and other towns. Many Eastern people avail themselves of the opportunity to send children with a tendency to weak lungs to a country where plenty of out-of-door exercise is a possibility every day in the year. Most of the leading religious denominations are represented, not only by scores of churches, but also by one or more religious colleges. The work of the school is further supplemented by an army of specialists in music, painting, and every department of art. The Chautauqua has an active membership of nearly a thousand, and meets annually at Long Beach. Lectures and other entertainments, by home and foreign talent, are of almost daily occurrence. The educational and social facilities afforded by Los Angeles are, in the widest sense of the word, unsurpassed. Public libraries are numerous and well stocked with the latest works.

PASADENA.

By the annexation of North Pasadena in November the territory of Pasadena was increased nearly 50 per cent and its population augmented by about 2,000, so that a conservative estimate of the number of people of the Crown of the Valley, taking into account other elements of growth, is 20,000, a growth of between 6,000 and 8,000 within the

year, or between 30 and 40 per cent. The annexation of North Pasadena did not shoulder upon the municipality an unimproved territory necessitating more expenditures than returns, but a prosperous community, including Hotel la Pintesca, one of Southern California's choicest tourist hostelrys, a growing business section, graded streets, and many handsome houses and home sites.

The past year has seen the completion of the \$80,000 new high school, a \$40,000 grammar school, and, in addition to this, the beginning of \$65,000 worth of other school buildings was made, which includes the erection of a \$30,000 grammar school in the northeast section.

Great progress was made in street improvement, the cost aggregating over \$200,000.

Central and Library parks, costing \$175,000, have been completed and beautified, and the city within the year came into possession of Tournament Park, a valuable sportsmen's headquarters, race track and grandstand, the gift of the Tournament of Roses Association. The city has added recently 160 acres to its prosperous sewage farm, paying therefor \$24,000.

POMONA.

Record-breaking has been the inception and completion of public improvements in Pomona during the past year. The new \$55,000 high school and the \$30,000 grade school buildings have been completed, nearly \$25,000 worth of curbing, guttering, and cement sidewalk work has been finished, West Second street park has been laid out, \$15,000 being devoted for that purpose, a well sunk and a large storage reservoir constructed on the summit of the highest hill at Ganesha Park. Water pipes have been laid so that the park shrubbery may be irrigated. The estimated population is somewhat over 7,000, there being nearly 1,600 school children. The city's assessed valuation is over \$3,100,000. A new savings bank has been started, which, with the two other national banks, furnish ample financial facilities for residents of the valley. The output of oranges for the past year was 2,200 carloads. A good deal has been done in the way of water development, old wells having been deepened and new ones sunk. About \$75,000 worth of new residences have been erected.

WHITTIER.

Among the past year's building improvements in Whittier are about one hundred new homes, several handsome new business buildings, a \$20,000 Methodist Church, a \$10,000 addition to Whittier College, and a magnificent \$60,000 union high school building. Business has been active in all branches, and the people have not only spent liberally, but have also saved, as is evident by the half-million dollars now on deposit in the local banks. Among the lines of industry which have brought eminently satisfactory returns here are walnut and citrus ranching, sheep-growing, and the activities growing out of the oil industry. The Whittier oil field has averaged 60,000 barrels of high-grade oil every four weeks, the output being readily marketed. The city streets and sidewalks have been materially improved within the year, miles of street having been graded and graveled and many thousands of feet of cement curb and sidewalks having been put in. Within the year there has been a gain of more than 33½ per cent in the assessed valuation of prop-

erty. In the year 1903-04 the valuation was \$1,039,000. This year it is \$1,600,000, with at least \$250,000 expended since the figures were compiled. Four years ago 200 voters were registered in Whittier. Two years ago this number had doubled. This year the register showed that for the second time in four years its electors had increased twofold, there being at present more than 800 voters in the city limits. Whittier was planned to be a quiet little Quaker colony, where its people might spend their days peacefully and quietly, afar from the bustle of the busy world. The extension of the oil fields to the hills back of town, the growth of the walnut industry of which Whittier has come to be a financial center, and the enlargement of citrus fruit interests in the community have, however, transformed the Friends settlement into a bustling and rapidly expanding city.

The census of 1903 showed for the Whittier district 583 children of school age (from 5 to 17). The census of 1904 showed for the district 714 children of school age. Among other public educational institutions in the community is the Friends College. At the Whittier State School several hundreds of incorrigible boys and girls are cared for by the State at the expense of the counties from which they are severally committed. The girls' department of the school is at East Whittier.

COUNTY FARM.

At the Los Angeles County Farm, as the county's almshouse institution is known, the orange crop of the season of 1903-04 amounted to 26 carloads and netted the county \$3,000. The crop now maturing is estimated at 20 carloads. Ninety head of cows are kept at the place. The milk is used for the farm inmates and for the county hospital. Three hundred swine are kept. There are 400 chickens, the eggs from which are consumed at the farm and at the county hospital. On December 1 there were 225 inmates.

THE SOLDIERS' HOME.

Among permanent improvements made at the Soldiers' Home within the year is an additional wing to the hospital, and also a detention ward for the mentally weak, costing \$28,379; a septic tank for hospital sewage, \$3,685; metal ceilings in two wards in hospital, \$767; painting of the governor's quarters, the surgeon's quarters, the dining-hall, and some barracks, \$2,604; hardwood flooring of barracks B and E, \$1,625; additional boiler in power-house, \$3,948. Improvements under way and to be completed before the end of the present fiscal year for which funds were appropriated include painting, varnishing, and tinting the interiors of barracks E and F and the hospital, and the exterior of barrack G, \$3,180; hardwood floor on barrack F, \$1,625; swill-hoppers for kitchen, \$1,072; canopies for steel ranges in kitchen, \$500; cast-iron covers for steam-pipe pits, \$528. Proposed improvements for the coming year are: An additional barrack, \$34,000; fire-pump, ice-machine, etc., \$7,100; storage reservoir, \$7,200; women nurses' quarters, \$10,000. In addition to these, \$45,000 appropriated for repairs will be chiefly expended on improvements. The sum of \$17,426 represents the product of the farm for the year. Considerable attention has been given to beautifying and extending the park. About twelve acres have been added and laid out in choice trees, shrubs, and flowers. Nearly three and one half miles

of paths and roads have been furnished with decomposed-granite gravel, at a cost approximating \$6,000, and more will be added during the coming year, until all the boulevards and paths are resurfaced. The total membership of the Home on November 26, 1904, was 3,248, of whom there were present 2,194; absent on leave, 1,054. The institution is virtually a part of the military establishment of the United States. Officially it is designated as the Pacific Branch of the National Home for Disabled Volunteer Soldiers.

SAN PEDRO, AND THE HARBOR.

Commerce continues to grow at San Pedro, and the year just passed was the greatest in the port's history. There arrived in 1904 at San Pedro 1,002 steamers, 373 coastwise sailing vessels, and 5 foreign ships, having a net tonnage of 519,787. The vessels arriving carried in crews 20,392 men, or an average of 1,700 men for each month. In the matter of lumber receipts, San Pedro has had a great year. The list of woodstuffs brought from northern ports and discharged over docks for distribution in the Western States and Territories includes 347,495,000 feet of lumber, 155,204,000 shingles, 5,598,000 shakes, 23,973,000 laths, 359,533 ties, 55,850 posts, 31,105 poles, and 7,820 piles. The recapitulation for the twelve months shows an aggregate of 384,243,106 feet of lumber products. The total receipts of woodstuffs for the year 1903 amounted to 350,805,023 feet. The value of the woodstuffs received during the year, figured at the average wholesale price of \$25 a thousand feet, amounts to \$9,506,000. In addition to the lumber receipts 11,635 tons of merchandise, 7,439 gallons of wine, 24,340 barrels of oil, 500,000 sacks of grain, 450 tons of asphalt, 2,177 doors, 165 bales of wool, 2,600 tons of coal, and 4,621 sheep were received. An item of importance was the large increase in foreign shipping. Five deep-water vessels arrived, bringing 20,585 barrels of cement, 1,532,522 pounds of pig iron, 21,490 tons of steel rails, 49,290 fishplates, 33,200 pounds of currants, 32,100 bottles of mineral water, and 338,350 pounds of fertilizers. The shipments going out by vessel within the year included 9,300 tons of merchandise and 780 tons of asphaltum. Of passengers 70,160 arrived and 67,280 departed. Approximately there were 1,500 men employed in the lumber yards and on the wharves during the year, most of them receiving \$2.70 per day of nine hours' work.

Of fish there was shipped away from San Pedro within the year, based on the records for eleven months, 1,000,000 pounds. The building improvements for the year aggregated \$153,000. The list included nine business blocks at an aggregate cost of \$50,500. Eighty-two residences were erected at an estimated cost of \$102,500. Postoffice gross receipts for 1904 were \$6,163. For 1903 they were \$4,832. Money-order business of the postoffice for 1904 showed the same proportionate increase over 1903 as was shown by the postal receipts.

For the three local banking houses the deposits December 1, 1903, amounted to \$491,217; loans, \$337,491. December 1, 1904, the deposits had grown to \$589,600, and the loans to \$466,444.

Among the municipal improvements in San Pedro for 1904 were: Cement sidewalks, 250,000 square feet, at a cost of \$25,000; 50,000 feet of cement curb, \$10,000; 5,000 feet of streets, \$30,000. Twenty carloads of oil were placed upon the streets at a cost of \$2,500. Within the

year the city of San Pedro voted \$30,000 for sewer bonds, and the high school district \$40,000 for the purpose of erecting and equipping a modern school building. The cut-off of the Pacific Electric Railway Company from Dominguez to San Pedro was completed to the city limits, and the long trestle from Wilmington to San Pedro built during the year.

Steadily and satisfactorily the work of building the Government breakwater at San Pedro continues, under the direction of Capt. C. H. McKinstrey, Corps of Engineers, U. S. A., assisted by Assistant Engineers H. H. Burton and D. E. Hughes. The substructure has been carried out 7,940 feet, and 560 feet of substructure remains to be completed. The trestle is out 8,356 feet, and, including the approach, has a length of 10,316 feet to the present end. About 2,000 feet of the superstructure has been completed. There have been 63,600 carloads of rock placed on the breakwater to date. About \$1,600,000 has been expended on the breakwater. The completed cost is not to exceed \$2,900,000. It is estimated that it will take three years more to complete the work. The total number of tons of rock delivered to December 1, 1904, amounted to 1,723,600 on the substructure and 53,000 on the superstructure. The breakwater when completed will contain, according to official estimate, 2,290,648 tons. The estimated anchorage area of water on the inside between the 24-foot contour and the breakwater is about 615 acres.

The work of the most direct and immediate benefit to the harbor during the year was the dredging operations, under the immediate supervision of U. S. Assistant Engineer Robert A. Crawford. The project for the improvement of the inner harbor, upon which the present appropriation is being expended, provides for dredging a channel 400 feet in width to a depth of 20 feet below low water from its entrance to the southerly end of the Salt Lake Railroad wharf, and between the wharves to a depth of 24 feet below low water; from this latter point northward up to and including a turning basin 1,600 feet in diameter at the foot of Mormon Island. On account of the large amount of material to be moved under this project, estimated at about 4,000,000 cubic yards, and its probable extension in time on up to Wilmington, which will require the removal of about 20,000,000 cubic yards more, it was deemed necessary by the Government engineers, in order to give temporary relief to shipping interests, to contract for a portion of this work along lines where it was most urgently needed, and at the same time to construct a modern dredge which would be operated by the United States as long as funds were available for carrying out the project; that in the event of a large appropriation by Congress for the continuation and extension of this work, a second and probably a third dredge of much larger proportions would be recommended for construction to facilitate the early completion of the work.

SANTA MONICA.

Steady growth along commercial lines is credited to Santa Monica for the past year, while in new buildings and permanent improvements all previous records have been broken. The year marked the first considerable inroads into the extensive holdings of large bodies of realty to the north and east. These tracts were bought for subdivision, and as

soon as they were laid out the actual work of home-making was on in real earnest. The population has made a material increase. A most conservative estimate at this time places it at 5,500. The Carnegie library building was completed at a cost of \$15,000. About two hundred building permits were issued, and the work done under them was at a cost of \$300,000. From Marine street on the south, to the city limits on the north and east, many new buildings have sprung up. It is estimated that building permits were not secured for over two thirds of the new houses, as the ordinance requiring permits is not rigidly enforced. Perhaps Santa Monica's greatest advancement during the year was in the permanent improvement of her streets. About thirty street assessment rolls were issued during the year. These represent the grading of approximately 20,000 lineal feet, several miles of oiling, 260,000 square feet of concrete sidewalk, 40,000 lineal feet of concrete curbing, 30,000 square feet of crosswalks, 12,000 lineal feet of sewer, 22,000 lineal feet of gutter, and 40,000 square feet of paving. This was accomplished at an expense of, in round numbers, \$73,000. Ten contracts in course of construction will add another \$50,000 to the grand total, while it is calculated that work done under private contract will equal one half of that done under public contract. Other improvements of a substantial character included the laying of a mile of 16-inch pipe and 15,000 feet of 4-inch mains by the Artesian Water Company. A new well sunk by the same company to a depth of 240 feet developed a good flow of fine water. The East Santa Monica Land and Water Company also sunk a number of new wells and laid several miles of mains throughout its tract just outside the city limits. Washington place was graded, sidewalked, curbed, and sewerred, the sewer alone costing \$16,000. A large quantity of grading and sidewalking was also done on the subdivision immediately adjoining the city on the east. Two blocks on Third street and Utah avenue were paved with asphaltum. At the brick and tile factory an expenditure of \$75,000 was made in a plant and machinery, and the manufacture of brick and tile was begun on an extensive scale. The freight shipments and passenger business of the Southern Pacific show an increase of 50 per cent over 1903.

The census of 1903 showed 1,341 children of school age. That of 1904 showed 1,557 such children. The Sunset Telephone Company substantially rebuilt its local system and made extensions to Sawtelle and The Palms, at an expense of \$20,000, and trebled the number of subscribers. The Home Telephone Company entered the city and built a fine system throughout the town. The postoffice was advanced from a third-class office on July 1st to an office of the second class, the receipts for the fiscal year showing a gain of more than 20 per cent.

PORT LOS ANGELES.

Within the eleven months ended November 30, 1904, there were received from vessels at the Southern Pacific Company's long wharf at Port Los Angeles the following items: Steel rails, 43,599 tons; merchandise, 29,457 tons; pig iron, 4,595 tons; lumber, 10,396,482 feet; 107,972 ties; coke, 6,722 tons; 9,274 bundles of fishplates; 298 bundles of steel; coal, 238,586 tons; fire clay, 238 tons; fire brick, 501 tons; and 1,868 steel plates. The net tonnage of vessels which arrived was 348,308. There were 14,777 passengers who arrived.

REDONDO.

Within the past year 80,000,000 feet of lumber has been received over the Redondo wharves, as against 65,000,000 feet for the previous year, an increase of over 23 per cent. The fishing industry has increased from 795,000 pounds to 1,320,000 pounds. About \$100,000 worth of realty, not including the sale of the Redondo Hotel and grounds (which itself amounted to \$200,000), changed hands. The building improvements completed within the year amounted to about \$100,000. The new Masonic Temple, a fine building erected for lodge purposes, was made of sandstone brick manufactured within a stone's throw of the corporate limits. An addition of two large classrooms and a library was made to the school building. About 700,000 barrels of oil were received and shipped over the wharves. Street improvements for the year aggregate about \$20,000. Five more acres have been devoted to the cultivation of carnations, and between 5,000 and 6,000 are shipped daily. The details for the bonding of the city for the building of a magnificent pavilion have been completed. The proposed structure will be situated south of wharf No. 1 and will be 200 by 100 feet and two stories high. Its estimated cost is \$25,000. The grain shipments amounted to 35,000 sacks. The water supply has been augmented by the addition of a large well, which has increased the available quantity 50 per cent. A second telephone company has invaded the territory, and the electric light and gas companies have perfected their respective systems, spending thousands of dollars for that purpose.

CATALINA ISLAND.

This insular community is boasting of an increase of 50 per cent in the number of persons carried to her shores in the past year. This growth is attributed to the new steamer Cabrillo, which went into commission last July, and which has cut the time between the wharves of San Pedro and Avalon to less than two hours. Among the improvements completed or nearly so is the fine boulevard of about six miles, connecting the isthmus and all the balance of the island with Emerald Bay; a bowling alley at the isthmus; a \$50,000 clubhouse at Avalon; a new apartment house; various improvements and betterments in the hotels, and a large number of cottages. The Banning Wool Company has completed over 60 miles of woven-wire fencing, which forms a chute 100 feet wide extending from end to end of the island, following the highest ground at the top of the hills, and from this at various points are fences leading down to the beach, separating the island into numerous pastures, making it possible to transfer the sheep to any desired point. Among the betterments planned for the coming year are improved water and sewer facilities.

GENERAL STATISTICS.

Area, 3,957½ square miles, or 2,532,800 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	862,515
Value of country real estate	\$26,304,680
Of improvements thereon	5,781,255
Of city and town lots	83,415,050
Of improvements thereon	43,095,425
Of personal property	35,919,765
Total value of all property	200,772,726

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle—Beef .....	.....	\$17,925	Mules .....	.....	\$132,675
Stock .....	.....	183,075	Sheep	50,110	87,690
Cows .....	.....	357,420	Lambs	9,220	10,150
Calves .....	.....	183,450	Goats .....	.....	565
Swine .....	.....	53,780	Poultry .....	.....	43,240
Horses—Thoroughbred	832	187,320	Hay .....	.....	169,450
Common	27,241	953,435	Wool .....	.....	26,235
Colts	1,700	17,000	Lumber	1,828,635

Acres of bearing grape vines growing in spring of 1904:

Wine	6,825
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Number of fruit trees growing in spring of 1904:

	Bearing.	Non-Bearing.		Bearing.	Non-Bearing.
Apple	136,110	31,710	Prune (French)	25,750	3,065
Apricot	115,610	6,300	Prune (other kinds)	23,845	750
Cherry	175	1,075	Lemon	145,675	33,840
Fig	1,750	560	Orange	611,420	275,870
Olive	373,430	57,110	Almond	42,615	8,175
Peach	146,745	12,710	Walnut	95,235	63,415
Pear	15,325	8,070			

Value of grain assessed in storage:

Wheat	\$73,415
Oats	575
Barley	52,420
Corn	3,250

School statistics:

Total number of census children, 1901	60,496
Number of teachers employed	1,272
Number of school houses	250
Number of school districts	138
Amount expended for public school purposes	\$1,737,935 58

MADERA COUNTY.

Madera County was organized from a portion of Fresno County in 1893. While less fortunate in the matter of development than her sister counties of the San Joaquin Valley, there has been a steady, healthful growth. Perhaps less than half of the acreage is arable land, and a greater portion of that is devoted to grain-raising, but during the past few years there has been a steady breaking away from the great wheat farm to the small fruit orchard and vineyard, which with the raising of alfalfa and dairying is a source of greater profit with less labor. There are several large dairies near the town of Madera which ship their cream to Fresno and San Francisco, and two large farms operate their own creameries and find a ready sale for their product.

The industrial interests of the county in the order of importance are lumbering, stock-raising and farming, and mining.

The county has substantial public buildings and no bonded indebtedness.

IRRIGATION.

About 50,000 acres of the choicest land in the county is under the system of the Madera Canal and Irrigation Company, whose water supply is obtained from Fresno River. Two large reservoirs have recently been completed at the base of the foothills, which by storing the flood waters of the river will increase the capacity of the system and give later irrigation. The Chowchilla, on the northern boundary, during the early spring furnishes water to irrigate the large vineyard of the Minturn winery. Many farmers, especially those who have taken up dairying, have installed pumping plants to enable more frequent applications of water to their alfalfa fields, and find them profitable.

LUMBERING.

Lumbering is the principal industry. The Madera Sugar Pine Company has the largest lumbering plant, and its sawmills are at Sugar Pine, 65 miles back in the Sierras. It ships its output to Madera, its distributing point, through a "V" flume. Its mills are equipped with modern machinery, as is its large box factory and finishing plant at Madera. There are several smaller mills in the sugar pine belt, which haul lumber to Madera and Fresno by teams. There is a large sash and door factory at Madera, which makes extensive shipments to the East. In these mills several hundred men find steady employment.

GRAPES—RAISINS.

In the irrigated sections raisins do well, and this county has no superior in the growing of the wine grape, the climate and soil being particularly adapted to its growth. The Italian-Swiss Colony Company, about the largest wine-grower in the State, has a thousand-acre vineyard near Madera, and a big winery with a capacity of 2,000,000 gallons. It is thoroughly equipped with modern machinery, and has a large distilling plant for the making of brandy. A spur track extends from town to the winery, giving facilities for shipping its product and handling the large shipments of grapes from the neighboring country received during the season. Another large winery is at Minturn, on the Southern Pacific Railroad.

MINERAL RESOURCES.

Madera County is rich in mineral wealth. Gold, silver, and copper are extensively mined all through the mountains, there being quite a number of well-developed and paying mines, but the cream of it remains, because capital has not yet entered the field to exploit resources back in the mountains. The mineral belt is extensive and comprises almost every metal common to the United States. The Minarets, mountains of solid iron, which Government mineralogists have pronounced the largest body of iron ore in the world, lie in the eastern and most inaccessible portion. To this is due its undeveloped condition, for were it near the railroad it would be a noted mining camp. So far no effort has been made to develop it. The introduction of electric power to railroads will solve the transportation problem, when this great wealth will be opened up. The best class of granite is quarried at Raymond, where there is an inexhaustible supply. The Raymond quarry furnished the granite for the San Francisco postoffice and other important buildings in that city. The courthouse of Madera County is constructed of this granite.

POWER—TRANSPORTATION.

The San Joaquin Electric Company, which furnishes electricity to Fresno and other points in the valley, has its plant in the mountains in eastern Madera County, obtaining power from the upper waters of the San Joaquin River. To insure an unfailing supply in the summer the company has two large reservoirs, one at the foot of Crane Valley and one 6 miles from North Fork, and is constructing another large one in Crane Valley. As the result of the extension of this plant an electric railway will be built from Fresno to Wawona, from which great things are prophesied for the mining interests. With facilities for cheap transportation, and electric power for the operation of mills, many mines with ores of low grade will be operated, and because of their vast extent will become paying properties.

The Southern Pacific and Santa Fé lines cross the county north and south, and a branch line extends from Berenda on the Southern Pacific to Raymond, where passengers for Yosemite Valley leave the trains and take the stages to complete their journey.

TOWN OF MADERA.

Madera is the county seat. It is a thriving town of about 2,500 inhabitants, with a full complement of business houses, good schools (grammar and high), and churches of every denomination. There are two banks, one State and one National. Building is active, several substantial brick blocks being under way.

GENERAL STATISTICS.

Area, 2,140 square miles, or 1,369,600 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	724,333
Value of country real estate.....	\$3,999,025
Of improvements thereon.....	452,190
Of city and town lots.....	287,270
Of improvements thereon.....	224,225
Of personal property.....	1,256,040
Total value of all property	7,403,563

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle—Beef	500	\$12,500	Mules.....	2,150	\$73,315
Stock	25,150	377,250	Sheep.....	32,200	64,400
Thoroughbred	25	250	Lambs.....	14,000	7,000
Cows.....	925	20,350	Goats.....	100	200
Calves.....	5,750	35,750	Poultry (dozen)	1,110	2,775
Swine.....	5,500	13,750	Hay.....	---	5,000
Horses.....	3,310	72,860	Lumber.....	---	8,200
Colts.....	390	4,875			

Number of acres sown for crop of 1904:

Wheat.....	121,850
Barley.....	52,950
Hay.....	12,780

Acres of bearing grape vines growing in spring of 1904:

Table.....	112
Raisin.....	2,500
Wine.....	1,650

Number of bearing fruit trees growing in spring of 1904:

Apple.....	3,500	Pear.....	2,000
Apricot.....	5,850	Prune (French).....	4,200
Cherry.....	35	Lemon.....	40
Fig.....	635	Orange.....	175
Olive.....	5,500	Almond.....	1,075
Peach.....	22,500	Walnut.....	50

Value of grain assessed in storage:

Wheat.....	\$62,730
Barley.....	33,600

School statistics:

Total number of census children, 1904.....	1,516
Number of teachers employed.....	51
Number of school houses.....	39
Number of school districts.....	37
Amount expended for public school purposes.....	\$33,828 93

MARIN COUNTY.

Marin County is decidedly one of water frontage, being bounded on the west and south by the Pacific Ocean and by the Golden Gate, which separates it from San Francisco by only a mile and a half at its nearest point, and on the east by San Francisco Bay.

TOPOGRAPHY.

The topographical features are rolling hills and numerous small valleys. A part of the Coast Range crosses Marin in a northwesterly and southeastly direction, and much of the surface of the county is broken and hilly, but a considerable portion immediately on the shore is composed of marsh and overflowed lands. The highest land is Mount Tamalpais, which has an elevation of 2,608 feet.

SOILS.

The soil varies from the rich adobe clay of the salt marshes, to the sharp, gravelly loam of the higher foothills. In the valleys it is composed of heavy black loam with an admixture of gravel; in the foothills a reddish loam prevails, sharper, and carrying less adobe. It is all easily worked, heavily charged with the elemental constituents of plant life, admirably suited to horticultural purposes, and wherever worked to fruit yields heavily. Irrigation is not required. The depth of the soil, its retentive nature, and ample rainfall in winter, render artificial watering unnecessary.

CLIMATE.

Average annual rainfall at Point Reyes, 17.56; Point Bonita, 25.39; San Rafael, 39.58. Mean summer temperature of San Rafael, 76° for June, July, August, and September; for the other months, 61°.

AGRICULTURE, DAIRYING, AND STOCK-RAISING.

The principal industry is dairying, but of late years attention has been paid to fruit-growing. Some of the finest apples grown in the State are produced. On the dairy lands of the Novato ranch there are ten orchards. On every rented subdivision of this, and the Burdell ranch, are apple, pear, quince, fig, pomegranate, persimmon, apricot, peach, plum, and other fruit trees, the thrifty growth and large yield from which prove the superior adaptability of the soil and climate of this portion to fruit-growing. On the Novato ranch is one of the largest fruit orchards, including one of the oldest and most celebrated apple orchards, in the State. This orchard contains 250 acres, with 40,000 trees, of which 22,000 are apple, 2,000 apricot, 3,500 pear, and

the remainder mixed fruits, including peaches, plums, cherries, English walnuts, almonds, and figs. There are also 200 acres of vineyard planted to Mission and Zinfandel grapes. The fruit from this ranch and section suitable for canning is taken by the Petaluma Canning Company. The apples are carefully sorted, and the best are packed in boxes and shipped to Australia, where they bring the highest price, the reputation of this orchard being established at the Antipodes. The smaller apples are used for cider and vinegar. Berries are grown to some extent and have proved profitable.

The land is generally held in large tracts, and rented out for dairying purposes. As a result there is but a sparse population, and but little advance is made in horticulture, although the greater part of the county is eminently fitted for this industry. The DeLong orchard is the oldest fruit farm. It was planted in 1857, and has been in continuous bearing from the beginning.

Immense amounts of vegetables are shipped from the low lands.

The shipments of butter are enormous, being from 600,000 to 800,000 pounds annually, and the quality is first class. Most of the large ranches are stocked by the owners, and divided into tracts, which are leased at annual rentals, according to the number of cows, the usual charge being \$25 to \$30 a head per annum.

SAN RAFAEL.

San Rafael has a population of about 4,000. It has many fine buildings, public and private, elegant hotels, banks, fine churches, schools, electric lights, and a perfect sewerage system. It is a noted place of residence for San Francisco business men, and its hotels are a favorite resort for invalids and tourists. Its climate is regarded as very favorable for those with pulmonary complaints. Its private dwellings are elegant and its drives most beautiful and romantic. The road to the summit of Mount Tamalpais is a continuous and easy grade. San Rafael, in a sheltered valley, is secure from ocean fogs and winds. It is in constant communication with San Francisco by rail and ferry at Point Tiburon.

Sausalito is also a favorite place of residence for San Francisco business men, possessing features similar to San Rafael. Novato is the center of the fruit district; Point Reyes of the dairy interests.

At San Quentin is located one of the two State prisons. It is situated on San Francisco Bay, about 12 miles north of San Francisco, with which it is connected by ferry.

GENERAL STATISTICS.

Area, 516 square miles, or 330,240 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	326,984
Value of country real estate	\$5,611,150
Of improvements thereon	1,163,730
Of city and town lots	2,537,490
Of improvements thereon	2,331,850
Of personal property	1,326,710
Total value of all property	13,779,747

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle—Stock	4,975	\$64,705	Oxen	12	\$360
Thoroughbred	160	6,400	Swine	8,400	25,200
Cows—American	450	11,250	Colts	72	1,440
Graded	19,750	395,000	Mules	14	320
Common	3,450	31,285	Sheep	475	950
Calves	3,985	19,925	Lambs	220	220
Horses—Standard-bred	30	3,000	Poultry	---	10,235
American	685	47,950	Hay	---	6,240
Common	1,145	28,625	Lumber	---	3,500

Number of acres sown for crop of 1904:

Hay	12,780
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Acreage of grape vines growing in spring of 1904:

	Bearing.	Non-Bearing.
Wine	430	10

Number of fruit trees growing in spring of 1904:

	Bearing.	Non-Bearing.		Bearing.	Non-Bearing.
Apple	20,165	1,115	Prune (other kinds)	400	---
Apricot	5,600	2,160	Lemon	35	20
Cherry	425	80	Orange	535	75
Fig	215	55	Almond	135	45
Prune (French)	---	2,350	Walnut	60	45

School statistics:

Total number of census children, 1904	3,873
Number of teachers employed	76
Number of school houses	44
Number of school districts	43
Amount expended for public school purposes	\$64,038 78

MARIPOSA COUNTY.

By L. W. SHARP.

The county reaches eastward from the edge of the San Joaquin plains across the foothills far into the Sierra Nevada Mountains, its altitude varying from 300 to 13,000 feet, Mount Dana, the highest point of land, reaching an elevation of 13,227 feet.

There are about 300,000 acres of plains and lower foothills together, the latter predominating, and the balance consists of high hills and mountains; bare of timber on the plains, then scattering oak and scrub pines, then rising to immense tracts of sugar and yellow pine, fir, spruce, and cedar, and the giant sequoias of Mariposa Big Tree Grove, which contains some 427 trees, many of 35 feet in diameter and 150 to 300 feet high. The county is well provided with natural water in the Merced, Mariposa, and Chowchilla rivers, fed from perpetual snows. The famous Yosemite Valley is located in the eastern part of this county, at an elevation of 4,060 feet, with walls 5,000 feet higher. The Merced River flows through the valley.

The soil of the plains and valleys is black alluvial, and in the lower foothills there is a sharp, red admixture of adobe and gravel, all easily cultivated and good for grain and fruits.

MINING.

Mariposa County achieved its greatest prominence on account of its yield of gold from its quartz veins and placers, and this industry will rank first for years to come. The most important working mines are on the "Frémont Grant," operated by the Mariposa Commercial and Mining Company. In all directions, other properties—old and new—are being put into condition for active mining, and the present year promises an awakening of the industry that will rival the golden days of old. There are three mining belts in the county—the Mother Lode with its off-shoots, the east belt, and the copper belt. All are rich in minerals, and in each preparation for active operation is in progress.

HORTICULTURE AND OTHER INTERESTS.

As a fruit-raising county, Mariposa has not attained the distinction her fruits deserve. There is no variety that does not grow to perfection in size and color, and the flavor is unsurpassed, being of that delicious quality found only in mountain fruits. Irrigation is practiced to some extent, water being taken from streams and mining ditches, and used with good results. With the exception of berries, vegetables, and some of the smaller fruits, however, irrigation is not required.

Apples are the chief fruit product, though wine and raisin grapes, oranges, and olives have been prize winners at World and State

expositions. Some of the best apples that find their way to the San Francisco market are produced in Mariposa County. An orchard of 1,500 trees planted by James Lannon in Yosemite Valley has been bearing for years and with good results. The fruit is large and handsome and the yield abundant. The principal fruit sections are around Coulterville, Jersey Dale, Darrah, and Grant's Springs.

The agricultural and fruit interests are steadily improving. Thousands of acres are taken up by settlers every year, and there is yet considerable valuable land left for newcomers. Fruit-growing and poultry-raising promise to be important industries.

Lumbering is of considerable importance, the splendid forests of pine and fir being extensive.

Stock-raising is a thriving enterprise. The vast hill and mountain ranges are well adapted to grazing and stock-raising, not much grain and hay being raised. The cattle and sheep are ranged in the mountains in the summer and in the valleys and plains during the winter.

Considerable dairying is carried on during the summer in the mountain valleys, and a high grade of butter is made.

The public school system is of high order. The proficiency of the schools is assured by the qualifications required of the teachers. There is an adequate number of schoolhouses, well supplied and furnished.

The greatest drawback to advancement has been and is the lack of shipping facilities. Long-distance hauling over mountain roads prevents fruits and other products being profitably marketed. This hindrance will be corrected by an electric railroad, now in course of construction, from one of the main railroad lines to Yosemite National Park, via the Merced River cañon. Another proposed railroad to Wawona through the eastern part of the county will be of vast benefit. These roads would give quick and cheap access to the markets.

Mariposa, the county seat, is well built and provided with churches, schools, hotels, and substantial county buildings and business houses.

GENERAL STATISTICS.

Area, 1,580 square miles, or 1,011,200 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	774,389
Value of country real estate	\$1,529,876
Of improvements thereon	318,440
Of city and town lots	34,142
Of improvements thereon	98,730
Of personal property	426,971
Total value of all property	2,416,006

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle—Beef	354	\$8,850	Mules	187	\$5,610
Stock	9,765	126,945	Sheep	15,318	30,636
Cows	115	2,300	Lambs	5,050	3,786
Calves	1,991	9,955	Goats	675	675
Swine	2,395	4,790	Poultry (dozen)	547	1,367
Horses—Thoroughbred	2	200	Hay	---	2,610
Common	1,785	35,700	Lumber	---	5,800
Colts	255	2,550			

Number of acres sown for crop of 1904:

Wheat.....	1,165
Oats.....	2,840
Barley.....	6,440
Hay.....	6,270

Acres of bearing grape vines growing in spring of 1904:

Table.....	100
Raisin.....	100
Wine.....	150

Number of bearing fruit trees growing in spring of 1904:

Apple.....	10,900	Prune (French).....	1,000
Apricot.....	1,090	Prune (other kinds).....	1,200
Cherry.....	400	Lemon.....	175
Fig.....	1,350	Orange.....	450
Olive.....	9,000	Almond.....	425
Peach.....	5,670	Walnut.....	250
Pear.....	2,550		

School statistics:

Total number of census children, 1904.....	914
Number of teachers employed.....	33
Number of school houses.....	32
Number of school districts.....	30
Amount expended for public school purposes.....	\$20,717 35

MENDOCINO COUNTY.

Mendocino County has 100 miles of coast-line. In general topography it is mountainous, with valleys lying between the mountain chains or along the coast. It is one of the three great northern counties—Humboldt and Trinity being the others—that embody the greater part of the northern Coast Range Mountains, taking in their highest peaks, their deepest cañons, their fertile valleys, wooded slopes, rushing rivers, and picturesque scenery. It shares with Sonoma, Humboldt, and Del Norte the glory of the great redwood belt. From north to south, Mendocino County has a length of 85 miles. Its width east and west is 45 miles. The Coast Range, composed of two parallel ridges, traverses the central portion its entire length. These mountains vary in height from 1,000 to 3,000 feet. Their lower slopes have a gentle declivity, while the higher portions are generally precipitous and furrowed with ravines and gulches. In the eastern and northern parts many small productive valleys are found. The Eel River, running north, and the Russian River, running south, have their sources in this county, and are the principal streams. A large number of tributaries connect with them; while down the slope of the western ridge large numbers of creeks, some of which might aspire to the dignity of rivers, find their way to the Pacific. Mendocino is well watered with the numerous streams which take their rise in the mountain chain that intersects her territory.

SOILS.

The land upheaval which formed the Coast Range left between two of the mountain chains a string of lakes, which are, in their geographical position as you travel north, known as Sonoma, Sanel, Ukiah, and Redwood valleys. Although the formation of these lakes is a matter of geological history, their conversion into valleys is a matter of recent date. The erosion from the mountains filled these lakes with a deposit at a very early date after their creation: but the erosion has been deposited to such an extent during the last few years that the large trees situated at the bottom are in nearly every case buried many feet above their roots. If one will consider the original formation of these valleys, and will at the same time keep in mind what the mixture of certain soils will be when the natural chemical reactions have taken place, he will have no trouble in seeing in his mind the nature of the soils.

The land upheaval left various strata of rocks which are found in all outcroppings. The erosion from the mountains washed down into

the valleys and, mixing with decayed vegetation, made a loam deposit which is very thick, varying from two feet near the foot of the mountains to thirty feet in the middle of the valleys. The soil which adjoins the loam deposit is black and gravelly, mixed more or less with adobe. The loam will produce more corn, while the black land will produce more and better fruit. Both will produce large crops of grain, but generally one will do about as well as the other.

Next back from the black soil is the hill land. The quality is uniformly a thick brown soil, which is lighter than the other two and drier. This last described soil is little cultivated, save in a few instances.

In Ukiah Valley there is the greatest variety of soil, even on a small tract. The river, and the many small streams which come from the mountains, have deposited sand, gravel, or alluvium. There is a band of sandy loam along the banks of the river and larger creeks. Lying back of this and a little lower is a broad band of clay loam, very rich. Rising still farther back is a sloping bench running to the hills, oftener of light, yellow clay, and formerly heavily covered with brush. In some places this bench is deeply covered with coarse gravel. The lower hillsides are clayey and timbered. There are some large bodies of a black gravel formed by mountain streams, and this black gravel is the finest fruit land. All of the best lands are under cultivation. Holdings are not large, 200 acres of valley land being an exceptional farm, and the tendency is to subdivision.

The soil in Yorkville Valley is a rich, black loam, and well adapted to the growing of vegetables, fruits, grains, and hops. The soil of the hillsides and mountains is well suited to the growing of grass, vines, and fruits, and in some places grain.

Anderson Valley is a long, narrow strip of land lying between two chains of mountains. It extends 17 miles southeast and northwest, and is from 1 to 2 miles in width. The soil in this valley is a rich alluvium, and is well adapted to the growing of vegetables, fruits, and cereals. The soil of the hills is a rich, black loam, except in a few places, where there is adobe and gravel.

In Potter Valley the soil is mostly a sedimentary deposit, but a variety exists—some clay, a small amount of adobe, and some lands well adapted for fruit-raising.

In Little Lake Valley the soil generally is a rich, sandy loam, but in a few places a black loam is found. The soil is very productive, and never in the history of the valley has there been anything approaching a failure.

AGRICULTURE—HORTICULTURE.

The principal agricultural industries are wool-growing, dairying, poultry- and stock-raising, and the growing of hops, grain and other cereals, potatoes, apples, and fruits of almost all descriptions. Wine-making is very thriving, and new vineyards are constantly coming into bearing.

Dairying is one of the leading interests. There are some up-to-date creameries, with numerous skimming stations. The butter produced is of a very high grade and finds a ready market.

Stock-raising, grazing, and wool-growing are very much in evidence. The Angora goat thrives well, the mountains being an ideal pasture. There are about 1,000,000 acres of land specially adapted for grazing purposes. The shipments of wool, of a grade second to none, amounted to over 1,000,000 pounds last season.

Hops are a very prolific crop and of the highest grade. Last season over 1,500,000 pounds were shipped.

Crops of wheat, oats, and barley are always certain, and over 1,000,000 bushels were produced last season.

Potatoes and apples of a very fine quality are raised and bring remunerative prices. The apples excel in size and flavor.

The Bartlett pear, nectarine, peach, and fig are grown very successfully. Berries of all descriptions grow abundantly and are of large size and fine flavor.

No irrigation is required, and crops do not suffer from drought at any time.

LUMBERING.

In the county are large tracts of redwood, covering over 600,000 acres, the lumber cut from which amounts to 100,000,000 feet annually. At Gualala, Greenwood, Albion, Mendocino, Fort Bragg, Westport, and Usal are located large lumber mills. These mills, in addition to having their logs floated on the streams on which they are situated, have modern railroads extending into the heart of the redwood belt. The largest mill in the interior is that of the Northwestern Redwood Company, being at the terminus of the California Northwestern Railway, at Willits. There are numerous smaller mills throughout the timber belt to supply the local demand for lumber, shingles, shakes, etc. All of these employ a large number of persons in the woods, about the shipping points, on their railroads, and in their mills. There is also a considerable employment for farming hands, and in Russian River Valley, during the season for picking hops and fruit, from August until about the middle of October, there is employment for a great number of people. Shingles, boxes, and other lumber products are manufactured and shipped in large quantities. The shipments of tanbark alone amount to over \$100,000 during a season.

Ukiah, the county seat, is located on the California Northwestern Railroad.

Most of the trade is carried by vessels from coast points to San Francisco. The California Northwestern Railroad, connecting with San Francisco, runs 60 miles through the county from south to north, and terminates at Willits, 24 miles north of Ukiah.

All the streams abound in trout. Game—quail, grouse, pigeons and deer—is abundant.

Land suitable for agricultural purposes, fruit-growing, etc., can be obtained at reasonable prices. The last report of the United States General Land Office gives the total vacant land open to settlement as over 737,000 acres, described as mountainous, timber, and grazing.

GENERAL STATISTICS.

Area, 3,460 square miles, or 2,214,400 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	1,466,467
Value of country real estate	\$6,886,035
Of improvements thereon	1,087,147
Of city and town lots	585,319
Of improvements thereon	853,772
Of personal property	2,112,347
Total value of all property	11,953,003

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle—Beef	120	\$3,600	Colts	716	\$14,320
Stock	16,227	243,405	Mules	150	4,950
Cows	6,124	122,480	Sheep	92,239	184,478
Calves	6,165	30,825	Goats	2,951	5,902
Oxen	25	625	Poultry (dozen)	1,000	2,500
Swine	9,494	23,250	Hay	---	2,500
Horses—Standard-bred	20	3,000	Lumber	---	106,950
Common	4,804	175,790			

School statistics:

Total number of census children, 1904	5,117
Number of teachers employed	163
Number of school houses	128
Number of school districts	122
Amount expended for public school purposes	\$105,277 11

MERCED COUNTY.

Merced County is in the heart of the San Joaquin Valley. The greater part of its area, which is about 90 miles east and west and 40 miles north and south, extends from the foothills of the Sierra Nevada range on the east to the summit of the Coast Range on the west. In the northeastern portion there are high foothills, increasing in height as they approach the higher lands of Mariposa County, where they merge into the high Sierra. On the southwest is the Coast Range, with rugged steppes, abrupt cañons, fertile valleys, and hills sloping to the plain, in the lower part of which is the San Joaquin River.

With the exception of this small portion of the eastern part, and that situated on the eastern slope of the Coast Range, the county is almost a level plain, broken only by watercourses. The San Joaquin River passes in a northerly and southerly direction almost through the center of the county. There are no precipitous banks to the river, and during the high waters it frequently overflows its banks, inundating the adjoining country for a distance of some three miles on either side. To the west of the San Joaquin River are the rolling foothills of the Coast Range. A large number of creeks take their rise in the mountain ranges on both sides of the valley. Most of these are torrents in winter, only to become dry beds in summer. Some find their way into the plains, and, where not diverted for irrigating purposes, become lost in the soil. Among the principal streams on the east side are the Chowchilla River, Bear, Black Rascal, Dry, Mariposa, Dead Man, Mills, Owens, and Dutchman creeks; on the west side are San Luis, Quinto, Los Banos, Cottonwood, Sycamore, and Wild Cat creeks. The principal stream is the Merced River, which, having its source in Mariposa County, in the Yosemite Valley, runs the greater part of its course through Merced, flowing through the entire length of the county, and reaching the San Joaquin on its western border.

On the eastern side of the San Joaquin are bottom and plains lands, skirted on the east by a narrow strip of low foothills. The Merced river bottom has an average width of three miles, with an abrupt bluff on each side.

SOILS.

The soils vary with locality. There are the alluvial lands of the bottom, a heavy reddish adobe loam mixed with gravel, a lighter chocolate-colored loam containing much gravel and sand, and a very sandy loam. The alluvial bottom land soil occurs over a large tract in the southern as well as in the western part of the district. It is a comparatively late deposit from the Merced River, Bear Creek, and smaller streams, dark gray in appearance, easy to work, and does not bake after irrigation; it is *the* soil for vegetables and grapes, is

easily irrigated, holds the water well, and everything planted in it grows quickly.

The heavy adobe-like loam is a direct wash from the foothills, and is principally found at their base. The color of this soil is dark brown, like chocolate, and turns darker when irrigated. It contains a great deal of iron, and is rich in all constituents which promote plant life. When properly moist, and not too wet, it plows and cultivates easily, and pulverizes to a beautiful loam. This is the favorite soil for the orange and other citrus fruits, not only because it is rich and contains much gravel, but principally on account of its location along the base of the hills, the very place where the thermal belt reigns. This soil is also eminently suited for olives. Old olive trees grown in it are yearly loaded with fruit.

The third variety of soil is the very dark, blackish-red chocolate loam, very similar to the best of other soils of this character. It differs from them, however, in being more reddish, and contains much iron. Like the adobe soils, it hardens if left alone after irrigation, but pulverizes readily if plowed or cultivated in time. This soil is also found at the base of the hills. Geologically considered, it is of older formation than the alluvial soils; in quality it is equal to the best of soils anywhere.

A fourth variety is a light, sandy loam, easily worked and irrigated, which holds moisture well, and which abounds in soluble plant-food.

IRRIGATION.

Irrigation is an absolute necessity over the larger portion of Merced County for the production of fruits, alfalfa, grain, and vegetables. Two of the largest and most complete irrigation systems in the State are owned and operated—one on the east side, the other on the west side, of the San Joaquin River. The one on the east side is owned by a corporation with a capital stock of \$3,000,000. The main canal comes out of the Merced River just above Merced Falls, where the company has constructed a large dam. The main canal is from 60 to 70 feet wide on the bottom, 100 feet wide on top, and 10 feet deep, the carrying capacity being about 4,000 cubic feet per second. The length of the canal is about 50 miles, with something over 200 miles of lateral or subsidiary canals which were originally built as part of the system, and these are being added to as demands require.

On the west side lies an immense irrigating canal, from which are watered tens of thousands of acres of the finest land in the valley. This canal was built by the firm of Miller & Lux. The canal is over 40 miles in length, and takes water from the San Joaquin River. Over a hundred miles of lateral ditches are maintained in connection with this irrigation system, which has developed an otherwise dry section into an immense garden spot.

DAIRYING.

Considerable attention is being given to the breeding of dairy stock, and the dairy business has gone ahead with such rapidity that it has become the principal industry. Some of the best-equipped creameries

in the United States are to be found in Merced County, and some of the recently constructed ones are models of up-to-date factories. Previous to 1895 no attention was paid to dairying. In August of that year a few farmers organized the New Era Creamery Company, the pioneer institution of the kind on the West Side. They put up a \$5,000 plant. Within a year the business had outgrown the plant, and its capacity had to be increased. This has been its history every year since. It must not be understood that this company has a monopoly of the business by any means. There are in addition several thoroughly equipped cheese factories in this locality, while many of the large producers have their own separators and ship their cream to San Francisco. The several creameries (with skimming stations) located in this section turn out more than a ton of butter per day; yet the industry is only in its infancy, and is especially inviting to the progressive settler of moderate means, as a few acres intelligently and industriously handled will afford a good and sure income. The great success of the creamery business is not only based upon good markets and shipping facilities, coupled with thorough manufacturing processes, but also, and especially, is due to the great alfalfa-growing industry.

The main milk-producing feed is alfalfa, and five to ten tons per acre during the season is a common yield. As alfalfa hay is worth a great deal more than nearly all the other kinds of hay, and, pound for pound, is worth nearly as much as wheat bran, it at once becomes apparent that alfalfa belongs to what is termed concentrated feed, and in conjunction with corn, especially as silage, makes an ideal ration and is inexpensive. One acre and a half of some land will produce ten tons of alfalfa hay and support one cow, whose milk will sell for \$40 at the creamery, one calf worth \$10, and two pigs worth \$20.

AGRICULTURE—HORTICULTURE.

Merced County is the natural sweet potato belt of the State. Crops of from 15,000 to 30,000 pounds per acre are raised annually. In the vicinity of Atwater, six miles northwest of Merced, are several thousand acres of land that seems to be peculiarly adapted to their growth, as experience has demonstrated. From the village of Atwater alone, from 500 to 800 carloads of "Merced Sweets" are shipped to market each year. Cereals of most kinds are raised, and even with its other great resources it is one of the leading wheat, barley, and corn producers.

Alfalfa grows prolifically, and produces four crops a year, besides pasturage. Table, raisin, and wine grapes find a natural home. Orange, lemon, olive, and fig trees thrive well, while apples, cherries, peaches, apricots, prunes, pears, nectarines, quinces, and persimmons are very profitable. The smaller fruits, such as strawberries, blackberries, raspberries, currants, and gooseberries, yield abundantly. Walnuts, chestnuts, pecans, almonds, and peanuts are easily raised.

A commercial product is buhach, from which the celebrated insect powder is manufactured and sent all over the United States. Over 300 acres are devoted to the growing of the pyrethrum plant.

LIVE STOCK.

The Los Banos farm, the property of Miller & Lux, containing a strip of land 35 miles long and 16 miles wide, raises thousands of cattle and hogs, which are fattened and marketed every year.

The Chowchilla Ranch and Pastoral Company, located near the city of Merced, is extensively engaged in the raising of pure-bred and grade shorthorn cattle. The herd of thoroughbred Durham cattle on the Howard ranch is second to none in the State. There are also large flocks of pure-bred and high-grade Merino sheep. The raising and fattening of hogs for market has proved very profitable. Poultry-raising is a paying industry. Climatic conditions are favorable to the raising of chickens. This industry offers an assured and profitable income when made a specialty and close attention and up-to-date methods are applied.

PRINCIPAL TOWNS.

Merced is the county seat. It has fine educational facilities and modern systems of sewers and water supply, and is lighted by electricity. It is the starting point, via the Coulterville route, to the world-famed Yosemite Valley. Merced Falls, Snelling, LeGrand, Dos Palos, Volta, Los Banos, Atwater, and Cottonwood are thriving towns, located in districts with surroundings of unexceptional fertility.

Merced County has a population of close to 10,000, according to the last United States census, and is traversed by two transeontinental railroads, viz.: the Southern Pacific and the Santa Fé.

The settlement of land by colonization has resulted very successfully. No more successful colonies can be cited than those of Dos Palos, the Rotterdam, the Pioneer, El Capitan, and the British, all regularly laid out in tracts of five, ten, and twenty acres. Diversified farming is practiced, and comfortable homes and thrifty farms are the result.

GENERAL STATISTICS.

Area, 1,750 square miles, or 1,120,000 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	1,182,834
Value of country real estate	\$9,253,423
Of improvements thereon	640,376
Of city and town lots	526,952
Of improvements thereon	662,725
Of personal property	2,172,857
Total value of all property	15,193,705

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle—Beef	810	\$21,800	Colts	1,084	\$11,382
Stock	37,250	556,500	Mules	3,495	115,985
Thoroughbred	75	3,750	Sheep—Graded	700	3,500
Cows	4,100	101,000	Common	106,550	213,100
Calves	7,300	43,800	Lambs	56,700	28,350
Swine	12,430	37,290	Goats	1,200	1,200
Horses—Standard-bred	110	8,925	Poultry (dozen)	3,385	8,462
American	4,940	123,500	Hay	—	9,200
Common	965	19,300			

Number of acres sown for crop of 1904:

Wheat.....	130,285
Oats.....	3,450
Barley.....	85,490
Corn.....	2,200
Hay.....	15,125

Acres of grape vines growing in spring of 1904:

	Bearing.	Non-Bearing.
Table.....	595	105
Raisin.....	560	125
Wine.....	780	165

Number of fruit trees growing in spring of 1904:

	Bearing.	Non-Bearing.		Bearing.	Non-Bearing.
Apple.....	4,200	955	Pear.....	9,200	1,620
Apricot.....	16,000	4,110	Prune (French).....	18,430	2,640
Cherry.....	325	60	Lemon.....	1,600	200
Fig.....	11,145	3,510	Orange.....	8,100	2,610
Olive.....	28,185	1,460	Almond.....	18,125	4,175
Peach.....	95,760	25,100	Walnut.....	825	210

Value of grain assessed in storage:

Wheat.....	\$94,320
Oats.....	4,830
Barley.....	48,585
Corn.....	6,000

School statistics:

Total number of census children, 1904.....	2,646
Number of teachers employed.....	79
Number of school houses.....	60
Number of school districts.....	58
Amount expended for public school purposes.....	\$91,722 99

MODOC COUNTY.

Modoc County lies in the extreme northeastern corner of California. The county is a succession of mountain ranges and valleys branching off from the Sierra Nevada Mountains, the principal spur of which is the Warner Range. It is principally drained by Pit River, which flows into the Sacramento, near Redding, Shasta County. The lava-bed section occupies over one half the total area. The county has two large lakes, but barring the lakes and the large cattle ranges of the late Jesse D. Carr and W. B. Whittemore, it is sparsely settled and fit only for the grazing of cattle.

The valleys are the principal features, the leading ones being Surprise Valley, lying on the eastern side of the Warner Range and running from Oregon on the north into Nevada at the eastern and southern ends; Goose Lake Valley, stretching from the west side of the Warner Range to Goose Lake on the west and into Oregon on the north; Hot Springs Valley, comprising the central part of the county; Jess Valley, in the Warner Range; Big Valley, in the southwestern part and running into Lassen County on the south; and Little Hot Springs Valley, in the extreme southwestern corner and touching Lassen, Shasta, and Siskiyou counties.

The soil of Surprise Valley is a rich, dark loam. The part of the valley located in California is generally under cultivation, with land selling at from \$10 to \$60 an acre. Wheat, barley, grain, fruit, vegetables, and hay are the leading staples. Thousands of acres are in alfalfa, and the stock and dairying industries are thriving. Every ranch has a fine orchard, and ranch houses and barns, costing \$5,000 or \$6,000 in total improvements, are not uncommon. Trees, both shade and ornamental, abound around every place. The principal towns of this valley are Fort Bidwell (an old Indian fort, now abandoned as such, but the seat at present of an Indian school), at the northern end; Lake City, 15 miles to the south; Cedarville, at the center of the valley, and the largest and most prosperous town in the county; and Eagleville, 16 miles south of Cedarville.

Goose Lake Valley resembles Surprise Valley in all material particulars, but is not quite so large. It also is well improved.

Big Valley is varied in character of soil. The larger part is in Lassen County. Its principal town, Adin, is in Modoc County and supports quite a population.

The climate is that of the temperate zone, and the products are those of the great intermountain region which stretches from the Sierra to the western plains of Kansas. Snow falls in the valleys and much deeper in the mountains, forming the principal supply of moisture for the development of the country. Stock is usually fed for several months through the winter, although it is not always necessary so to do. The thermometer will sometimes run below zero for a

few days in winter, but not for very long, and 90° is extreme heat for summer. Even in summer the evenings are cool and delightful.

The county is well watered. Surprise Valley has nearly twenty streams, which run both winter and summer. Goose Lake Valley is equally fortunate; while the Pit River supplies water for many farms and ranches. Many springs exist, especially in the mountains; and in Surprise Valley there are many artesian wells.

The timber of the county is pine and fir in the Warner Range, and sugar pine in the western part.

Horticulture has had but a small place in the industries, only sufficient fruit for home uses being raised. However, the gradual approach of the railroad running north from Reno, Nevada, will increase the productivity in this line immensely, as the county is well adapted for apples, pears, and berries. The wild plum is about the only native fruit. The cultivated fruits were brought in the earlier days from Eastern States by the immigrants who came across the plains. A great deal of orchard planting has been done within the last few years.

The last five years have seen a great deal of reservoir work undertaken throughout the county and its tributary valleys. The rains come in time to insure abundant harvests year after year.

The nearest railroad point to Alturas, the county seat, is Madeline, in Lassen County, and 33 miles south of Alturas. Daily trains are run from Madeline to Reno, Nevada.

There are seven flouring-mills, located at Bidwell, Lake City, Cedarville, New Pine Creek, Alturas, and Adin. There are nine sawmills, located at Bidwell, Cedarville, Eagleville, Willow Ranch, Davis Creek, Jess Valley, Alturas, Adin, and Widow Valley.

The population by the last census was 4,986, over 2,100 being in Surprise Valley and about 1,300 around Alturas and in the Hot Springs Valley country; the rest being in Goose Lake and Adin, with scattering settlements elsewhere.

GENERAL STATISTICS.

Area, 4,097 square miles, or 2,622,080 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	449,963
Value of country real estate	\$1,773,895
Of improvements thereon	422,510
Of city and town lots	50,914
Of improvements thereon	215,465
Of personal property	1,461,055
Total value of all property	4,024,317

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle—Beef	276	\$8,280	Colts	1,221	\$12,210
Stock	35,891	611,248	Mules	580	11,605
Thoroughbred	41	1,250	Sheep—Graded	290	1,415
Cows	595	17,840	Common	28,944	86,832
Calves	11,117	111,170	Lambs	15,320	30,640
Oxen	18	400	Goats	376	1,063
Swine	2,823	6,765	Poultry (dozen)	923	1,846
Horses—Standard-bred	51	6,580	Hay	---	1,820
American	2,290	95,339	Lumber	---	2,240
Common	5,408	86,536			

Number of bearing fruit trees growing in spring of 1904:

Apple.....	42,780	Peach.....	2,850
Apricot.....	1,960	Pear.....	1,740
Cherry.....	2,230	Prune.....	1,700

Value of grain assessed in storage:

Wheat.....	\$950
Barley.....	1,615

School statistics:

Total number of census children, 1904.....	1,392
Number of teachers employed.....	42
Number of school houses.....	33
Number of school districts.....	35
Amount expended for public school purposes.....	\$25,458 83

MONO COUNTY.

BY J. N. ANDERSON.

Mono is a long, narrow county lying on the eastern slope of the Sierras, its greatest length bordering on the State of Nevada, which forms its northeastern boundary; its general direction being southeast and northwest.

TOPOGRAPHY.

The general contour is mountainous and very rough, all but 400 square miles, or less, being mountainous. The western portion lies among the Sierra Nevada Mountains, along their summit, the heights being clad in snow, and the slopes of the range being covered with forest trees.

Among the highest peaks are Mount Dana, 13,627 feet; Mount Lyell, 13,217 feet; and Castle Peak, 13,000 feet. The greater portion of the population is in the eastern part, in the valleys and the mining camps in the surrounding mountains. This portion, which has always been considered a strange, mysterious country, is of a desert-like, volcanic character, abounding in salt pools, alkali, and volcanic tablelands, its character being significantly indicated by some of the local names, such as Hot Springs, Geysers, Sulphur Springs, Black Lake, Soda Pond, Volcanoes, Obsidian Mountain, Deep Cañon, Volcanic Tableland, Red Crater, Adobe Meadows, and Oasis.

Mono Lake, the "Dead Sea of America," is one of the attractions, and situated in the center of the county; it is about 12 miles long and 8 miles wide; its waters are a somewhat unusual compound, various chemical substances being found in solution in them. Several attempts have been made to utilize this water without success, but if the experiment now being carried on, and which looks very favorable, proves successful, there will be created an industry that will rival anything in that line in the State. This lake has all the appearance of having once been the scene of volcanic action. The country surrounding it, as Bodie, Aurora, Lundy, Tioga, and Benton, abounds in minerals. A number of volcanic cones, having extinct craters, lie to the south of the lake, and a great portion of the formation of the district is volcanic débris, consisting of porphyry, granite, limestone, and a remarkably pure obsidian. Deposits of lava are found at Aurora and Table Mountain. The fires of the ancient volcanoes are not yet entirely extinct, for upon the islands in the center of the lake jets of hot vapor escape, and there are a number of boiling springs of water that deposit on the surface oil of a superior quality. The great bluffs and rocky ravines of the Sierras come almost to the western shore of the lake, while on the eastern side salt deposits and lines of driftwood

mark the plain, showing very distinctly what were the former more extended shores of this sheet of water. Upon the bluffs on the western side are water marks, which make it seem highly probable that the waters were once almost a thousand feet above their present elevation, spreading out over the immense plain to the east, and forming a great inland sea. The lake has a number of small streams flowing into it, but is without a perceptible outlet.

Owens River in the south, which takes its rise in a high peak in the Sierras, and Kitten and Walker rivers in the north, are the principal streams. One passes through the southern part into Inyo County. The other, after rising in Mono County, continues its course into the State of Nevada. These two streams with their branches, together with the small streams that flow into Mono Lake, furnish the principal water supply for irrigation.

The retaining of the snow in the high mountains, at the sources of the streams used for irrigation until later in the season, assures an abundance of pasturage on the mountain ranges, which are thronged with vast herds of cattle and bands of horses and sheep that are brought from the lower sections to graze during the summer.

SOIL.

That portion of the valley soil lying contiguous to the streams is very rich. It is formed by erosion from the mountains, and is to a great extent sedimentary and alluvium. A great deal of the sagebrush land, formerly considered barren, is found to be very productive when placed under cultivation. Thus the area of tillable land has been vastly increased within the last few years, and wherever water can be got onto the land, even well up on the foothills, there are ranches that are making comfortable homes for their owners. Yet there are great tracts that are barren and sandy, and great fields of alkali. Cereals do not attain that perfection of growth so desirable, partly from the extreme altitude and partly from the rigors of the climate. Mono County has, however, a considerable cultivable area, and much of it is very fertile. This lies mostly in the eastern part. Among the richest of her agricultural lands may be classed Bridgeport Valley, or Big Meadows, as it is frequently called: Antelope Valley, Long Valley, Mono Lake Valley, and the Adobe Meadows, south of Mono Lake. There is also a vast area of rolling foothill country admirably adapted to grazing.

AGRICULTURE—STOCK-RAISING.

The agricultural resources are chiefly confined to the raising of hay and the hardier cereals and vegetables for home consumption. The small surplus finds a ready market in the mining camps. Apples raised in the lower valleys, as Antelope Valley, and the valley along the Carson and Colorado Railroad in the south end of the county, are of superior quality and flavor and thrive well. Plums and peaches are grown on a limited scale. Berries also do well, considering the high altitude.

Grazing is the leading industry, and the pasturage is good and plentiful. Herds of dairy cattle are moved from the valleys during the summer, and an excellent product of butter is made. Large bands of sheep are also driven to its mountains for summer pasturage. Goats, hogs, horses, poultry, and mules are raised in large numbers.

Farming is on the increase, and much new land is annually being brought under cultivation. Water in most of the valleys is plentiful, and irrigation will always secure a crop in all the valleys. Considerable hay (timothy, natural grass, and alfalfa) is raised for winter feeding.

TIMBER.

The timber belt is very large and the product of good marketable quality, but as there is no means of transportation to market, the development of the lumber interests is retarded, although considerable quantities are used for local mining purposes. With the completion of a railroad through this portion of the county, which there are good reasons to expect in the very near future, the lumber business will be one of the leading industries.

Bridgeport is the county seat, and is located in a prosperous farming section.

MINING.

Considerable mining for precious metals is carried on, the leading camp being Bodie, from which place over \$35,000,000 in bullion has been shipped in the past. This industry is again prosperous. The introduction of the cyanide process, and the installing of electric power plants on the several streams of the county, thereby furnishing an abundant supply of cheap power, make it possible to work at a profit large bodies of low-grade ore that heretofore were of no value, on account of cost of reduction. Lundy has also produced considerable bullion, also the Golden Gate mine in Antelope Valley. With the bright prospects in the new camp of Masonic, and in the Coldwater Cañon district in the southern end of the county, there will be considerable activity in the mining line.

Capital is being attracted and new developments are being made. Altogether the interests of the county are more prosperous than for years.

The latest report of the United States General Land Office gives the area of vacant land as nearly one and a half million acres, described as grazing, mineral, timber, and agricultural.

GENERAL STATISTICS.

Area, 2,796 square miles, or 1,789,440 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	162,599
Value of country real estate	\$470,674
Of improvements thereon	181,300
Of city and town lots	20,525
Of improvements thereon	93,530
Of personal property	291,326
Total value of all property	1,128,710

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle—Beef	523	\$10,460	Colts	134	\$1,345
Stock	3,404	51,075	Mules	38	715
Cows	267	6,675	Sheep	130	327
Calves	500	2,500	Goats	172	206
Swine	227	480	Poultry (dozen)	156	780
Horses—American	386	11,815	Hay		3,040
Common	618	6,180	Lumber		1,470

Value of grain assessed in storage:

Wheat	\$950
Barley	1,615

School statistics:

Total number of census children, 1904	411
Number of teachers employed	11
Number of school houses	9
Number of school districts	9
Amount expended for public school purposes	\$9,748 95

MONTEREY COUNTY.

Monterey County is situated about 100 miles south of San Francisco, and 500 miles north of Los Angeles, on the Pacific coast. It is 124 miles long and 45 miles wide, its extreme length being from north to south.

Owing to the peculiar topography, with its rough mountains and broad plains, its great river running from south to north with tributaries from either side, its rolling hills and rugged mountains, it is found to be a miniature of the State with its entire diversity of climate and soil, enabling it to yield everything produced in the State, and rendering it one of the most desirable regions for settlement.

Its rivers furnish a never-failing supply of water for irrigation, and the mountains abound in minerals—gold, silver, copper, coal, bitumen, and oil.

The county is divided into three sections—the mountains and hills on the east, mountains and hills on the west, and the great Salinas Valley situated between these ranges of mountains, and opening upon Monterey Bay on the north. This valley extends south from Monterey Bay over 100 miles, and is from 5 to 15 miles wide.

THE EASTERN SECTION.

The Gabilan range of mountains extends down the eastern side. Gabilan Peak, near the northern end of the chain, is 3,381 feet above the level of the sea, and Mount Cholame, 45 miles to the southwest, is 3,800 feet in height. This range extends from the Pajaro River on the north—where the county begins—through its entire length in a southeasterly direction. Going south from Pajaro River, the first twenty miles of the range consists of low hills and small valleys, covered with grass and timber. In this belt, Carneros, Aromas, and Prunedale districts are notable for their beautiful homes and extensive orchards of apples that go largely to supply the shipments from Pajaro. There are also extensive apiaries. All fruits, vegetables, and berries grow to the highest state of perfection. The next forty miles of the range is composed of higher and rougher mountains, which produce an abundance of grass, and are used for grazing stock cattle on a large scale—the more accessible parts for dairying. Southeast of this portion, from the San Lorenzo River to the southern boundary, the mountains are low, rolling hills, interspersed with numerous little valleys, among which are Peach Tree, Cholame, Slack's, Long, Indian, Priest, Parkfield, and several others, all possessing rich soil and delightful climate, fine grain and stock ranches, small orchards and beautiful homes. All have fine schools, and many have nice churches with regular services.

THE WESTERN SECTION.

The Santa Lucia Mountains, on the west side, extend from Monterey Bay in an unbroken line southeast, bordering the coast as far as San

Luis Obispo County. After leaving the bay, for 20 miles they are a rough mass, with an average width of 18 miles, and an elevation of 5,000 feet at the highest point. The Carmel River rises in this range, runs north, and empties into Carmel Bay about 5 miles south of the city of Monterey. It is a beautiful stream, draining the hill country north and east of the northern termination of the Santa Lucia Mountains, and abounds in mountain trout. The valley bordering the river is one of the richest in the State, producing beets, potatoes, berries, vegetables, and fruits, and having three or four of the finest apple orchards in the county. The hills are covered with grass, feeding fine cattle for dairying purposes. Carmel Bay is 4 miles in length, 2 miles in width, and has deep water. In the mountains near its border are deposits of coal. San José Creek rises in the same mountains, runs north and empties into this bay. The Big and Little Sur rivers also rise in this range, flow west and empty into the Pacific Ocean. All these streams are noted for trout-fishing, and their little valleys contain fine farms and stock ranches. Idlewild, on the Sur, is a pleasant summer resort for camping parties. Farther south the mountains are heavily timbered with oak, redwood, and pine, and are used for ranging cattle. Point Lobos juts out into the ocean at the southern extremity of Carmel Bay. Point Sur is about 20 miles farther south, near the mouth of the Sur River. Cypress Point is situated at the northern point of Carmel Bay, and is one of the grandest spots on the coast. The dark cypress trees—from which the point was named—cover the headland and skirt the water's edge, and their seeds have been planted all over the State. About 90 miles south of this point is situated Los Burros district, consisting of several paying quartz and placer mines, gold mining being the principal employment.

Salinas River has its source in San Luis Obispo County, enters Monterey County nearly in the center of its southern border a few miles north of the mission of San Miguel, runs north about 100 miles, and empties into Monterey Bay. It is the third river in length in the State, and its tributaries are the Estrella and San Lorenzo from the east, Arroyo Seco, San Antonio, and Nacimiento from the west. The Arroyo Seco empties into the Salinas about 30 miles southeast of Salinas City. About 20 miles up the stream the valley narrows into a cañon, leading back into the mountains in a southerly direction, and heading far up in the Santa Lucia range. The little valleys are rich, and all cultivated to grain; the mountains are used for grazing. In this cañon are fine indications of oil, the wells sunk showing flattering prospects.

The San Antonio and Nacimiento rivers flow through the upper part of their course in a direction opposite to that of the Salinas, being a southeasterly direction. For more than 30 miles they are nearly parallel, and only 5 or 6 miles apart. The region between consists of high ridges composed of bituminous shales, underlaid by sandstone, in which there are fine prospects for oil; the bitumen also being of superior quality. Where the San Antonio River emerges from the mountain gorge and opens out into the Jolon Valley, is the San Antonio Mission, built by the Mission Fathers, and still in a fair state of preservation. It is one of the most picturesque valleys in the State, with its great, towering oaks, and rich, alluvial soil. This is the finest wheat belt in the county, and deciduous fruit trees produce well.

The olives can not be excelled, and at the old mission still stand trees now two hundred years old. The valley is about 15 miles long, and 3 or 4 miles wide. In the vicinity of Pleyto are some fine orchards. Along the Nacimiento River, south to the border of San Luis Obispo County, are low mountains used for farming and stock-raising, many farms containing fine orchards of deciduous and semi-tropical fruits. There are numerous small valleys, like Sapaque and Hames, which are rich and productive. On the east, the Estrella is a wheat-growing district, with cattle and sheep in the hills. Near the head of the San Lorenzo are great coal deposits which are being worked, and coal shipped to San Francisco. Lower down, the bitumen is of fine quality, and two mines are operated.

The portion of Pajaro Valley lying south of the Pajaro River, and running to Monterey Bay on the southwest, is in Monterey County, and is about 15 miles long, and from 6 to 8 miles wide. The land is exceedingly fertile and under a thorough system of cultivation, producing immense crops of all kinds of vegetables, grain, fruit, and berries. Well-tilled farms greet the eye, and villages, school houses, churches, and picturesque residences dot the landscape in every direction. The foothills are covered with flocks and herds, and the lower ranges are timbered with live oak. The Pajaro River flows southwesterly and finds an outlet in Monterey Bay, near the mouth of the Salinas River.

SALINAS VALLEY.

The great Salinas Valley, embraced by the Gabilan Mountains on the northeast and the Santa Lucia range on the southwest, opens out on Monterey Bay and extends southward 100 miles, with an average width of 10 miles, therefore its area is about 1,000 square miles, or 640,000 acres. It begins to form near San Luis Obispo County, and gradually opens until at Salinas City it is from 12 to 15 miles wide, and is as fine a section for farming as can be found in California. The Salinas River flows through its entire length. The land may be divided into three classes, viz.: First, the heavy, rich bottom lands, which produce almost everything, the soil being sediment and black adobe, which often contains just enough sand to make it work easily. Second, the mesa or table lands, particularly adapted to growing wheat, barley, and other cereals; the average yield of wheat being 30 bushels per acre. Third, the uplands and slightly rolling hills, some of which are the finest fruit lands in California, and will produce oranges, lemons, grapes, peaches, apricots, almonds, walnuts, figs, apples, plums, pears, berries, and all other fruits common to the State.

CULTURAL PRODUCTS.

Nearly all semi-tropical fruits do well in some part of this county, especially in the thermal belt along each side of Salinas Valley. A number of orange and lemon trees in yards of Salinas City hang full of fruit each year and are never injured by frost. Around Salinas, apples, pears, quinces, plums, cherries, and walnuts excel, while all the fruits do well in the valley.

In barley (producing 50 to 100 bushels per acre), beets, and carrots, this valley can not be surpassed; 20,000 acres being in beets alone.

Going south, wheat excels; and grapes, peaches, prunes, apricots, cherries, and almonds grow to perfection in the foothills, cañons, and small valleys, and figs do well in sheltered places.

Olive trees flourish with all the vigor they possess in their native country. Currants, gooseberries, blackberries, Loganberries, and raspberries grow luxuriantly. Strawberries are in the market all the year round, and are shipped from Pajaro by carloads. Grapes grow to perfection everywhere in the county, except in the heavy bottom-lands of the lower Salinas Valley.

Experience gained in the varied climate of the county has brought about a policy of growing the varieties of fruit that long experience and careful trials have demonstrated to be best adapted to any particular locality. Over a large area the apple has been selected as the leading fruit. The English walnut, while an infant industry, has been proven to be equal in quality to any in the State. Apricots on the mesa or table lands of the Salinas Valley can not be excelled, and the Moorpark is a steady bearer. Almonds and prunes are equally prolific in the same locality, and peaches in the southern part of the county. The lower Salinas and Pajaro valleys are particularly adapted to potatoes, beets, apples, and berries.

As to potato-raising, the Salinas Valley has not its equal; here is the home of the famous Salinas Burbanks that are in such great demand all through the northwest, and thousands of sacks are shipped to the Philippine Islands. As high as four hundred bushels to the acre have been raised near Salinas, and last year the average price paid was \$1.35 per hundred pounds, making the same an exceedingly profitable crop. Acreage in potatoes, 2,000.

DAIRYING.

Dairying is a very prominent, if not a leading industry, most of the dairies being devoted to butter-making. Some of the finest dairies in the State are in Monterey County, and some of the best butter in the State is made here. A number of years ago one person owned a dairy of 1,500 cows, which was probably one of the largest in the world. At the present time there are a number of dairies of 300 to 500 cows. And be it said to the credit of the dairymen of Monterey, their stock is equal to any in the West. They have the latest and best improved machinery, and have found their business very profitable, during the past two years especially. Seventy-six dairies now average 200 cows. Twenty thousand head of beef cattle are shipped to market outside of the county annually.

IRRIGATION.

Extensive work has been done in the last few years in bringing the valley under a thorough system of irrigation. Near San Lucas there is some irrigation; a canal near King City, taken from Salinas River, distributes water to several thousand acres. Another, from Arroyo Seco, covers several thousand acres, and is 12 miles long. Opposite Soledad, on the south side of Salinas River, considerable irrigation is done around Fort Romie on lands purchased by the Salvation Army, and sold on most favorable terms to worthy poor in need of homes. This is one of the most prosperous colonies in America. At Soledad is another canal, leading to Gonzales, which covers several thousand

acres of fine land. Around the Spreckels sugar factory, 4 miles from Salinas City, a great deal of land has been irrigated for raising beets. This is the largest beet-sugar factory in the world, with an output of over 60,000 tons during the season of five months, slicing 3,000 tons of beets daily and producing 450 tons of sugar daily, raw and refined. It employs, during the manufacturing season, 700 men in the factory alone, to say nothing of the hundreds employed on the outside, hauling, topping, etc. It requires 30,000 acres of land, planted to beets each year, to supply this factory.

The main transcontinental line of the Southern Pacific Railroad enters this county through Pajaro Valley on the north, and runs south-east through its entire length, paralleling Pajaro and Salinas rivers.

CITIES AND TOWNS.

Pajaro, the first town of any importance after entering the county, is the great shipping point for apples, berries, all fruits, and dairy products of its section.

Hotel Del Monte, "the queen of American watering-places," including the main structure and two annexes, together with the connecting wings, is simply immense, and everything connected with the establishment is on the same magnificent scale. The grandeur of the hotel is repeated in the grounds, which cover 140 acres laid out in lawns, flower-beds, parks, and groves, and the landscape gardening is a marvel of beauty.

A little farther on is Monterey, situated on the beach of Monterey Bay, lying back on her sloping hills, and overlooking the placid waters of the bay—one of the grandest and most beautiful townsites nature ever formed.

Two miles farther on is Pacific Grove. Nestled among the pines is this little town of 2,000 inhabitants, with beautiful streets, magnificent cottages, fine churches and school houses, charming drives, and with never a saloon in its sacred limits.

The harbor of Monterey Bay is second in importance on the coast. The largest battleships of our navy find anchorage within 100 feet of the shore, and during heavy storms at sea it is not unusual to see many ships of different nations anchored in the calm waters of the bay. The fishing is incomparable for quantity and variety, and a cannery is located at Monterey. There is an abalone canning factory located at Point Lobos, and one at Point Sur. Monterey Bay contains about one hundred and fifty species of food fish, and many are annually taken for market. There is a whaling company at Monterey, and some seasons many whales are captured.

Salinas City, the county seat, with 4,000 inhabitants, is in the heart of the best portion of Salinas Valley, the head of the first division of the railroad, near the Spreckels sugar factory, and containing extensive gas and water works, a large flouring mill turning out 600 barrels of flour daily, a large creamery, a planing mill, and shops, three banks, many churches, and four school houses, with about 700 pupils and 17 teachers. The high school is on the accredited list. There are many magnificent residences and well-improved streets. Fraternal societies are well represented.

Soledad, named for Soledad Mission, is in another wheat belt, and is

an important shipping point for grain and dairy products. It is the nearest point to Paraiso Springs, whose waters contain medicinal properties of a high order. This place is highly improved, and is called the Carlsbad of America.

The narrow-gauge railroad from Pajaro to Salinas parallels the main line on the west, taps Monterey Bay at Moss Landing—where there are extensive warehouses and lumber yards, and where the coast vessels stop regularly for grain and merchandise—then continues to Spreckels's sugar factory, and is used principally for hauling beets to the factory and limerock from the quarries, though considerable grain is also shipped by it from the region west of Salinas.

GENERAL STATISTICS.

Area, 3,450 square miles, or 2,208,000 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	1,422,930
Value of country real estate	\$10,633,045
Of improvements thereon	1,587,360
Of city and town lots	1,549,475
Of improvements thereon	1,289,030
Of personal property	2,175,540
Total value of all property	19,446,048

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle—Beef	420	\$12,600	Colts	192	\$1,920
Stock	8,556	128,340	Mules	120	2,400
Cows	7,465	186,625	Sheep	12,200	24,400
Calves	8,040	64,320	Lambs	500	500
Oxen	10	180	Goats—Angora	400	1,600
Swine	4,020	8,040	Common	1,200	2,400
Horses—Thoroughbred	6	1,500	Poultry (dozen)	3,100	9,300
Standard-bred	110	11,000	Hay	—	18,720
American	1,240	37,200	Wool	—	55
Common	7,218	180,450	Lumber	—	31,780

Number of acres sown for crop of 1904:

Wheat	67,200
Oats	14,120
Barley	42,000
Corn	230
Hay	24,060
Sugar beets	10,120

Acres of bearing grape vines growing in spring of 1904:

Table	320
Wine	280

Number of fruit trees growing in spring of 1904:

	Bearing.	Non-Bearing.		Bearing.	Non-Bearing.
Apple	42,200	21,000	Peach	6,500	3,600
Apricot	19,200	3,400	Pear	4,000	1,000
Cherry	1,100	200	Prune	8,760	—
Olive	450	100			

Value of grain assessed in storage:

Wheat	\$220,140
Oats	70,080
Barley	130,280
Corn	960

School statistics:

Total number of census children, 1904	5,284
Number of teachers employed	140
Number of school houses	106
Number of school districts	94
Amount expended for public school purposes	\$90,034 11

NAPA COUNTY.

BY NAPA CHAMBER OF COMMERCE.

Napa County lies in a northeasterly direction from San Francisco, its county seat, Napa, being about 40 miles from San Francisco and about 70 miles southwesterly from Sacramento. Though one of the smallest, it is one of the most important counties of the State, on account of its proximity to the great market of San Francisco, with which it has several lines of rail and water communication, the variety and wealth of its agricultural, mineral and manufactured products, the fertility of its soil, the salubrity of its climate, and the excellence of its educational facilities. The length is about 50 miles, and its width varies from 30 to 35 miles.

TOPOGRAPHY.

Spurs of the Coast Range Mountains having a northwesterly trend divide the county into several valleys and afford a variety of scenery of unsurpassed beauty. The western boundary runs for its entire length, from San Pablo Bay to Mount St. Helena, along the top of one of these ridges. The only valley of importance intersecting the slope of this western range is Brown's Valley, a productive glen that lies west of Napa City and contains many pretty suburban homes. East of this range, extending for almost the entire length of the county, lies the beautiful Napa Valley, varying in width from 1 to 5 miles, and opening at its lower end into a wide, fanlike expanse of tule land. Mount St. Helena, at the head of this valley, rears its summit nearly 4,500 feet above the level of the sea. The valley is watered by numerous streams that flow from the mountains and find their way into Napa River, which flows the entire length of the valley, and is navigable for steamers and sailing craft as far as Napa City.

The northeastern half of the county is broken by ranges of high mountains into several valleys, of which Berryessa, the most easterly, is the largest. It contains an area of about 40,000 acres and is drained by Putah Creek, which flows through Yolo County and into the Sacramento River. The Blue Ridge Mountains form its eastern boundary. In the range of mountains bordering Napa Valley on the east are some high peaks, such as Bald Peak (Mount George), Atlas Peak, Howell Mountain, etc., ranging in height from 2,000 to 3,000 feet. Over the Howell Mountain grade, to the east of Napa Valley, lie the broad and fertile fields of Pope Valley, and over a low divide to the south of Pope is Chiles Valley. A high range of mountains on the eastern side of Pope and Chiles valleys separates them from Berryessa Valley. Off the road from Napa to Berryessa are the smaller valleys of Wooden, Gordon, and Capell.

The rainfall averages so well that a shortage of crops is unknown. The influence of the ocean breeze is felt during the summer to an

extent amply sufficient to temper the sun's heat, while the hills act as a barrier against the fogs. The foothills are especially famed for their climatic features, and here are some of the most noted health resorts in the State.

SOIL.

The soil may be divided into five classes. The first class, termed argillaceous, is common to the mountains on the east side of the county, and is not very productive. In Berryessa and Chiles valleys there is a large percentage of this soil mixed with a rich loam, adapting these sections to grain-growing. The second class, adobe, does not exist to any great extent, and is found only in spots in Berryessa, Pope, Chiles, and Brown's valleys. It is a stiff, cold, and disagreeable



CURING FRUIT ON TRAYS IN AN OPEN FIELD.

soil, not easily worked, but yields excellent crops under proper conditions and manipulation. The best soil is the loam, which may be found in all the valleys, but principally in Napa. It is a rich alluvium, well adapted to all sorts of vegetable growth, and especially suited to fruit. Tule soil is found from Napa City southward, and along the margin of the bay. The last class is lava, a decomposed volcanic formation, and is excellent for vineyards. It is found in the vicinity of Howell Mountain.

HORTICULTURAL AND VITICULTURAL INTERESTS.

As the climate of Napa Valley corresponds strikingly in its main features to that of the south of France, grape-growing, wine-making, and horticulture are followed with great success. The olive, which requires a temperate climate, and dreads equally excessive hot or cold weather, thrives remarkably, and has been largely planted on stony hillsides that would be almost useless for other fruits. The

oil and pickled olives manufactured are not excelled by any other domestic or imported product.



WALNUT DRIVE.

Entrance to the celebrated "To-Kalon Vineyard," one of the largest resistant vineyards in California—property of E. W. Churchill of Napa.

Napa County at one time led the State in the amount of wine produced, but the ravages of the phylloxera caused the death of many of the finest vineyards, and curtailed the production of grapes. Some of

these vineyards have been re-planted with resistant vines, and thus the output of wine is increasing.

The raising and curing of French prunes has been brought to the highest state of excellence in Napa Valley, the prunes raised in this section finding always a ready market at the highest prices. Cherries and peaches are always successful crops, and walnuts, almonds, apricots, pears, and apples thrive in all sections. While Napa County makes no claims to general adaptability to the culture of citrus fruits, there are few orchards that do not contain a number of orange and lemon trees to provide for the use of the family and for local sale. The output is uniformly of fine quality. Berries of all kinds thrive, and form a very material part of the produce.

CEREAL PRODUCTS.

Diversified farming is carried on on a large and profitable scale, the nature of the crops raised depending upon the character of the soil. The hay crop is generally large, and, being near to market, finds a profitable sale. Wheat, oats, barley, and corn are raised on a large scale, particularly in the eastern valleys. Potatoes, asparagus—in fact, vegetables of all kinds—do well. All the crops are raised without irrigation, the rainfall being ample, even in the driest years, to insure a good crop.

DAIRYING—STOCK-RAISING.

More and more attention is being paid, year after year, to dairying and stock-raising, and also to poultry-raising. The fact that California does not nearly supply its own markets with butter, eggs, and poultry insures a steady and growing demand for these products, while the rapid division of the great stock-raising ranches of the West into small farms devoted to more intensive forms of husbandry naturally limits the area devoted to stock-raising, and makes it correspondingly more remunerative.

Napa County has always been noted for the fine horses that its farms produce. The most complete establishment devoted exclusively to the breeding of thoroughbred horses, The Napa Stock Farm, has several high-class imported stallions, and over sixty thoroughbred mares.

MINERAL RESOURCES.

Quicksilver, magnesite, mineral waters, and building stone are produced in large quantities.

PRINCIPAL TOWNS.

Napa City is situated at the head of navigation, on Napa River. It is chiefly interested in the manufacture of leather and leather goods. There are two tanneries, a glove factory, a shoe factory, a woolen mill, and many other industries. It has excellent streets and buildings, fine schools and numerous churches. The State Hospital is located a short distance from the city. At Yountville, 9 miles from Napa, is the State Home for Volunteer Soldiers, where nearly 1,000 veterans are accommodated.

St. Helena, farther up the valley, is the second town in size, and is chiefly devoted to the wine-making industry. It is also the business center for Pope Valley. Here is situated the St. Helena Sanatorium and the health-food factory.

Napa County is famous for the excellence of its roads and the size and number of its stone bridges. All the main county roads are sprinkled in the summer, and rural delivery routes carry the daily mail to the doors of the country people.

GENERAL STATISTICS.

Area, 800 square miles, or 512,000 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	417,987
Value of country real estate	\$4,925,520
Of improvements thereon	2,498,470
Of city and town lots	1,096,445
Of improvements thereon	1,818,520
Of personal property	2,177,630
Total value of all property	13,516,150

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle—Beef	550	\$22,000	Mules	350	\$14,000
Stock	7,200	144,000	Sheep	4,250	10,625
Thoroughbred	205	16,400	Lambs	—	1,150
Cows	6,550	163,750	Goats	—	200
Calves	4,450	44,500	Poultry	—	9,500
Horses—Thoroughbred	165	41,250	Hay	—	7,650
American	4,350	174,000	Wool	—	1,650
Common	—	126,000	Lumber	—	28,900
Colts	1,250	24,100			

Number of acres sown for crop of 1904:

Wheat	2,200
Oats	3,960
Barley	4,350
Corn	3,960
Hay	8,875

Acres of grape vines growing in spring of 1904:

	Bearing.	Non-Bearing.
Wine	5,000	2,000

Number of fruit trees growing in spring of 1904:

	Bearing.	Non-Bearing.		Bearing.	Non-Bearing.
Apple	49,600	12,200	Prune (French)	125,840	56,400
Apricot	13,500	2,000	Prune (other kinds)	34,000	1,850
Cherry	23,650	8,600	Lemon	450	180
Fig	1,650	200	Orange	3,385	260
Olive	52,000	1,200	Almond	45,860	9,680
Peach	97,650	12,670	Walnut	9,560	2,150
Pear	58,260	2,250			

Value of grain assessed in storage:

Wheat	\$1,910
Oats	2,160
Barley	1,200
Corn	2,260

School statistics:

Total number of census children, 1904	3,449
Number of teachers employed	89
Number of school houses	57
Number of school districts	52
Amount expended for public school purposes	\$59,245 24

NEVADA COUNTY.

Nevada County extends from the summit of the Sierra Nevada range, on the east line of the State, westward to the Sacramento Valley, a distance of 70 miles. It is from 12 to 20 miles in width. On its western line it has an elevation of about 1,000 feet, increasing to 2,000 or 3,000 feet in the central portion, and 8,000 feet along its eastern boundary. Its natural boundaries are the South Yuba and Bear rivers on the south, and the Middle Yuba River on the north. The general course of these rivers is from northeast to southwest, and through the northern and central portions the county is partly divided by the South Yuba River, which unites with the Middle Yuba, near the western boundary, and forms the main river, which is a tributary of the Feather.

The western and middle portions present a pleasing variety of landscapes in wooded hills, small valleys, or rolling uplands, a large part of which is well adapted to agriculture and grazing, and to orchards and vineyards. Along the extreme western boundary citrus fruits grow to perfection, as do the olive and other sub-tropical fruits; through the central portion, at an altitude of 2,500 feet, the Bartlett pear and other fruits of the temperate zone reach their best development in flavor; while at an altitude of 3,500 feet and 400 feet farther up the mountain slopes, the apple attains a superiority unequalled by any raised at lower elevations.

The variety in soil, the difference in temperature, and accessibility are encouragements to fruit and vineyard culture that are making a valuable and profitable production.

The elevation above the lowlands of the Sacramento Valley lifts Nevada County beyond malarial influences, and its middle and mountain sections are inviting to those seeking health and recreation. The temperature is comparatively mild the year round.

The rainfall for the season is not often excessive, the average annual precipitation being about 50 inches; but there are exceptional years in which there is a variation of 8 or 10 inches above or below this estimate. These figures vary with the altitude, the precipitation on the higher lands and mountains being much heavier than in the valley region. The annual rainfall makes the failure of crops an impossibility, and insures generous harvests.

WATER SUPPLY.

The abundance of rain and the melting of snow in the mountains afford an adequate supply of water for the canals and artificial reservoirs, that can be used for either mining or irrigation, and for the latter the demand is steadily increasing for clover and grass lands and orchards. The soil of Nevada County, with proper cultivation, is capable of producing cereals and fruits without the aid of irrigation.

Wherever irrigation has been used, crops of every character have been raised in remarkable abundance. There is plenty of water stored in artificial reservoirs along the summit of the mountains. Originally these artificial lakes and expensive ditches were constructed to supply hydraulic mines.

FRUIT CULTURE.

Nevada County holds a prominent position among the fruit-growing counties, and with her great variety of soil, climate, and altitudes seems well adapted to nearly all varieties of fruit. Orchards of fruit and nut-bearing trees, and vineyards of the choicest table, raisin, and wine grapes are specialties. While California, as a whole, beats the world in this direction, these foothills equal any other part of the State in the quality, and in some things, as pears and winter apples, excel for special adaptation and regular productiveness. Within the past few years hundreds of acres have been planted in fruit trees and vineyards, which thrive well. Wine made from grapes grown on Nevada's foothills has an enviable reputation.

The abundant rainfall is especially propitious for the growth of the Bartlett pear, which here reaches perfection. This fruit finds a ready market in the Eastern States, and brings good prices.

Oranges grow well. In at least half of the circuit—in all that part below the bench upon which Grass Valley is situated, in the lands 1,000 to 1,600 feet above sea-level, the thermal belt of the foothills—the citrus fruits are at home.

Any kind of fruit adapted to the temperate zones flourishes. The olive, fig, prune, and all kinds of berries do well.

The principal fruit sections are Chicago Park, Grass Valley, Nevada City, San Jaun, French Corral, Rough and Ready, and Anthony House. The chief fruits grown in these sections are apples, pears, peaches, plums, cherries, grapes, and nuts, and the contiguous country is fast being converted into orchards and vineyards.

MINERAL WEALTH—OTHER INDUSTRIES.

Nevada County is the banner gold-producing county, having the largest hydraulic mines in the world and a number of quartz mills running forty stamps. An electric railroad is in operation between Grass Valley and Nevada City, being a broad gauge with seventy-pound rails, and the very latest style of cars. This line is supplied with power from the Bay Counties Power Company, whose plant is situated on the Middle Yuba River, which is the dividing line between Nevada and Yuba counties. This plant has a capacity of 17,000 horsepower, and supplies eighteen counties. The Truckee River General Electric Company, situate in the western part of the county, supplies the mines of Virginia City with power.

The second largest paper mill in the United States is at Floriston, on the Truckee River, and gives employment to some four hundred men, women, and children. The pulp used is manufactured from the forests of the immediate neighborhood.

One of the great industries is that of lumbering. From the earliest times the woodman's ax has been heard reverberating through these

hills, and the mines have furnished a splendid market for this product. The mountains are thick with sugar and yellow pine, fir, spruce, and cedar. The Truckee basin yields about 50,000,000 feet of lumber yearly through the mills of Truckee. The lumber industry is principally in and around Nevada City, Grass Valley, and Truckee, and there are large sawmills that annually turn out millions of feet. At present the scene of greatest activity in this industry is in the vicinity of Truckee, where large sawmills, door, sash and box factories are located. The town of Overton has one of the largest box factories and sawmills in the State, and is connected by railroad with Truckee. The finer quality of lumber, sugar and yellow pine, brings high prices, and much of it is shipped all over the United States. The business is a profitable one and gives employment to a large number of men.

Much stock is raised and fine butter made in the high altitudes of the Sierras in summer, with every advantage of clear, pure water, cool weather, and abundant nutritious grasses. One of the best-known creameries in the State is situated in Penn Valley, and the dairy industry is growing in importance.

LAND VALUES.

Settlers of limited means can procure farming lands of a variety of soil, for from \$5 to \$20 per acre. The low, level lands carry a very deep soil and are especially well adapted to the cultivation of vegetables, alfalfa and clover, while on the verdant rolling hills fruits thrive to perfection. Thousands of acres of such lands are now used for pasture, which only need to be cleared of brush and cultivated to equal any producing lands in the State. Water can be had for irrigation at reasonable prices. Where land is irrigated, three crops of alfalfa can be raised each season. This would result in a yield of two to three tons per acre for each crop, and the same finds a ready market at home for \$17 per ton. There are thousands of acres of timber lands of all kinds that can be had at from \$20 to \$50 per acre. Excellent wood lands can be had at from \$6 to \$20 per acre.

EDUCATIONAL AND RELIGIOUS.

Nevada County is well equipped with schools and churches. The public schools rank with the best. There are fifty-two districts, which maintain primary and grammar schools. In Grass Valley, Nevada City, and Truckee are located high schools, which are accredited to the State University. Thus, pupils from these schools enter direct to the highest institution of learning in the State. Of the private educational institutions, Mount St. Mary's Academy is by far the largest. It has a corps of 12 instructors and nearly 200 pupils. Its graduates are found all over the country. Grass Valley also has a business college of high standard of instruction. Throughout the county, particularly in Grass Valley, Nevada City, and Truckee, are edifices. These represent all the creeds and denominations usually found in a civilized community.

TOWNS.

The principal towns are Grass Valley, Nevada City, and Truckee. Nevada City is the county seat, and Grass Valley is the largest mining town in the State. They are 4 miles apart. All these towns are provided with modern systems of lighting and sewerage; have paved streets, and a pure and wholesome water supply. Grass Valley and Nevada City each support two banking institutions. At Nevada City is the courthouse, a fine building that cost over \$100,000; and also a public library and reading-room. Grass Valley has an auditorium costing \$35,000.

RAILROADS.

The Central Pacific Railroad enters the county east of Truckee and runs thence westward, close to its south boundary, for a distance of 60 miles to Colfax, below Cape Horn. Colfax is the south terminus of the Nevada County Narrow Gauge Railroad. This makes four trips daily between Colfax and Nevada City via Grass Valley. Grass Valley and Nevada City, but four miles apart, are also connected by an electric railroad making hourly trips. At Truckee the Lake Tahoe Railroad makes daily trips to Lake Tahoe, one of the scenic wonders of the State. Boca is the south terminus of the Boca and Loyalton Railroad.

GENERAL STATISTICS.

Area, 958 square miles, or 613,120 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	483,762
Value of country real estate	\$2,364,235
Of improvements thereon	1,414,525
Of city and town lots	401,170
Of improvements thereon	1,272,030
Of personal property	1,025,980
Total value of all property	7,261,700

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle—Beef	38	\$560	Swine	280	\$1,400
Stock	3,150	37,700	Colts	108	1,230
Cows—Graded	190	4,750	Mules	44	795
Common	1,469	29,380	Sheep	6,765	13,530
Calves	1,193	5,965	Goats	225	225
Oxen	7	140	Poultry	---	1,190
Horses—American	246	1,285	Hay	---	335
Common	1,527	36,485	Lumber	---	50,400

Acres of bearing grape vines growing in spring of 1904:

Table	230
Wine	300

Number of bearing fruit trees growing in spring of 1904:

Apple	16,300	Pear	23,200
Apricot	2,400	Prune (French)	1,300
Cherry	1,200	Lemon	180
Fig	380	Orange	320
Olive	400	Almond	380
Peach	6,500	Walnut	425

School statistics:

Total number of census children, 1904	3,463
Number of teachers employed	86
Number of school houses	54
Number of school districts	43
Amount expended for public school purposes	\$63,623 25

ORANGE COUNTY.

Orange County is one of the youngest counties, having been organized in 1889 from a portion of Los Angeles County. Its area is divided into mountains, 65; foothills, 150, and valleys, 550 square miles.

The Santa Ana range of mountains is the line between Orange and San Bernardino counties at the northeast corner of the former county. It is also the dividing line between Orange and San Diego counties on the east. This range also sends up a line of foothills westwardly along the seashore nearly half way across the county. All of the western portion of the county is included in the Santa Ana plain, or valley. There are also several small valleys among the foothills and along the mountain streams. The Santa Ana plain is covered with rich loam, and, with the exception of some patches of alkali, is very productive. The highest point of land is what is locally known as Saddleback, or Santa Ana Peak, with an elevation of 5,675 feet.

WATER SUPPLY.

There is an abundant water supply. The Santa Ana River enters near the northeast corner, and traverses the entire Santa Ana plain, flowing into Newport Bay. Besides this stream there is Santiago Creek; also Aliso, Trabuco, Mission Vieja, San Juan, and Coyote creeks, and other streams. The last-named creek forms the boundary between Orange and Los Angeles counties on the west. The artesian belt running through Orange County furnishes a plentiful and cheap water supply, and makes the section as nearly independent of rainfall as it is possible to be. Much artesian water has been developed: more in the artesian belt west of the river than in any other portion. There hundreds of artesian wells have been sunk, and the farmers have installed pumping plants and organized irrigation districts.

SOIL.

In the foothills a sharp, gravelly loam of a reddish color prevails. Descending into the valleys, this loam loses its color and its sharpness and becomes black, with a large admixture of adobe and frequent streaks of alkali. Beginning about one mile west of Santa Ana is a deposit of alkali. Here is a strip about ten miles long, which will average something like a mile in width, and on the west side of the Santa Ana River patches of this mineral may be found impregnating the soil in the vicinity of Westminster and Garden Grove. West of the Santa Ana River large deposits of peat are found, the product of tule roots and other swamp vegetation. This varies in depth from a few inches to sixteen feet. This land is considered the best for agricultural purposes, and is held at a high figure.

FRUIT CULTURE.

All the fruits do well. Many varieties of oranges and several of lemons are grown, taking their names generally from the party introducing them, the country from which brought, or a peculiar marking. The Mediterranean Sweet, Washington Navel, Valencia, Kohna, and Mission, or Seedling, are the varieties generally preferred. Of lemons, the Genoa, Eureka, and Lisbon may be named. Oranges are shipped from the last of December until June, and the bulk in March and April.

There are some portions where apples are grown which vie with those of the Eastern States or Oregon, in size, flavor, and appearance. It was only during the past few years that much fruit besides oranges and grapes was grown. Now, however, large orchards are annually being planted to almost every known variety.

The principal fruit sections are Westminster, Garden Grove, Anaheim, Orange, Santa Ana, Fullerton, Placentia, and Tustin, and apricots, peaches, apples, oranges, lemons, figs, prunes, and walnuts do well, apricots especially holding front rank, with walnuts in the second place.

The larger amount of the fruit produced finds a market in the East, the citrus fruits and walnuts being shipped entirely out of the county. The deciduous fruits are very largely disposed of to the drying establishments and packing-houses, and by them shipped both dry and green to Eastern States.

AGRICULTURE.

The acreage in Orange County is 30,000 to 40,000 of barley, 12,000 to 15,000 of wheat, 4,000 to 5,000 of corn, about 3,000 of oats, 5,000 of beans, and 10,000 of hay. Much of the barley is exported for brewing purposes, and some 2,000 carloads of grain are shipped out in years of average yield, besides 200 to 400 carloads of hay.

The rich bottom lands yield immense crops of corn, and large portions grow the finest alfalfa and natural grasses.

The mesa, or uplands, are of the finest quality, and admirably adapted to barley, oats, wheat, flax, hemp, and the vine, as well as all the ordinary northern fruits.

Every character of soil that is found in California can be duplicated in these lands, and every product grown in the semi-tropics can be successfully raised.

VEGETABLES.

The celery industry has grown so that the present season finds about 3,000 acres in celery, and the output is expected to amount to somewhere in the neighborhood of 1,500 cars.

While celery-growing is occupying much attention, other sources of income are not neglected, and of these the most important are the dairy interests and the rearing of cattle and hogs. The exact figures are not available, but it may be safely asserted that cattle-raising and dairying are a close second to celery-growing, and the rearing of hogs is not far behind either.

The shipping of vegetables, consisting of early onions, potatoes, cauliflower, cabbage, etc., is a growing and profitable business. There are shipped to Eastern points about 150 carloads each year.

The sugar-beet is raised extensively, and a factory is located at Los Alamitos. This factory runs four months, and consumes the product of over four thousand acres, turning out millions of pounds of sugar ready for table use. The big sugar factories at Chino and Oxnard draw extensively from the soil of this county, thousands of tons of beets being shipped to these places from the vicinities of Anaheim, Buena Park, Garden Grove, Westminster, and Bolsa every year.

MANUFACTURES.

The Buena Park condensed milk factory consumes 24,000 pounds of milk per day, furnishes employment to forty men and women, and pays out \$14,000 each month to the farmers for their milk and to the factory employes.

The flouring-mill at Olive has had to work day and night during the greater portion of the year to keep up with its orders. Besides consuming the wheat product of the Santa Ana Valley, this mill draws heavily from San Diego, Riverside, San Bernardino, and Los Angeles counties.

The three canneries turn out large packs, and besides this many of the large fruit-growers dry their own product and ship it in car-load lots to the Eastern market.

PETROLEUM.

No business has developed more rapidly than the oil industry. North and east of Fullerton thousands of dollars have been expended in sinking wells, several of which have turned out to be gushers. The oil product is at least 60,000 barrels per month, and new wells are being sunk.

PRINCIPAL TOWNS.

The population of Orange County is over 20,000. Santa Ana is the county seat, with a population of 5,000. Anaheim is next in size, Orange following. Tustin is a charming suburb of Santa Ana, with splendid orchards, attractive homes and people of refinement; Fullerton is a place of much business and the headquarters of the oil industry of that section; El Toro is made up in large measure of English settlers of wealth and progressive ideas; San Juan Capistrano, in the extreme south, is the seat of one of the largest and most interesting old missions.

GENERAL STATISTICS.

Area, 780 square miles, or 499,200 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed.....	445,711
Value of country real estate	\$6,072,305
Of improvements thereon.....	1,198,300
Of city and town lots	2,265,135
Of improvements thereon.....	1,674,190
Of personal property.....	1,709,205
Total value of all property.....	14,431,453

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle—Beef	420	\$6,300	Swine	2,140	\$6,420
Stock	6,110	61,100	Colts	1,750	21,875
Cows—American	2,080	52,000	Mules	560	22,400
Common	4,416	88,320	Sheep	39,750	79,500
Calves	2,705	18,935	Lambs	10,500	5,250
Horses—Thoroughbred	14	2,800	Poultry (dozen)	12,680	31,700
Standard-bred	22	5,500	Hay	—	10,500
American	1,560	62,400	Lumber	—	15,680
Common	3,210	80,250			

Number of acres sown for crop of 1904:

Wheat	18,500
Oats	1,200
Barley	37,500
Corn	3,500
Hay	20,000
Sugar beets	3,500

Acres of grape vines growing in spring of 1904:

	Bearing.	Non-Bearing.
Raisin	250	150
Wine	750	—

Number of fruit trees growing in spring of 1904:

	Bearing.	Non-Bearing.		Bearing.	Non-Bearing.
Apple	9,715	3,700	Pear	3,280	1,560
Apricot	115,420	45,060	Prune (French)	20,450	5,820
Fig	2,200	—	Lemon	35,605	45,610
Olive	19,115	—	Orange	422,180	94,785
Peach	18,910	23,585	Walnut	113,850	70,190

Value of grain assessed in storage:

Wheat	\$9,360
Oats	600
Barley	48,125
Corn	240

School statistics:

Total number of census children, 1904	6,800
Number of teachers employed	154
Number of school houses	59
Number of school districts	43
Amount expended for public school purposes	\$116,688 37

PLACER COUNTY.

Placer County lies between latitude $38^{\circ} 70'$ and $39^{\circ} 30'$. Its direction is northeast and southwest. It is about 100 miles long and of varying widths, from 10 to 30 miles, the course and distance being defined by the course of the rivers which mark its boundaries. It extends from about 8 miles from the Sacramento River to the summit of the Sierra Nevada Mountains. Just above Auburn, between the Bear and American rivers, the county is very narrow, being but about 8 miles across. Above Auburn it widens out into the two divides lying between the Bear River and the Middle Fork of the American River. These are known as the Dutch Flat or Railroad Divide, and the Forest Hill Divide. The southwestern portion is more regular in shape than the part just described. This section contains the foothill and agricultural lands. Its shape is nearly a parallelogram, the southwest two thirds being on the plain proper, and the northeast one third being the foothill and fruit district.

TOPOGRAPHY.

Of the area, 810 square miles are mountainous, 450 foothills, and the remainder valleys. The entire extent faces toward the west, extending from an altitude of some 40 feet on the plains in the western portion to over 7,000 feet at its eastern boundary line, embracing nearly every variety of climate known in the State. At the eastern boundary, separating it from the State of Nevada, is Lake Tahoe, one of the most picturesque lakes in America. The topography of Placer County is as irregular as is its shape. Imagine the whole Atlantic Coast from Labrador to Tallahassee incorporated into one county, and one will have a fair idea of what may be found in Placer, exaggerated as to size, but not as to the great variety of climate, elevations, soils, and resources. As to the latter, the whole Atlantic seaboard can hardly equal the endless variety to be found within the borders of this county, which rivals Florida in the quality of its oranges, excels New Jersey in peaches, equals the New England States in its granite quarries, and compares favorably with Maine in the quality of its lumber.

From an elevation of about 2,500 feet up to the summit of the mountains snow falls in the winter, light at the lower edge of the line, and increasing in depth as it ascends the Sierras. Here is a strip of territory from the snow line up to an elevation of 3,000 feet, where the snowfall is not greater than in New England, and where the winter temperature is much higher. It is particularly well adapted to the apple, the pear, and a great variety of vegetables.

SOIL.

The soil of the western or valley portion, around Roseville, Lincoln, and Sheridan, is of the same general alluvial composition as all the soil in the Sacramento Valley, and is well adapted to the growth of grain. Over 30,000 acres are annually devoted to wheat, barley, oats, and hay. The low foothills back of Lincoln are excellent for the grape, and many new vineyards are springing up in that locality. They produce table and wine grapes, and raisins of superior quality.

The soil of the valley lands is mostly a red loam, mixed with considerable clay in spots; that of the foothills is a gravelly red loam, in places light and sandy, and is excellent for the production of fruits. Farther up the soil changes to a red character, with a slate bedrock. This, too, is very fertile. The agricultural region includes the valley and foothill lands all the way from the western boundary to an elevation above Colfax. The foothills everywhere possess a soil which only needs cultivation. The granite soils around Newcastle are composed largely of clay, sand, soda, potash, lime, phosphorus, iron, and magnesia. The constant decomposition that is going on appears to be of nearly endless duration, and of such a nature as to render the soil almost inexhaustible. Artificial fertilization is entirely unnecessary.

For an irrigation water supply Placer has three sources—the Yuba, Bear, and American rivers. Including its branches, the Bear River irrigation ditch is 200 miles in length. This system has been increased in its capacity and brings water from the Yuba River, so that an abundance is assured. There are several other canals, originally built for mining but now used for irrigation.

FRUIT CULTURE.

Placer County holds a foremost position among the fruit producers, and it is the most easterly of the counties of California. With the Central Pacific Railroad running the entire length of her territory, she is one day nearer the Eastern market than any other part of the State, a very large item in the shipping of green fruit. In her thermal belt fruit ripens earlier than in most other places in the State, another large advantage. There is hardly any fruit in the entire range of production that will not grow in some portion. Pears, plums, prunes, apples, apricots, cherries, persimmons, pomegranates, quinces, and figs all do well. Peaches have been grown for the past twenty-five years, and failure of a crop is unknown. Fine oranges are produced, and Placer holds a position beside Butte in the northern citrus belt. In the production of small fruits, berries, and table grapes, Placer holds a foremost place.

The chief fruit section, and the fruits to which they are especially suited, are: Loomis, peaches, figs, and grapes; Penryn, peaches, pears, plums, and grapes; Newcastle, peaches, pears, plums, cherries, and grapes; Auburn, pears, grapes, and peaches; Colfax, pears and grapes.

The largest cherry trees in the world are at the ranch of Robert Hector, from one of which has been picked as high as 3,000 pounds in one season. At the Pan-American Exposition, Placer carried off

the gold medal for peaches, oranges, and grapes. An exhibit of fifty oranges averaged twenty-four ounces in weight.

A lemon that was on exhibition at the Sacramento Chamber of Commerce measured 22 inches in circumference the small way, and weighed three and a half pounds.

Olive-growing is a profitable industry. The principal orchards are provided with manufacturing plants and are producing a very fine quality of oil. The first prize for olive-oil was awarded to Placer County at the Chicago World's Fair. In addition to oil, large quantities of pickled ripe olives are shipped, the demand for which largely exceeds the supply. Land suitable for olive culture can be bought for from \$15 to \$50 an acre. The trees begin to bear in about four years, and they will thrive without irrigation, provided the orchard is extensively cultivated.

DIVERSIFIED FARMING.

Diversified farming is practiced very generally. Wheat, barley, oats, alfalfa, and hay are raised in considerable quantities, there being close to 60,000 acres devoted to their production.

Dairying and stock and poultry raising are also extensive industries. Butter-making is carried on in the summer, the mountain ranges providing plenty of natural feed; the butter is of a very fine quality.

Considerable quantities of vegetables are raised, not only for local consumption, but also for shipment abroad.

TIMBER RESOURCES.

Much sugar and yellow pine, fir, spruce, and cedar are found in the mountains, and the lumber output from that section has been very large for many years. Oak and scrub pine abound all over the foothills, and fuel is plentiful. The annual output of lumber amounts to over 16,000,000 feet, principally yellow and sugar pine, the latter being of the finest grade produced in California.

MINERAL RESOURCES.

Placer County ranks well up among the mining counties. Her average yearly contribution to the world's wealth is something like \$1,000,000, mostly gold. The total production since the discovery of gold at Auburn, May 16, 1848, is estimated at much over \$75,000,000. The mining methods include drift, river, placer, and quartz. The latter is yet in its infancy, while Placer's drift mines are among the largest in the world.

The granite quarries rank with the best in the United States. Nearly all the street curbing in San Francisco is from the Placer quarries, while the State Capitol is an example of the value and beauty of foothill granite.

Potter's clay is found in abundance at Lincoln, from which is manufactured sewer pipe, tiling, pressed brick, architectural terra cotta, and glazed brick for interior decoration. Among the notable specimens of the latter none is more prominent than that in the interior of the Mills Building, San Francisco.

Placer County is a natural sanatorium. As a resort for patients suffering from pulmonary diseases, leading physicians say it has no equal on the Pacific Coast. It is here patients find relief and some of them are cured. The altitude is just right for people suffering from consumption or bronchial diseases.

GENERAL STATISTICS.

Area, 1,484 square miles, or 949,760 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	640,318
Value of country real estate	\$3,952,025
Of improvements thereon	1,265,150
Of city and town lots	413,760
Of improvements thereon	911,545
Of personal property	946,525
Total value of all property	9,933,382

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle—Beef	73	\$1,460	Colts	521	\$9,700
Stock	2,140	33,940	Mules	539	16,170
Cows—Graded	496	14,880	Sheep—Graded	405	2,025
Common	2,370	59,250	Common	23,100	46,200
Calves	1,590	12,720	Lambs	2,800	2,800
Swine	740	2,220	Goats	575	575
Horses—Standard-bred	9	1,845	Poultry (dozen)	1,400	4,200
American	391	15,640	Hay	---	1,040
Common	2,883	86,900	Lumber	---	28,600

Number of acres sown for crop of 1904:

Wheat	29,760
Oats	21,300
Barley	10,400
Hay	31,500

Acres of bearing grape vines growing in spring of 1904:

Table	1,290
Raisin	200
Wine	800

Number of fruit trees growing in spring of 1904:

	Bearing.	Non-Bearing.		Bearing.	Non-Bearing.
Apple	19,400	6,770	Prune (French)	7,000	3,000
Apricot	14,900	7,670	Prune (other kinds)	118,900	176,400
Cherry	16,200	9,000	Lemon	900	850
Fig	5,100	2,960	Orange	27,800	17,400
Olive	36,000	20,000	Almond	6,300	3,900
Peach	804,200	597,600	Walnut	1,000	700
Pear	112,700	53,000			

Value of grain assessed in storage:

Wheat	\$12,690
Oats	1,125

School statistics:

Total number of census children, 1904	3,200
Number of teachers employed	87
Number of school houses	59
Number of school districts	57
Amount expended for public school purposes	\$62,718 14

PLUMAS COUNTY.

Plumas is a mountain county. Mountain chains define its limits on several sides. It extends for a distance of 50 miles from north to south, and 75 miles from east to west, in the heart of the Sierras, having Lassen Peak, with an elevation of 10,577 feet, on its northern border, and Pilot Peak, 7,605 feet, and Spanish Peak within its boundaries. Between the parallel ridges and spurs of the mountain range there are some picturesque and fertile valleys. The Feather River and its tributaries, with their deep cañons that have cut down in places to a depth of over 2,000 feet, afford drainage into the Sacramento River. It has less plains land than the counties lying to the south; but, on the other hand, differs from those counties in contour, the surface being more of a rolling character. A great deal of rich valley land is thus placed at the disposal of the husbandman. There is virtually no limit to the fertility of the soil in those valleys, composed as it is of the alluvial deposits carried down by the melting snows and the rains of centuries from the overhanging Sierras. Still, much of Plumas is up among the mountains, lying in the midst of the Sierra Nevada range. Some of its scenery is among the wildest and most picturesque in the State, snow covering the summits of the mountains, their slopes being clothed with magnificent forests of pine, fir, and oak trees, and high ridges alternating with abrupt chasms and deep cañons, through which tumble running streams. There are grassy valleys of considerable extent, which are cultivated, among them being Big Meadows, Mountain Meadows, Indian, Genesee, American, Beckwith, Butte, and Meadow valleys. Big Meadows Valley, 15 miles long by 4 wide, is the largest, and is immediately adjacent to Mountain Meadows, of nearly the same size, and to several smaller valleys, also cultivated, the whole constituting a plateau high up in the mountains, the elevation being 4,500 feet. Indian Valley, an important and prosperous district, is 11 miles in length by 2 in width; American Valley being the same size. Both connect with smaller valleys, and support several small towns, as well as the farms scattered over their extent. All these valleys are fertile, well watered and timbered, and contain an area of agricultural and grazing lands sufficient for the support of many thousands of people.

The greater part of the county is located in the Sierra Nevada Mountains, and has the climate peculiar to that section. The rainfall will average about 40 inches.

Where irrigation is needed Plumas has abundant water. Mountain rills run down every cañon and ravine, and streams take their course through every valley. Two important branches of the Feather River rise in this county. The valleys are well watered, but generally treeless. Pure mountain springs and streams abound, and are found

very desirable for dairying and general farming. Many of the valley ranches are irrigated from mountain streams. Round Valley reservoir covers about 1,000 acres, and supplies water for mines and for irrigating the lands of Indian Valley.

Indian Valley is the largest grain-producing section; it produces annually about 60,000 bushels of oats, wheat, barley, and rye. The oats average from 40 to 48 pounds per bushel, and the wheat and rye from 60 to 65 pounds. The average oat yield is about 55 bushels per acre, and of wheat about 35 bushels. This valley also contains a number of large dairies, averaging from 40 to 150 cows each. The butter is sold principally among the mines of Plumas and Sierra counties. The valley also produces annually about 7,000 tons of hay, which is fed to local stock, which number about 2,500 head. The average yield of hay is about three tons per acre.

American Valley produces a great quantity of grain of all kinds, and alfalfa and timothy hay; a great many cattle and horses are also raised. The average yield per acre is about the same as that of Indian Valley. Quincy, the county seat, is in this valley.

Butte Valley, Big Meadows, and Mountain Meadows are chiefly devoted to stock-raising and summer pasture. Big Meadows, which is situated at the head of the North Fork of Feather River, is a fine summer resort. The average yield of hay of the latter three valleys is over two tons per acre, of a high quality of timothy.

Many parts of the county are especially adapted to deciduous fruits, apples and pears doing especially well. Plums, prunes, nectarines, and peaches also do well in many localities, and where favorable conditions exist the trees yield abundantly.

Currants, gooseberries, blackberries, raspberries, and strawberries grow in great quantities and of the best quality.

The apple nowhere in the State grows nearer to perfection than in Plumas County, but fruit is only raised on a limited scale for home consumption. Railway connections would greatly increase the production, for no county produces finer flavored fruits than are raised in its mountain valleys.

Sheep and cattle are driven in annually in large numbers for summer pasturing, the mountains and their valleys affording abundant natural feed and water. The choicest article of mountain butter is produced.

Poultry and eggs are raised for home consumption, and in quantities to supply the mining camps of Plumas and Sierra.

The magnificent virgin forests of sugar and yellow pine, fir, spruce, and cedar timber are of great size and value.

Considerable mining for precious metals is carried on, and both quartz and hydraulic mines are operated on a very large scale, and are most profitable industries.

The copper prospects are attracting the attention of capitalists, and much prospecting work has been done, with a very encouraging showing.

Iron, marble, asbestos, and other minerals exist in large quantities, and it only needs the influx of capital to open up the mining industries and bring Plumas County to the front as a leading and profitable mineral-producer.

There are a number of summer resorts on the Feather River and its tributaries. Hundreds of campers pass the summer here, the trout-fishing being unexcelled. Big Meadows is one of the most famous resorts in the State for followers of angling. Game of all descriptions, of both fur and feather, is very plentiful, and excellent sport can be obtained.

GENERAL STATISTICS.

Area, 2,361 square miles, or 1,511,040 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	523,967
Value of country real estate	\$3,051,386
Of improvements thereon	332,467
Of city and town lots	35,935
Of improvements thereon	149,366
Of personal property	368,393
Total value of all property	4,054,842

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle—Beef	120	\$3,260	Horses	1,182	\$35,825
Stock	3,236	48,543	Colts	240	4,800
Cows	2,340	46,800	Mules	16	370
Calves	2,803	28,035	Sheep	285	570
Oxen	10	150	Hay		1,195
Swine	458	1,780	Lumber		1,765

Number of acres sown for crop of 1904:

Wheat	2,600
Oats	4,500
Barley	1,500
Hay	3,000

Number of fruit trees growing in spring of 1904:

	Bearing.	Non-Bearing.
Apple	4,215	1,820
Peach	500	400
Pear	800	600

Value of grain assessed in storage:

Wheat	\$400
Oats	2,065
Barley	490

School statistics:

Total number of census children, 1904	908
Number of teachers employed	32
Number of school houses	29
Number of school districts	28
Amount expended for public school purposes	\$17,826 50

RIVERSIDE COUNTY.

Riverside is one of the youngest counties, having been formed in 1893 from the southwestern part of San Bernardino and the northern part of San Diego.

The progress of the county is practically confined to its northwest corner, embracing the largest orange-growing district in the world. The rest is largely an undeveloped desert region, believed to be a storehouse of useful minerals and metals.

The past year has been one of exceptional progress and prosperity, and a considerable area of new land has been brought under cultivation. Many new orchards, both citrus and deciduous, have been set out. Alfalfa has also been planted on a large scale.

The orange crop in the county is the largest in the State, the output being over 6,000 carloads, besides several hundred carloads of lemons. The growing of citrus fruits is the main industry, although deciduous fruits of most kinds do well, particularly apricots and prunes. The olive thrives, and a very fine grade of oil is produced. Melons and cantaloupes are extensively grown and mature early.

Diversified farming is quite a feature in several sections. Alfalfa grows luxuriantly; broomcorn does well, and is a very prominent and profitable crop. The sugar-beet thrives, and considerable new land was put in cultivation last season.

Dairying is profitable, and modern creameries with the latest appliances are located in different sections. The stock used for dairying purposes is of a very high grade, mostly pure-bred representatives of the milk strains.

Considerable stock and hogs are fattened for market, and poultry-raising receives considerable attention.

Bee-keeping is another growing industry, and a fine grade of honey is produced.

In 1901 the city of Riverside completed a \$40,000 steam-power plant, to generate electricity for power and lighting purposes. The sewer system has been extended and the streets extensively improved.

The Riverside Water Company is the chief of the companies that supply Riverside with its fine water system, that has a continuous and ample flow.

The rapid development of Strawberry Valley as a health resort has done much to stimulate local trade. Idyllwild, a mile above the valley, among the pines, attracts visitors from all over the country. A large amount of money has been expended in improvements. It is without doubt one of the most healthful and beautiful summer and winter resorts in the State.

The importance of Perris as a commercial center and base of supplies for a mining district has been increased by the rapid development

of water, and the consequent large acreage of new land put under cultivation. Thousands of acres in this vicinity have been planted to alfalfa.

Hemet has a large flouring-mill, fruit-drying plant, and broom factory in successful operation. The shipments of olives are large. Fine raisins are produced in this section, and the grain industry is flourishing.

Elsinore is famed for the curative properties of its hot springs. Coal mines are successfully operated, and a superior quality of potter's clay is obtained in the vicinity. The domestic water-system is owned by the city. The water is supplied from hot sulphur wells, pumped into a 400,000-gallon reservoir, whence it is carried under pressure to every house in the city, furnishing all with soft mineral water at a nominal cost. Fine apricots, prunes, olives, and other fruits are raised around the lake. Seven miles distant is the Good Hope gold mine, with a 20-stamp mill and a cyanide plant. During the open season Lake Elsinore abounds with wild ducks of various kinds, making it an attractive place for sportsmen.

The flourishing settlement of Ethanac furnishes a striking example of the possibilities of this section, as a result of the progressive work of the Chase Nursery Company of Riverside, whose enterprise has wrought wonders in the development of the county. A modern and progressive colony has been established, possessing what is undoubtedly the most perfect and complete private irrigation system in the State. The colony has an electric plant of the most modern type, which is utilized to generate power for pumping and lighting purposes. Broomecorn, sugar-beets, and alfalfa produce profitable crops.

Indio is a little health resort that lies below sea-level. A number of artesian wells have been developed, and much land in the vicinity has been placed under cultivation. Watermelons and cantaloupes are extensively grown.

GENERAL STATISTICS.

Area, 7,008 square miles, or 4,485,120 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	933,260
Value of country real estate	\$5,522,851
Of improvements thereon	2,792,495
Of city and town lots	1,252,334
Of improvements thereon	1,886,745
Of personal property	1,381,065
Total value of all property	15,573,685

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle—Stock	4,557	\$45,570	Oxen	10	\$190
Thoroughbred	37	1,480	Swine	1,780	7,120
Cows—American	441	8,820	Colts	540	6,480
Graded	107	1,819	Mules	391	9,775
Common	2,986	59,720	Sheep	10,675	21,350
Calves	2,006	10,030	Goats	80	160
Horses—Thoroughbred	28	2,240	Poultry (dozen)	2,020	3,030
Standard-bred	213	3,405	Hay	---	7,650
American	5,111	116,275	Lumber	---	14,160

Number of acres sown for crop of 1904:

Wheat.....	29,870
Oats.....	3,185
Barley.....	55,210
Corn.....	35
Hay.....	4,726

Acres of bearing grape vines growing in spring of 1904:

Table.....	20
Raisin.....	290
Wine.....	100

Number of fruit trees growing in spring of 1904:

	Bearing.	Non-Bearing.		Bearing.	Non-Bearing.
Apple.....	3,535	16,830	Pear.....	9,575	3,735
Apricot.....	30,600	6,254	Prune (French).....	38,295	---
Cherry.....	800	590	Lemon.....	111,567	7,075
Fig.....	1,705	10	Orange.....	995,000	309,075
Olive.....	35,315	11,645	Almond.....	10,145	1,500
Peach.....	29,200	9,415	Walnut.....	1,400	20

Value of grain assessed in storage:

Wheat.....	\$5,680
Barley.....	12,255

School statistics:

Total number of census children, 1904.....	5,548
Number of teachers employed.....	152
Number of school houses.....	76
Number of school districts.....	67
Amount expended for public school purposes.....	\$110,664 26

SACRAMENTO COUNTY.

By WINFIELD J. DAVIS.

Prepared by direction of the Board of Supervisors of Sacramento County.

Sacramento County is among the largest in the Sacramento Valley. It was organized by the first Legislature; within its confines is the seat of State government; the annual fairs of the State Agricultural Society are held in and near Sacramento City.

Population, census 1900: Of county, 45,915. Of cities and towns—Sacramento, 29,282; Folsom, 1,309; Galt, 783; Elk Grove, 361; Florin, 104; Oak Park, 2,500; Walnut Grove, 223; Isleton, 162; Franklin, 83; Cosumnes, 109. In the four years that have elapsed there has been a considerable increase of population, and, conservatively, the estimate of the inhabitants of Sacramento City can be placed at 32,000, with a corresponding increase in the county and the towns. Number of registered voters, 1904, 12,938.

SCHOOL STATISTICS.

Following are the county and city school statistics for the year ending June 30, 1904:

	City.	County.	Total.
Number of census children between five and seventeen years of age	6,324	3,602	9,926
Total number of children of all ages	8,248	4,924	13,172
Number of teachers employed, including high schools	159	99	258
Number of pupils enrolled in grammar and primary departments	4,624	2,703	7,327
Number of pupils in kindergarten schools	340	.....	340
Average daily attendance in primary and grammar grades	3,834	1,957	5,791
Number of volumes in school libraries	3,925	13,970	17,895
Number of school houses	14	77	91
Number of school districts, 77.			

FINANCE.

	City.	County.	Total.
Amount paid for teachers' salaries (primary and grammar)	\$108,194 90	\$52,989 07	\$161,183 97
Contingent expenses	29,900 15	11,705 02	41,605 17
Amount paid for sites, buildings, etc.	21,120 20	2,200 78	23,320 98
Total expense for the year	159,215 25	66,894 87	226,110 12
Valuation of school property	375,475 00	124,606 00	500,081 00

HIGH SCHOOLS.

	City.	County.	Total.
Number of teachers	14	3	17
Enrollment	404	45	449
Number of graduates	46	.....	46
Teachers' salaries	\$15,350 00	\$2,600 00	\$17,950 00
Expenditures for the year	18,253 80	3,401 65	21,655 45

STAPLE PRODUCTIONS OF SACRAMENTO COUNTY, 1904.

	Amount.	Value.
Green deciduous fruits	75,000,000 pounds	\$3,300,000
Oranges and lemons	50 carloads	15,000
Dried fruits—French prunes	3,000,000 pounds	60,000
Peaches	500,000 pounds	30,000
Pears	400,000 pounds	28,000
Apricots	100,000 pounds	8,000
Nectarines	8,000 pounds	400
Figs	50,000 pounds	1,500
Apples	200,000 pounds	5,000
Pitted plums	40,000 pounds	2,000
Raisins	75,000 pounds	2,200
Almonds	200,000 pounds	20,000
Walnuts	50,000 pounds	5,000
Wines and brandy	1,250,000 gallons	375,000
Wheat	350,000 sacks	735,000
Barley	50,000 sacks	60,000
Oats	140,000 sacks	168,000
Corn	15,000 sacks	30,000
Hay	60,000 tons	600,000
Potatoes	450,000 sacks	495,000
Asparagus (green)	200 carloads	240,000
Beans	925,000 sacks	2,220,000
Butter	2,229,000 pounds	557,250
Cheese	864,000 pounds	86,400
Hops	2,800,000 pounds	560,000
Olive oil	23,200 gallons	40,000
Pickled olives	21,200 gallons	13,000
Strawberries	2,000,000 pounds	125,000
Onions	110,000 sacks	165,000
Root vegetables	85,000 sacks	70,000
Cabbage	175 carloads	55,000
Fish	3,920,000 pounds	200,750
Gold		419,287
Canned fruits and vegetables	295,624 cases	1,369,000

Shipments by rail out of the State from Sacramento County in 1904, according to report of State Board of Trade:

	Tons of 2000 lbs.
Fruit—Green deciduous	41,355.4
Citrus	354.5
Dried	16,526.7
Raisins	918.8
Nuts	264.3
Canned	7,750.1
Wine	15,255.1
Brandy	426.1
Vegetables—Green	1,228.6
Canned	1,814.5

TOPOGRAPHY AND SOIL.

The area is almost all a rich alluvial plain from 30 to 75 feet above sea level, gradually rising from the rivers to meet the low rolling foothills of the Sierra Nevada Mountains; these foothills commence at the extreme eastern part, and are from 6 to 8 miles wide. There are no mountains and aside from this foothill belt the surface has only gentle undulations.

The Sacramento River traverses the western boundary tortuously for about 90 miles across the rich bottoms, cutting them up at the lower part into numerous small and several large islands. The Sacramento is the longest and largest river in the State, and is navigable from Red Bluff to San Francisco Bay.

The American River rises in the upper Sierras, and enters the county at the northeast corner, among the low foothills. It flows in a south-

west direction through the entire width, a distance of some 35 miles, and empties into the Sacramento just north of Sacramento City.

Thirty miles south of the American is Dry Creek, at the southern boundary of the county. Midway between these two rivers, or 16 miles south of the American, the Cosumnes River flows out from the eastern foothills, and runs through the county southwesterly, and about parallel with the American, dividing the portion of the county south of the American into two nearly equal sections.

The Mokelumne River runs along a portion of the south line. The section lying between the Cosumnes and the south boundary is again divided in about the middle by a watercourse known as the Laguna, that runs nearly parallel with the Cosumnes.

Geological indications prove that in remote ages the entire Sacramento Valley and a section of the foothills to an altitude of several hundred feet were portions of the bed of a vast inland sea or lake, and that into this lake the washings of the surrounding mountains were poured to form the present soils, which are made up of all the fertile mineral and vegetable elements in almost inexhaustible quantities. Many analyses have been made of these soils from the alluvial valleys, the upper lands, and the foothills; these analyses have demonstrated that the soils of this valley are unexcelled for fertility.

Along the borders of the Sacramento River and around the islands is a belt of sediment land, partly a clayey, sandy loam, of great depth and unexcelled richness, varying in width from half a mile to a mile or more. This deposit has been formed by the overflowing of the stream for countless ages, and has produced a soil as fertile as that of the valley of the Nile. The same quality of soil exists along the lower reaches of the other rivers. The interior of the islands is a sedimentary deposit from the river and its tributaries, diversified occasionally by formations of peat along the lower reaches of the river.

Next to this belt of river-bank land is a strip of tule land considerably lower in altitude. This strip is quite narrow in the northern half of the county, but expands to a width of about fifteen miles at the south. All of these tule lands are naturally subject to overflow in the rainy season, and portions of them, and all of the islands, have been reclaimed and protected against inundation by substantial levees and drainage canals and pumping plants. These reclaimed lands are in a high state of cultivation to fruit, alfalfa, and vegetables.

Thence eastward the surface gradually rises to meet the low foothills, from whose spurs diverge broad, low ridges of reddish loam, gravelly near the hills, and these spurs are alternated with swales having a soil somewhat heavier and less deeply tinted. Southeast of Sacramento City these reddish loam lands are underlaid by a porous and soft material at from 2 to 6 feet, and this by an impervious clay.

The belt of foothills is rolling, interspersed with low hills, and its soils are red and gravelly clays, having a scattered growth of oaks.

IRRIGATION.

The water supply is unlimited and inexhaustible. The first and most important source is the Sacramento River. The bank lands ordinarily require no irrigation; but at such times as fruit-growers

along the river need water it is either siphoned or pumped through pipes from the river by gasoline or steam engines. This river carries an abundance of water at all times, and if necessary the surplus could be utilized to irrigate a large area.

The American affords an unlimited supply at all seasons of the year, and enough flows out of the county and to the ocean to irrigate all of the upper lands, as well as to furnish an unlimited supply of power for manufacturing purposes.

The Cosumnes carries a large body of water in the rainy season, and maintains a good supply in the summer, sufficient to furnish ample for irrigation purposes, however extensive.

The Laguna has a good flow in the winter, and during the greater part of the year is quite a stream, but in the latter part of the season is generally dry.

Dry Creek is quite a prominent stream. It flows a strong volume in the rainy season, and in the driest part of the year gives an ample supply for the farmers along its banks.

The Mokelumne never runs dry, and the topography of the country is favorable to the utilization of its waters.

In addition to the numerous rivers and streams there is, underlying the entire area of the county, an inexhaustible supply of pure and excellent water for domestic and irrigating purposes. Throughout the greater portion this subterranean supply is easily appropriated by means of a light lifting power. South of the American River the entire western half of the county has this supply within eight to ten feet of the surface, while east of that center the depth at which water is reached somewhat increases. By reason of this abundant subterranean water-supply the farmer or fruit-grower who wishes to irrigate his land may do so without being dependent on any canal corporation, and at a trifling cost. For instance, a windmill with two six-inch pumps will cost about \$100, and has the capacity to irrigate six acres in fruit and is often made to answer for eight. Many mills so equipped are used for raising water from wells 18 to 20 feet deep, but gasoline or steam engines and centrifugal pumps are employed in most cases where the need of water is very extensive.

AGRICULTURE—HORTICULTURE.

The first venture in agriculture in the Sacramento Valley was by General John A. Sutter in 1839. He received a concession of a large tract of land from the Mexican Government, and located his fort near the junction of the American with the Sacramento River. His first wheat field was a portion of the land now covered by Sacramento City. He planted the first grapevines and fruit trees, and practically demonstrated the unsurpassed fertility of the soil of the great valley in the north.

All of the lands of the county are practically arable, and there has never been a crop failure. The up, or red, lands in the eastern part along the Cosumnes River and between that and the Mokelumne River and Dry Creek, and north to and beyond the American River, are devoted largely to the growing of grain and hay and to stock-raising and dairying, though fruit production is also very considerable where

irrigation is practiced. Thousands of acres along the river bottoms and on the islands are used for the production of all kinds of vegetables, which are shipped East by the earload, and at times by the trainload. It is impossible to reach even an estimate of the vast quantities that are daily carried to the San Francisco markets by the various regular and trading steamboats which traverse the river. A great deal of this product is disposed of to the canneries in this and other counties. These vegetable lands along the Sacramento often command an annual rental of \$50 an acre.

Alfalfa grows luxuriantly without irrigation on all the rich bottom lands, producing from four to eight tons to the acre in the four crops that are cut annually. The average time between the cuttings is from thirty-two to thirty-six days, and for six months the fields are used for pasturage and dairying. The hay finds a ready market, and yields good prices.

Fruits of all kinds are produced on any of the lands of the county, and particularly on the river bottoms and the islands.

The winter fruits are oranges, lemons, pomegranates, olives, and persimmons, which all ripen in November, December, and January. Oranges and lemons ripen here earlier than in the southern part of the State, and are always sold at fancy prices on that account. The Japanese persimmon grows to the size of apples. Olives are very profitable, both for pickling and for oil.

The spring fruits that mature and are marketed in April, May, and June embrace strawberries, raspberries, blackberries, and cherries.

At Florin, on the western division of the Southern Pacific Railroad, $9\frac{1}{2}$ miles south of Sacramento City, is the most productive strawberry belt in the State. Its product has a reputation for excellence all over the Western States. The land in this section is principally a red soil, with a bedrock foundation, the soil ranging from two to three feet in depth. The depth to water averages about twelve feet, and the flow is abundant, though at places, to obtain a stronger current, the boring is made fifty or sixty feet to a stratum of quicksand, from which the water rises to about ten feet of the surface. The water is lifted mostly by windmills, though many use steam engines with oil fuel. The berries are marketed in California, Oregon, Washington, British Columbia, Montana, Utah, Colorado, and Nevada. There are three local shipping companies that handle the product. There are now planted about six hundred acres in strawberries, with about four hundred in full bearing. Tokay grapes from this district are shipped to Eastern markets through the local associations. From three to four hundred acres are planted in grapes.

After picking his early fruits and collecting the returns, the fruit-grower has to attend to the early summer fruits: apricots, plums, peaches, pears, and nectarines. The first peaches are ready by the last of May, and apricots and the earlier varieties of plums ripen about the same time. From then until October there is no cessation in the picking and shipping of fruit. Peaches are very largely cultivated all over the county, but reach their greatest importance on the river bottoms and island lands. From these districts alone hundreds of tons are marketed every day, during the season, both in California and in the East.

Apricots ripen early, and of all countries in the world California is the only one that has made a thorough success of that fruit, and in this county it reaches its very finest development in size, flavor, and productiveness. Much of this product is canned.

A large number of varieties of pears are grown, among them the Madeline, Bloodgood, Dearborn Seedling, Le Conte, Beurré Hardy, Seckel, Beurré Clairgeau, Beurré Bosc, Winter Nelis, etc.; but chief among them is the renowned Bartlett. This latter variety is shipped in large quantities to every city of any size in the Union, and is as well known in New York and Chicago and other centers of population in the East as it is at home. It grows on the rich lands of our rivers and islands in larger quantities and to greater size than anywhere else in the world. There has been no instance where an acre of Bartletts, on land suited to their cultivation, has failed, during the past twenty years, to yield a handsome income.

Plums are very profitable. They grow to a large size, and are shipped in vast quantities to the Eastern and home markets and to the canneries. Much of this product is pitted and dried in the sun for the market.

Nectarines do well, and are cultivated to a considerable extent.

In the fall the fruit products are apples, pears, grapes, quinces, prunes, and peaches.

Sacramento County is preëminently the home of the grape, and on the red lands of the plains it reaches its highest perfection, particularly with irrigation. The table varieties include the Tokay, Muscat, Black Prince, Morocco, Emperor, and Cornichon. They always bring first-class prices for shipment to the Eastern markets. The wineries of the State handle quantities of some of these varieties.

French, or petite, prunes are a leading fruit. They are remarkably prolific, and when cured excel the imported article, and bring a much higher price in the markets of the world. They do well on any land that is suited for plums, and are readily cured for market.

Figs grow in any part of the county, but on the river bottoms they reach a great size, and are remarkably prolific. The common black fig requires absolutely no care; the tree is as hardy as the native oak. The first crop is usually sold green, but the second is allowed to fall to the ground, and when dried the fruit is sacked. The Smyrna, or "fig of commerce," has been introduced and successfully grown.

Raisins are easily cured, the climate being peculiarly favorable.

Almonds have long been found a reliable and profitable crop. Like the fig, the trees require little or no attention. They can be grown in any part of the county. There is never any trouble to market all that is produced, at very satisfactory prices; in fact, there is an ample field for more extended production of this standard nut.

The English soft-shell walnut has been demonstrated to be a profitable crop. Black walnut trees are extensively grown for shade and ornament.

Broomecorn is grown, as is also Egyptian corn—the latter making an excellent and cheap food for stock.

Hundreds of tons of beans of all kinds are produced on the river and island lands. The interior of Grand and Tyler islands is to a great degree devoted to their production.

Potatoes, both sweet and Irish, are grown in large quantities on the bottom lands; of the latter, the average yield per acre is from 100 to 150 sacks.

FRUIT AND FRUIT SHIPMENTS.

Sacramento City, by reason of natural advantages, geographical relation to various producing sections, and admirable transportation facilities, deservedly bears the reputation of being the largest fruit and vegetable shipping point in the State. It is the recognized outlet for the products of the Sacramento Valley. Within the borders of the county every character and variety of agricultural, horticultural, and viticultural products thrive, and in abundance; their excellence commands universal and unlimited demand from many portions of the civilized world. In fact, the soil will successfully produce any staple product that can be grown on the Atlantic side from Maine to Florida. The average number of carloads of green deciduous fruits annually shipped from Sacramento County is about 1,300, each car averaging from twelve to thirteen tons. These shipments are distributed in every quarter of the United States and Mexico, and a large quantity is marketed in London, Glasgow, and other European cities. In the East, Chicago, New York, Boston, Philadelphia, Pittsburg, and Montreal are regular distributing points, though between here and those cities the fruit is sold, and thus the distribution is practically all over the United States.

This fruit consists of all the deciduous varieties, such as apples, apricots, peaches, pears, plums, nectarines, and all kinds of shipping grapes: Muscat, Tokay, Emperor, Cornichon, Ferrara, Verdal, and others.

Ordinarily the highest priced fruit is the Bartlett pear. Each pear is a "golden nugget." It is sold in the Eastern markets at an average of more than \$2 a box. The Sacramento River district is peculiarly the home of this magnificent pear, and from that district immense quantities are shipped each season. The demand for this pear is unlimited, and the California product is without competition in the markets of the world. What we know and sell as the Bartlett pear originated in France, and came to us through English sources. Under our favorable climatic conditions it has outstripped the parent tree, and we are shipping the fruit back to the country of its nativity in a state of greater perfection. In the London market California Bartletts in half-boxes of twenty-five pounds each are sold for as high as \$3. The freight is 85 cents, so the profit is handsome.

Plums and peaches find ready sale in England and Scotland. The fruit reaches European markets in perfect condition, being specially packed and carefully refrigerated. It is landed and marketed in London and Glasgow within three weeks after leaving Sacramento.

Sacramento cherries always make a remarkable selling record in the East.

VITICULTURE—CITRUS FRUITS.

In Sacramento County is grown the highest-priced table grape—the Flame Tokay. The favorite qualities of this grape are its size and beautiful coloring. It has a rich, iridescent bloom, which gives

it the name "Flame" Tokay. It is, however, by no means the only table grape grown. All varieties grown in the State are produced with rare success on Sacramento County soil.

In addition to table grapes, there is a very large market for wine grapes. So far as the Sacramento Valley is concerned, viticulture is but in its infancy. The Natoma Vineyard, the second largest in the world and covering over 1,900 acres, is in Sacramento County, and the largest vineyard (all wine grapes) in the world is at Vina, in Tehama County, also in the Sacramento Valley. But it must be remembered that the American market alone covers over 75,000,000 people and that a very small proportion is at present supplied by the



TOKAY VINEYARD OF R. D. STEPHENS, AT MAYHEWS, SACRAMENTO COUNTY.

home product. It must also be fully realized that the quality of our grapes and wines is no longer a matter of speculation, and that the demand for viticultural products of California is rapidly increasing, not only at home but also abroad.

The production of citrus fruits in Sacramento County is in its infancy. Oranges grow on any of its soils to perfection, and in late years extensive orchards have been planted. The establishment and phenomenal success of the colonies at Orangevale and Fair Oaks, where land of supposed inferior quality has been demonstrated to be peculiarly adapted to citrus and deciduous fruits of all kinds, were incentives to the planting of fruit trees, and a very considerable area that had been devoted to grain-raising and grazing has been planted in orchards. Large quantities of citrus fruits are shipped East and

much is sold locally in Sacramento and San Francisco. They go to the latter city by steamboat, by express, and by train. The production of lemons and grape-fruit is not as great as the demand warrants, although they do fully as well as the orange, and can be raised on any of our lands. At Fair Oaks and Orangevale particularly fine specimens of both are produced.

DRIED FRUITS AND NUTS.

We are indebted to Castle Brothers for an estimate of the amount of dried fruits produced in Sacramento County in 1904, and for other matters of interest in connection with this character of product. This firm handles most of the dried fruit produced in the county, and indeed a large part of that produced in the State. The fruits are all sun-dried by the growers, artificial evaporators not being used at all. The dry atmosphere is specially suited for the drying of fruits, and the article so produced is regarded as first class in the markets of the world. The prunes raised on the American River are of superior quality, and are everywhere so regarded. Large consignments are loaded for Ireland, Scotland, England, and Denmark. They are also sold all over the United States and Europe. The foreign trade is large. A very respectable portion of the product goes direct to France, astonishing as that might seem. Hamburg is an important foreign market. The producers receive for their dried peaches an average of over 5 cents per pound, cash in hand at the bins in the orchards; for their prunes, an average of 3 cents net; for their apricots, an average of over 8 cents net; for their apples, an average of about 3½ cents net; and for their nectarines and pitted plums, about the same as for peaches. About fifteen carloads of raisins were shipped during the last season.

All of the fruits named find a ready market all over the world. The figures given in the preceding table for the past season are not to be considered as a fair estimate of the average yearly production, from the fact that the green fruit market was active and took quantities at gratifying prices, and the consumption by the canneries was greater than in any former year.

There are several sections that are especially favorable for development of the almond, notably the Antelope district, where the land being high and rolling, frosts are less liable to occur, and the soil is peculiarly adapted to retaining the moisture. Insect pests have caused very little damage. It is always better to have water available for irrigation purposes in case of an unusually dry season or during a series of dry years, when the soil might become exhausted, but in an ordinary season these lands will mature a crop in good shape without irrigation. The Orangevale and Fair Oaks sections are also very favorable for almond production, and from them there is now a considerable output. Elk Grove is a good district. We import into the United States at least five times as much almonds as are produced in California, and in this State there is a wonderful opening. We could supply the market of the country if we had the goods, and there is no immediate prospect of any decline in prices, owing to the fact that the price of almonds in the United States is usually dependent on foreign market conditions. Another feature in regard to planting almond

trees is that lands adapted to growing them are not, as a rule, as valuable as lands especially fitted for fruit-growing.

English walnuts, pecans, and peanuts thrive.

THE CANNERIES.

The California Fruit Canners' Association possesses at Sacramento one of the largest and most modern fruit and vegetable canneries in the world. This canning plant is erected on the site of the old plant, which has been in operation many years, at Sixth and G streets, running through to F street, and covers a space of 160 by 320 feet, is two stories in height, thus giving a floor space of more than 200,000 square feet. The cost of the building and equipment was, in round figures, \$100,000. This outlay was deemed advisable by the association, as Sacramento's situation commanded the largest and best orchards and fruit lands in the State, practically embracing the famous orchards extending along the Sacramento River from the city to Isleton, a distance of nearly 40 miles, and along the American River to Folsom and vicinity, 22 miles more. Then Yolo, Yuba, Sutter, El Dorado, and Placer counties contribute largely. The produce manufactured goes to all parts of the world, the English settlements on the Nile, and South Africa and India taking a goodly portion. This cannery is in operation during more months each year than any other in the State, beginning on asparagus the latter part of March and running steadily for the succeeding eight months, ending the latter part of November on tomatoes and beans. During this period the various fruits follow rapidly—strawberries, cherries, apricots, blackberries, early peaches, plums, pears, late peaches, grapes, followed by tomatoes and beans. In 1904, owing to the old plant not having capacity great enough, only about 140,000 cases were packed; or (cases containing a variable number in them, according to whether the cans are 2½-pound, 1-pound, or gallons) the number of cans packed exceeded three millions. The new building has more than double the capacity of the old one, and may reasonably be expected to pack more than five million cans in 1905. In fact, the capacity is only limited by the supply of help procurable. The weekly payroll is about \$4,500, and goes mostly to women and girls in sums ranging from \$5 to \$20, and in turn is distributed to nearly every industry in the city—the butcher, baker, grocer, etc., getting each his quota. Cleanliness in all departments is insisted upon. After the fruit is prepared for canning it is washed thoroughly in clear, cold water, placed in the cans and hermetically sealed, and then is cooked by steam. The boiler-room has a great capacity, being supplied with three large boilers, using oil as fuel. Electricity is used wherever possible, such as for running the various elevators, box printing and nailing machines, etc.

The California Fruit Canners' Association also possesses another cannery in the county, at Vorden, on the Sacramento River, 26 miles below the city. This cannery packs only asparagus, being situated in the vicinity of the finest asparagus fields in the world. This season the output will be at least two and a half million cans of this luscious product, supplied by about 1600 acres of asparagus plants, which is

under contract for a term of years to this association. The asparagus pack of 1904 was 56,000 cases, valued at \$224,000.

The Central California Canneries commenced operations in 1901. They have an extensive establishment in Sacramento City, and, like the others, do a prosperous business. The general remarks as to the advantageous position for procuring the choicest of fruits, the methods of canning, the market advantages, etc., apply as well to this cannery. This establishment did not pack asparagus in 1904, but does in 1905 and will hereafter. In 1904 the pack was 99,624 cases; value, \$500,000. On an average five hundred persons are employed during the season. The pack is marketed all over the world, and recently a considerable trade has sprung up in the South Sea Islands and South America.



DAIRY SCENE, SACRAMENTO COUNTY.

STOCK-RAISING AND DAIRYING.

Sacramento County presents great opportunities to the livestock breeder and the dairyman. The climate is so even, temperate, and mild that animals remain in the open air, practically unsheltered, the year round without hardship. The soil, because of its richness, is peculiarly adapted to the growth of forage crops, especially alfalfa which is at the same time one of the best and the cheapest of stock feeds. Because of the economy with which livestock can be maintained and the cheapness with which food can be produced, there is a large margin of profit in breeding and rearing farm stock. Animals mature early and produce heavily, and their judicious breeding has been profitable. There are six large and several small creameries. The

average character of the dairy stock is fair, and is being constantly improved by the introduction of well-bred animals. The average production of butter per cow per year is not high, but the conditions are favorable for a very large product. The breeding of pure-bred pedigreed cattle is engaged in by several persons, but not as extensively as the profits of the business would seem to render advisable. The dairy product of California has heretofore been quite insufficient for the supply of the home demand, and as a consequence butter and cheese, as well as eggs and cured meats, have been imported. This short supply has insured profitable prices. Butter manufactured in creameries has been sold in Alaska, British Columbia, Washington, Oregon, Idaho, Montana, and Arizona, with some few shipments to the Philippine and Hawaiian Islands, China, and Japan. Most of the cheese is produced in the southern portion, on the Cosumnes River, where there are twelve factories.

While the farmer as a rule raises more or less stock, the production of beef cattle is not sufficient to supply the demand for meat in the county, and most of the beef comes from the northern coast, principally southern Oregon. What stock is produced finds a ready sale at good prices.

Sheep are raised in the section north of the American River and in the southern and eastern portions of the county. From May to October these sheep are pastured in the mountain ranges of the Sierras.

Hogs are raised generally by the farmers, and several breed pedigreed Poland-China, Berkshire, and Essex swine quite extensively. The breeding of pedigreed hogs has been very profitable.

POULTRY AND EGGS.

The poultry business has steadily increased in importance in the last few years, and while it has not received the attention that it deserves it may be noted that, excepting alone the famous Petaluma district in Sonoma County, it ranks first in the State. At Elk Grove, 15 miles south of Sacramento City, on the line of the railroad, and but 5 miles east of the Sacramento River, is the principal poultry district. From the depot of that town it is not unusual that eighty cases of thirty dozen each of eggs are shipped in a day, and the net average income for the season is reckoned at about \$1 per hen.

Near Sacramento City the raising of poultry is made a specialty by many, and with profit. It requires, however, strict attention and the supplementing of careful and intelligent aid to the favorable conditions of nature. As an example of the profit that can be realized from poultry it may be instanced that the Messrs. Stickney, at Elk Grove, from their White Leghorn chickens receive an annual income of \$9,000. The fowls are kept on thirty acres of land, part of which is in alfalfa and the standard varieties of fruit, which of course yield an additional revenue.

Many persons breed fancy poultry—all the leading varieties being represented.

Frank Newbert has a poultry farm about one mile south of Sacramento City. He has made the poultry business a careful study, and

at the start selected quality and not quantity. At this time he has 1,500 White Leghorns. His houses are so arranged that the chickens from each pen have a free run on the green alfalfa. In connection with his plant he has a green bone cutter, that will handle one hundred pounds per hour and it is run by a three-horsepower gasoline engine. In speaking of the poultry industry of the county Mr. Newbert writes: "A number of the poultry farms have from six hundred to two thousand hens. Seven hundred and fifty chickens can be kept on one acre, and when it is considered that each hen will pay a clear profit of one dollar per annum, it can be readily seen that the business is very remunerative, and when combined with other lines of diversified agriculture a prudent and industrious man has no trouble in making a comfortable living for himself and family. But with the poultry let him begin right and give quality the first place: quantity will follow. Sacramento County raises an immense



POULTRY FARM OF FRANK NEWBERT, NEAR SACRAMENTO CITY.

quantity of vegetables and considerable grain, and it is easy for the poultrymen to get the best feed at a low price. The White Leghorn is the money-maker, and in all of the large and successful poultry farms that variety predominates. There is another advantage: as yet California does not produce one half of the poultry and eggs for her consumption. For that reason the home production finds a ready market and at satisfactory prices. There is plenty of money in the poultry business, but to obtain the best results let it be understood that one must work hard and give careful attention. The work, however, is interesting and healthful. The poultryman can always command cash for his output. He always has a ready market and one that is never dull. In winter eggs have sold for as high as 60 cents per dozen."

STOCK FARMS.

No State has more complete and valuable natural advantages for the growing of stock than has California, and it can not be long, if present indications mean anything, when she will take precedence, even of the far-famed Kentucky, in the number and extent of her

foaling farms. Indeed, it has come to pass that no race in the broad East, from New Orleans to New York, is considered worth material attention unless it has one or more representatives from the great stock farms of the Golden State. It is with peculiar pride that the people of Sacramento County call attention to the fact that the most famous stables of the State are within her borders. Located in this county, and only five miles from the State capitol, is the largest stock farm devoted to thoroughbred horses in the world. Reference is particularly made to the great breeding farm at Rancho del Paso, to the north of the city of Sacramento. Here the thoroughbred and trotting and draft horses are brought to their highest degree of perfection, and all over the nation their fame has gone. Kentucky can not, in its highest glory, boast of so far-famed and extensive a breeding farm as this. California has other noted stock farms, and it may be said, with a bold challenge to all disputers, that they are not to be excelled by the best in England or America. And why should not this be true? Here is the most superb of climates; here can be grown the choicest of feed; here there is every incentive in the realm of nature for the production of the highest types of the breeder's skill. The days are rare or never come when the finest horses may not be exercised, and the climate is likewise decidedly in favor of the fast possibilities of the young and growing animal. The Rancho del Paso contains 44,000 acres. John Mackey is the superintendent, and it is since he assumed its management that Rancho del Paso began to take the foremost position it now commands. The trotters and thoroughbreds are kept in different parts of the farm, and good exercising tracks are maintained for both. The horses from Rancho del Paso that have been heard of in the East are too well known to need mentioning, and it is enough to know that they have gallantly maintained the claims of Sacramento County as the bright particular spot in California for the development of the finest thoroughbred horses. The annual sales of these horses at home, in the East, and in Europe have come to be considered great opportunities for lovers of the horse, and the prices realized satisfactorily demonstrate this appreciation.

Another stock farm, the Rancho del Rio, is situated three miles south of Sacramento City. This farm is under the management of Thomas Fox. There are over 1,000 acres devoted to the rearing of horses. From this farm came Emperor of Norfolk, the Czar and Yo Tambein, which in their time were considered among the best horses in the United States. At the head of the horses of the Rancho del Rio is St. Avonicus, son of the greatest sire of race horses in the world, St. Simon, who was never beaten. The rancho has also Cunard, grandson of Ormonde, the horse of the century. Although young, under its present management this farm promises to become one of the best in California. It maintains eighty brood mares and four stallions.

HOPS.

Along the Sacramento, American, and Cosumnes rivers are the most productive hop fields in the United States. Hop culture on this coast dates back to 1858, when the first roots were imported from Vermont by Daniel and Wilson Flint and planted in Alameda County. Hop culture developed slowly, because of the prejudice of brewers

against a hop that contained so much greater percentage of strength than that which they had been accustomed to use; but in time they found that it did not take as much for a brewing. It was early demonstrated that the soil and climate of Sacramento County were unsurpassed for hop culture, and that it is the only place known where a crop of from 1,000 to 2,000 pounds per acre can be grown the first year the roots are planted. It is a common occurrence to grow 2,000 or 3,000 pounds on an acre of ground, and in some instances 4,000 pounds. The cost of picking is from 80 cents to \$1 per hundred pounds; 28 or 30 pounds of dried hops are obtained from 100 pounds of green, and a bale averages from 180 to 200 pounds. From the



HOP-PICKING SCENE, SACRAMENTO COUNTY.

stock imported by the Flint brothers the roots in Oregon, Washington, and throughout California were obtained. In one year \$3,000 worth of roots were sold from their yards. In 1904, 1,255 acres were planted in hops in Sacramento County. The crop is shipped to all parts of the world, but is consumed principally in the Eastern States and England. About 6,000 bales are used by the local market.

WINES AND BRANDY.

There are eight wineries in the county—the California, Kohler & Van Bergen's, Nevis's, and the Eagle in the city; one at Elk Grove, one at Bruceville, one at Folsom, and one at Natoma. The product consists of sherry, port, angelica, claret, and brandy. The output is

shipped all over the world, and is principally disposed of in the United States, Central America, and the Islands. The vintage for the season of 1904 was an ordinary one. The wines were of fine quality, carrying a good bouquet, strong in alcohol and saccharine, but slightly light in color. Other than the last objection, the county has never turned out a better quality of wine. The port is not heavy in body nor dark in color, but is rather more delicate and lighter, having great character, and resembling closely the light, high-grade ports of Portugal. The county has a great reputation for fine sherry. The range of climate, together with the soil, seems to produce a quality of grape which makes a fine grade of that class of wine. There has not been as much grape-planting as has been going on in other counties, but sufficient planting is being done to take the place of the acres being devastated by that arch-enemy of the viticulturist, the dreaded phylloxera. Farmers are being gradually educated to the use of resistant roots, and where vineyards are going out and new ones coming in, the larger percentage of the farmers are using resistant stock.

RAIL AND RIVER TRANSPORTATION.

Few counties contain a greater mileage of railroads than does Sacramento. From the capital city the Central Pacific leads eastward across the continent: the California & Oregon passes to the north into Oregon, and from thence to Washington, and also to the Eastern States; the Western Pacific, which terminates at Oakland, connects also with the Southern overland line at Lathrop, and at Galt a branch line runs up into the county of Amador; the California Pacific runs on the west of the Sacramento River to Oakland; and the Sacramento & Placerville passes along the American River through Folsom, and thence into the county of El Dorado. From most all of these roads branches extend into the various counties of the Sacramento Valley. From its geographical position, Sacramento City is the natural railroad center of the central and northern portions of the State, and the agricultural and mineral products of this great and rich section of the American Union are shipped from her ample storehouses.

The Southern Pacific Company operates two steamboats that make daily trips between Sacramento and San Francisco, touching at the various towns and farm landings to receive and discharge freight. The Sacramento Transportation Company operates eight steamboats and twenty-five barges that are run between Red Bluff and San Francisco. They touch at all landings, and move a great part of the grain that is produced in the up-river counties, as well as all other kinds of freight. The Farmers' Transportation Company is controlled by an association of farmers. Its steamboats run between Colusa and San Francisco, making weekly trips.

MANUFACTURES.

Sacramento City, being the center and metropolis of a rich portion of the State, the heart of a vast railroad system, the point from which steamers pass to the north and to the south, and with unlimited water and electrical power at her very doors, presents advantages in

manufactures excelled by no other city on the coast. Here are located the extensive shops of the Southern Pacific Company, where about 3,000 men are employed, and in which the company builds its own cars and general rolling stock, and does its own repairing. These shops occupy some 110 acres. But the great and overshadowing superiority the city possesses is the unlimited cheap power. For years the great power of the swift-flowing American was allowed to go to waste, but in 1888, at the Folsom State Prison, twenty-two miles from Sacramento City and in the county, a mighty granite dam was constructed across the river. At that point solid bluffs of rock rise on either side, affording a splendid site. The corner-stone for the structure was laid September 14, 1888, and the work was vigorously prosecuted to completion. The natural fall of the American gives as great a force as any other stream west of the Rocky Mountains, and the artificial assistance rendered by the dam creates added power. From the canal the water falls upon turbine wheels. Five generators produce the electric power, and it is transmitted to Sacramento City by four circuits on two sets of poles, so as to guard against breakages and accidents. The distance of the generators from Sacramento is 22.4 miles. The Sacramento Electric, Gas, and Railway Company receives and controls this power. Each of the five generators produces one thousand horsepower. In addition, the company receives current at 40,000 volts from the Bay Counties Company's power plant that is located on the North Yuba, 35 miles above Marysville. This power is transmitted to Sacramento over a circuit 64.2 miles in length. With the combined power so received the street car lines of the company in Sacramento City and suburbs are operated. These lines are 24.5 miles long. The lighting of the city is from this source. It also furnishes an aggregate of over three thousand horsepower for manufacturing purposes in and about the city.

The Central California Electric Company derives its power from abrupt drops in the canals of the South Yuba Water Company, located in Placer and Nevada counties. The water company has an immense storage system for municipal supply, irrigation, and water power, and maintains twenty reservoirs on the divide, or in the upper foothills, thirteen distributing reservoirs in the lower foothills, four hundred miles of canal (three hundred of which will carry one thousand miners' inches), besides many miles of flumes, pipe-lines, and tunnels. The whole forms a vast network over Placer and Nevada counties, stores two billion cubic feet of water, and sustains the flow of six thousand miners' inches for one hundred and fifty days of drought. The electrical power-houses of the Central California Electric Company are three in number—at Newcastle, in Placer County, 28 miles distant, and at Auburn, also in Placer County, 33 miles distant. The aggregate output of these two is nearly two thousand horsepower. A third power-house at Alta, 65 miles from Sacramento, in Placer County, has an output of three thousand horsepower. The Central California Electric Company supplies power, and illuminates Newcastle, Penryn, Loomis, and Rocklin, in Placer County, and about fifteen hundred light consumers, its incandescents amounting in the aggregate to about fifteen thousand.

FISH AND GAME.

The natural fish in the rivers are salmon, sturgeon, pike, perch, hardheads, and dace. Those planted are striped bass, black bass, shad, and three kinds of catfish. The only fish propagated is the salmon, in the headwaters of the Sacramento. All of the planted fish have multiplied satisfactorily. In the open season large numbers of salmon and other fish are taken and sold in the local and San Francisco markets.

In the line of game, there are geese, ducks, quail, curlew, doves, and larks. All but the geese are protected. The wild geese arrive from the north from the 15th of September until about the last of October. The varieties are the honker or Canada, the speckled-breasted brant, two of the white brant, the Mexican or black, and the China. The ducks are mostly migratory. Of the non-migratory species are the mallard, spoonbill, and wood duck. The migratory ducks that come from the south are the red-head and the blue-winged teal; and from the north the green-winged teal, widgeon, sprig, canvasback, gadwell or gray duck, blue-bill, and black-jack.

ROADS AND BRIDGES.

One can drive in any direction, at any time of the year, with no inconvenience, over roads that favorably compare with the streets in many towns elsewhere in the State. All of the bridges and roads are free for travel.

The Sacramento River is spanned at the city by a new bridge, and lower down several ferries are maintained. The American is bridged north of the city on a line with Twelfth Street to connect with Placer County; at Fair Oaks; above at Folsom, to reach the county of Placer; and still farther at Mormon Island, to connect with the county of El Dorado. There are four bridges across the Cosumnes—one at McCracken's, one at Live Oak, one at McConnell's, and the fourth at Michigan Bar. Across the Mokelumne is a bridge at Benson's ferry, connecting with San Joaquin County, and a ferry connecting Staten and Tyler islands. A steel drawbridge spans Georgiana slough, and connects Andrus Island with the main land at Walnut Grove.

The county authorities have experimented with bituminous oils on the roads, with a view of laying the dust in the summer and of preserving their integrity during the winter months. It has proven to be practicable, economical, and lasting in its effects.

MINING.

Placer mining is prosecuted to a considerable extent around Folsom, the industry having again come into prominence. On the American River, in what is called the Folsom district, that extends from the town of Folsom to a short distance below the Fair Oaks bridge, a distance of a little more than 6 miles, extensive dredge mining is being carried on. Most of the gravel is on the south side of the river and in width from 1 to 1½ miles. The area of gravel so far acquired for dredge purposes is about 5,000 acres. These mining operations are in the hands of people with plenty of capital and skilled engineers. One of the companies has a machinery plant larger than any other in

California, outside of San Francisco, and is prepared to do its own repairing and build its own dredges. The data here presented are condensed from a recent bulletin issued by the California State Mining Bureau. The gold is comparatively evenly distributed, and the results of drill samples indicate that the gravel will average from 15 to 25 cents per cubic yard and that the ultimate probable yield will be over \$40,000,000. Electric power is used and there is an abundance of water, both power and water being supplied at low rates. The gold is comparatively very fine in size particles and has a mint value of about \$19 per ounce. The Ashburton Mining Company has area holdings of 310 acres. It began operations in March, 1899, with a dredge that was burned May 25, 1903. Its new dredge, made by the company at a cost of \$120,000, is in operation and another one will be built. The El Dorado Gold Dredging Company has area holdings of 550 acres. It has one dredge. The Colorado-Pacific Gold Dredging Company has area holdings of 200 acres. It has two dredges, one of a capacity of 35,000 cubic yards per month, and the other of 60,000 cubic yards. Another company, the Folsom Development, is in operation, but its manager did not furnish any information to the Mining Bureau.

SACRAMENTO CITY.

Sacramento City, the capital of California and the county seat of Sacramento County, is situated on the east bank of the Sacramento River, immediately south of the mouth of the American. The distance by rail from San Francisco is 90 miles. The business portion is built of brick and the residence portion of wood. Shade trees are abundant and almost every residence yard is lawned and planted with orange trees, palms, and ornamental shrubbery and plants. The imposing State capitol building, that cost about \$3,000,000, is one of the finest of its kind in the United States. It stands in the middle of a park of thirty-eight acres, almost in the heart of the city. The park is beautifully laid out in trees, shrubs, and flowering plants that represent all portions of the globe. At the east side of the park is located the Exposition Pavilion of the State Agricultural Society, and also the State Printing Office and Bindery. The Federal building, of red sandstone, costing \$150,000, accommodates the postoffice, the revenue and land offices, and the weather bureau station. The waterworks are the property of the city, and water-takers are charged at a rate to afford a revenue slightly in excess of the amount necessary to meet the operating expenses. The lines of two electric power companies enter the city. The street railway lines and most of the manufactories receive their energy from these powers. The city is lighted by electric lights from the power of these companies. The natural-gas wells in the city yield an abundance of gas for domestic purposes—heating and cooking. There are fourteen public school buildings, one of them for the high school; a Catholic college under charge of the Christian Brothers; a conventual school conducted by the Sisters of Mercy; and also two business colleges, and an art school. The number of church buildings is twenty-six. There are two orphan asylums, a foundling home, a home for aged women, one for old men, and one for destitute and erring girls and women and their children—all conducted under private auspices. The State Library of 130,000 volumes,

in the capitol building, is one of the most complete in the United States. It contains many rare books and engravings. The city maintains a free public library of 36,000 volumes in a two-story and basement brick building that it owns. The Crocker Art Gallery, an imposing and commodious fire-proof building, with its contents—rare and expensive paintings and statuary purchased in Europe and America—was presented to the city by the late Mrs. Margaret E. Crocker, and is free to all visitors. Sacramento is perhaps the best ornamental-parked city of its corresponding size in the United States. In addition to the State capitol grounds, and those at Sutter's Fort, as it is now restored, the city has a tract of thirty-seven acres that was purchased for a playground for children. It is called "McKinley Memorial Park" and is under the control of five trustees. In addition the city maintains three parks of two and a half acres, or a full block, each, that are lawned and planted with ornamental trees and shrubs. During the summer months evening band concerts are given in the parks of the city. The first railroad in California was projected from Sacramento City to Folsom in 1856, and it was from this city that the first transcontinental railroad in America was inaugurated in 1863. The city is on the line of four branches of the Southern Pacific system, two of which are transcontinental.

In Sacramento is the office of the Sacramento Valley Development Association, which represents twelve counties of the Sacramento Valley and is actively engaged in an effort to attract the attention of the world to the advantages of this great valley and bordering mountain chains. This association is representative of a spirit of coöperation which prevails among the Sacramento Valley communities. Through it the county governments are working together for the development of their resources and the improvement of conditions in various ways. The local chamber of commerce has a large membership of representative citizens and is doing effective work in the line of development of the county and its contributory territory.

Sacramento County presents unusual attractions to the intelligent, industrious and prudent homeseeker who wishes to engage in diversified farming on a small holding. Here he will find an equable climate, a fertile soil, independent irrigation facilities, a ready market, exceptional educational and social advantages, commercial and industrial opportunities, combined with an opportunity to purchase desirable land at a reasonable price. It is the fact that lands adapted for the establishment of permanent livelihood under the most favoring conditions may be secured on terms both reasonable and convenient.

GENERAL STATISTICS.

Area of county, 987.66 square miles, or 632,108 acres.

The following figures are given by the County Assessor for the year 1904:

<i>Real Estate and Improvements.</i>	
Number of acres assessed	606,885
Value of country real estate	\$10,061,160
Of improvements thereon	1,602,250
Of city and town lots	8,843,830
Of improvements thereon	8,149,580
Of personal property	5,322,190
Total value of all property	36,184,197

Number and Value of Live Stock.

	Number.	Value.		Number.	Value.
Cattle—Beef	400	\$8,000	Colts	2,260	\$85,000
Stock	4,000	60,000	Mules	450	11,250
Thoroughbred	200	7,000	Swine	5,000	15,000
Cows	7,000	175,000	Sheep	18,000	45,000
Calves	3,000	15,000	Lambs	7,000	3,500
Horses—Thoroughbred	400	120,000	Goats	100	100
Standard-bred	300	18,000	Poultry (dozen)	10,000	40,000
American	6,100	152,500			
Hay					\$10,000
Lumber					90,000

Number of Acres Sown for Crop of 1904.

Wheat	100,000	Corn	700
Oats	88,000	Hay	76,000
Barley	14,000		

Acres of Grapevines Growing in Spring of 1904.

	Bearing.		Bearing.
Table	5,000	Wine	9,000
Raisin	880		

Number of Fruit Trees Growing in Spring of 1904.

	Bearing.	Non-Bearing.		Bearing.	Non-Bearing.
Apple	5,800	1,200	Prune (French)	24,000	46,000
Apricot	22,000	33,000	Prune (other kinds)	27,000	43,000
Cherry	4,500	8,500	Lemon	1,500	950
Fig	1,200	2,600	Orange	24,800	20,000
Olive	12,200	6,500	Almond	32,700	30,000
Peach	11,000	38,000	Walnut	1,900	1,700
Pear	65,300	57,000			

Value of Grain Assessed in Storage.

Wheat	\$52,500	Barley	\$3,250
Oats	500	Corn	2,800

Other Statistics.

Value of mortgages and trust deeds	\$959,870 00
Bonded debt	311,000 00
Annual interest thereon	13,430 00
Expended on roads—1904	84,904 08
Expended for bridges—1904	22,981 87
Assessed value of railroads	1,570,337 00

SAN BENITO COUNTY.

BY THE SAN BENITO COUNTY IMPROVEMENT CLUB.

One of the most fertile counties is San Benito. It is larger in area than Rhode Island, with its population of half a million; this county has a population of but 6,000.

TOPOGRAPHY AND CLIMATE.

San Benito County is 95 miles south of San Francisco. It lies 25 miles inland east of the quaint old town of Monterey, and 15 miles east of Moss Landing, on Monterey Bay. The average precipitation is 12 inches annually, which all falls between November and April. In some of the valleys, particularly San Juan, and in Fairview and San Felipe, the rainfall is never less than 18 to 20 inches.

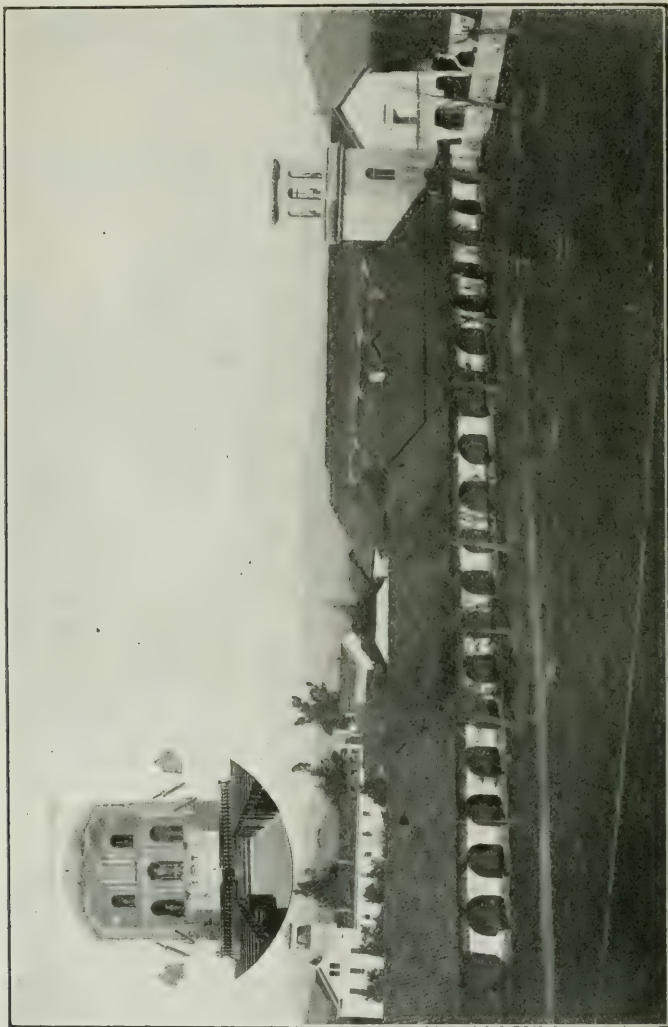
The county is 70 miles in length, and averages about 21 miles in width. From Tres Pinos south, the county opens out like a fan, stretching away for miles, following the courses of the Tres Pinos Creek and the San Benito River. To the southwest the road extends through the San Benito River country to Bitterwater Valley in the extreme end of the county. To the southeast the roads follow the winding Tres Pinos to the Panoche and Vallecitos valleys, ending at the New Idria mines. It is inclosed on two sides by mountains: on the east by the Mount Diablo or Mount Hamilton range, and on the west by the Gabilan range. From these ranges the surface slopes to the valley of the San Benito River, which flows northwesterly through the middle of the county and empties into the Pajaro River, which in turn empties into the Pacific Ocean, winding through a gap that gives to the county the refreshing ocean breezes.

THE COUNTY SEAT.

Hollister, the county seat, is a beautiful town, with a population of 3,000. It is well laid out with cement walks, graded streets, and magnificent shade trees; it has a sewer system, gravity system of water works, and electric light and gas works. The grammar school is conducted in a \$30,000 building, with nine teachers; the high school, with three teachers, is accredited to the Stanford University and the University of California. The town is well supplied with religious facilities. Presbyterian, Methodist Episcopal, South Methodist, Christian, Episcopal, and Catholic denominations are represented with fine buildings and large congregations. All the standard fraternal orders are represented by lodge meetings in the three fine lodge rooms supported by the town.

GENERAL RESOURCES.

San Benito County has many elements vitally necessary to be considered in the selection of a home or place of business. Climate is



SAN JUAN MISSION.

one of its chief attractions. Proximity to the coast makes it a pleasant one, and the fact that it is not right on the coast renders it suitable for those who cannot live too near the ocean. Sufferers from asthma, lung trouble or catarrh can here find climate that will at least benefit, if

not cure. Mineral springs of different kinds abound, and beautiful mountain scenery can be enjoyed from every front door.

The soil of San Benito County is chiefly sediment, light and loamy. The soil in the valleys is mostly a rich, deep sediment or alluvium. This is particularly true around Hollister, in the San Juan Valley, and at San Felipe. Five good public highways lead to Hollister; one from San Juan eight miles to the west, one from San Felipe eight miles to the north, one from Palmtag's vineyard and vicinity ten miles to the south, one from Tres Pinos seven miles to the southeast, and one from Lone Tree, Fairview and Santa Ana districts to the east. These roads are all hard, well graded, and in good condition the year round.

In the southern part of the county are situated the famous New Idria quicksilver mines, the largest producer in the world; the annual shipments exceed 200 tons.

In the way of gorgeous mountain scenery the county presents the Vancouver Pinnacles, the largest conglomerate mass of boulders in the world, covering seven sections of land and rivaling in beauty the famous Yosemite Valley or the Grand Cañon of the Colorado.

POULTRY.

In the Hollister and San Juan valleys poultry-raising has become one of the leading industries, and it is successful beyond anticipation by reason of climatic conditions. The capital required for a start in the poultry business is infinitesimal. Newcomers, even though not experienced, have no difficulty in meeting with success. From \$1.25 to \$2 per hen has been realized in the business in a year. In the season of 1902-03, with 850 hens feeding on land valued at \$35 per acre, Gustav Brown cleared a net profit of \$1,163.70, or about \$1.36 per hen, and had 400 pullets left.

The climate is peculiarly adapted to the successful raising of poultry. The trade winds reach the valley after passing over the distance from the coast, shorn of their chill, yet cooling the heat of summer so that it is free from extremes, fog and winds. There are scarcely ten days in the year when chickens can not be outdoors. Land in any part of the county is adapted to this business. In the country several miles from town, it can be bought from \$5 to \$10 per acre. Peddling wagons run a distance of 60 to 65 miles gathering up the products and paying cash. A person can take five acres in the San Juan or Hollister valleys, embark in the raising of poultry, give the business intelligent attention, and be in possession of a cash income three months after he has finished his improvements.

AGRICULTURE—HORTICULTURE.

Hay is the main export, San Benito County raising one fifth of the hay produced in California. Hollister is the largest single shipping point in the State, the average shipments amounting to 25,000 tons annually. The hay crop for 1904 ran over this amount for Hollister and vicinity, with 35,000 for the county. Hollister hay is shipped East to Chicago, New York, St. Louis, Cincinnati, Memphis, Lexington, and other points. The fine quality is due to superior climatic conditions—

absence of fogs, extreme heat or cold—making a perfect sun-cured hay. The largest hay warehouses in the world are at the Hollister station, furnishing steady employment to several crews the year round.

Fourteen thousand tons of grain were shipped, in addition to the large quantities retained at home for use as poultry food. Barley and oats are among the principal products.

There were also shipped 4,000 tons of fruit, consisting principally of prunes, apricots and pears. Walnuts and almonds are receiving some attention.

Other shipments were: Wine, 80,000 gallons. This is the product of a single vineyard, in the foothills nine miles south of Hollister. It is surrounded by thousands of acres of similar land, awaiting the magic touch of the viticulturist. Hogs, 1,600 head, all raised on wild



HAULING WHEAT.

feed and pasture lands. Cattle, 3,200 head: cattle live in the open air all the year. Horses, 800 head, chiefly of thoroughbred Percheron and Shire stock. Poultry, 5,502 dozen. Eggs, 870,526 dozen.

BUSINESS OPPORTUNITIES.

With San Benito recognized as the section preëminent for successful poultry-raising, the already large business is bound to increase. The demand for incubators, brooders, and other appliances will justify the establishment of a factory here. The poultry business is a demonstrated success.

A thousand acres can profitably be set out in strawberries and other small fruits to fill the demand from nearby markets. For the vineyardist there is land at \$10 to \$25 per acre, not merely twenty, thirty, forty or a hundred acres, but thousands. In the Gabilan hills, a most thrifty vineyard flourishes upon the steepest slopes. Farming land for hay and grain can be purchased at \$25 to \$60 per acre. Land can be rented on shares, the renter only taking the risk of labor and seed. Many of our prosperous farmers to-day secured their start by renting land.

IRRIGATION.

The San Benito River furnishes winter irrigation to about 3,000 acres in Hollister Valley. This water is used in orchards and on dairy farms; one flooding generally suffices for the former, and two floodings generally keep the pastures green late into the summer. Where land can not be irrigated from the river, pumping from wells is resorted to. The average cost of pumping irrigation can be figured at \$1.25 per acre. Fifty plants are now in use in the valley, ranging from 10-inch pumps and 60-horsepower engines to 5-horsepower engines and 2-inch pumps. In almost every section a supply of water can be reached at an



SENATOR THOS. FLINT'S LAKE IN GABILAN MOUNTAINS.

average depth of 80 feet. Fifteen miles south of Hollister is the site of an immense storage reservoir. This reservoir, catching and holding the flood water of the San Benito River, will furnish sufficient for summer irrigation.

HONEY.

In the foothills there is room for a hundred thousand beehives. The sagebrush bloom and countless varieties of wild flowers furnish nectar the greater part of the year. Land for apiaries can be bought for from \$3 to \$5 per acre.

Stock ranches are valued at \$4 to \$15 per acre, according to location. Thousands of acres in the Hollister and San Juan valleys are suitable for seed farms. The seed farms now under cultivation in the vicinity

of Hollister show conclusively that the industry is practicable and successful.

FRUIT BUSINESS.

Orchards are fast supplanting the hay and grain fields, and adding materially to the wealth of the county. Orchardists are making money wherever they give attention to the business. The San Juan Valley has 10,000 acres especially adapted to the raising of apples, with a market at every man's door. Apricots, prunes, peaches, walnuts, almonds, in fact every fruit, save tropical, can be grown with profit in any section that can be reached with water. One orchard in the foothills of the Gabilan range has produced over 110 tons of dried fruit annually. A pear orchard has produced at the rate of \$552 net per acre, when the price was 90 cents per box. Winter Nelis pears from the San Juan Valley are conceded by packers to be the best grown in the State and are shipped to Europe, reaching there in perfect condition for the winter holidays.

DAIRYING—STOCK-RAISING.

Among the varied industries of the county, that of dairying is rapidly forging to the front, adding to the wealth of the community generally, and making the dairymen independent. While dairying upon a small scale has been carried on from an early period, the development of the last few years has been something remarkable. The old method in vogue, that of milking herds of graded cattle only in the spring when wild feed is abundant, has given way to more scientific and systematic methods, that place the business upon a sound basis and make it an all-year-round business proposition. Improved styles of manufacture and handling of products have also brought greater profits. No longer is it necessary to await the return of sales account from commission houses. The dairyman sells his product for cash, and in turn can pay cash for his supplies, and thus a constant stream of cash, ever circulatory, instills life into business communities. The oldtime owner ran yearly accounts, generally settling up in what was known as the "spring flush." His cows were common stock that were milked only while the grass lasted. The owner of to-day pays as he goes, for whether he sells to creamery or factory, the money for his product awaits his call; he has a permanent, prosperous business that builds good houses, good barns, buys better stock, sends the children to schools and colleges, and puts money in the bank. The basic principle of the dairy business in San Benito County is the feed. Land is here in endless variety, and where it can be reached with water, the soil will grow anything that will grow elsewhere on earth. The standard feed is alfalfa, which grows to perfection. Upon land in the San Felipe section, which is unusually well watered, five crops of alfalfa are, upon an average, cut during a season. The first cutting is generally in April, and then again every six weeks until the fall, when the fields are pastured until spring, except during the stormiest weather. In sections reached by the canals of the Hollister Irrigation Company four crops is the average, or about seven tons to the acre. Underground streams of water are abundant in all sections of the county, and to the extension of the pumping

system is largely due the development of the dairy business. Due north of Hollister is a 100-acre tract of alfalfa belonging to Daniel McCroskey. From three wells the water is raised 30 feet, and carried over the tract in ditches. Steam is the power used, with oil fuel. The oil is laid down at the plant for 72 cents per barrel. A careful accounting shows the cost of irrigating this tract, including labor, to be \$1.25 per acre. Near the McCroskey farm is the Buttingham place, also irrigated by steam power. Three wells furnish water for 55 acres of alfalfa, at a cost of \$1.20 per acre. Upon this place six crops of hay were cut last year. Farther south is the forty-acre tract belonging to R. Hardin, irrigated with two wells and a gasoline engine. Still farther south, P. J. Dooling, manager of the creamery, has 75 acres, irrigated once annually from the irrigation canal, and he cuts an average of three crops before pasturing. There are numerous other pumping plants, the owners of which are preparing land for alfalfa, or pumping water for the use of others. Anywhere in the valleys water can be obtained at an average depth of 30 feet, and centrifugal pumps easily lift it to the surface. In summer, when old Sol has turned the grain and hay fields yellow, and seasoned the native grasses, the alfalfa fields stand out like oases in the desert, the cattle waxing fat and their owners waxing wealthy. Land suitable for raising alfalfa may be purchased at from \$60 to \$75 per acre. This is not land upon the irrigation canals, but land upon which water can be developed and a pumping system installed. The cost of such installations varies from \$10 to \$20 per acre. The West-Side Irrigation Company, an association of land-owners, is now completing a plant northwest of Hollister which will irrigate 300 acres at a primary cost of \$17.50 per acre.

Is there room in San Benito County for an increase in the dairy business? Most decidedly. The Hollister Creamery, now in its sixth year, has never received milk enough to work up to its full capacity. Tests of milk are made twice a week, or oftener if demanded, and the test determines the price paid for the product. For milk averaging 4 per cent butter-fat, payments will be about \$1 per hundred pounds the year round. The highest price received for butter was 38 cents per pound, and the lowest 19 cents. Taking out the cost of manufacturing and a slight profit, the balance is divided among the dairymen. The skim milk, after separation from the cream, is sold to the dairymen at one half cent a gallon, and is used principally for hog feed. Scattered all through the country are innumerable cheese factories, some of them worked upon the coöperative plan, but others are individual enterprises. All are meeting with success and disposing of their products in the various markets of the State; but a new and greater market is looming up for the dairymen, a market that will call for a fourfold expansion within a very short time. In one of the suburbs of Hollister there is now in course of erection the Alpine Evaporated Cream Factory, which was located through the California Promotion Committee. This installation will require many tons of milk daily to meet the demand for its product, and expects to have milk shipped in from all points within 50 miles. That this may be possible, an extremely low freight rate per 100 pounds has been guaranteed. The factory will start with a capacity for working up twelve

tons of milk daily, and its product will only be limited by the amount of milk obtained.

A careful estimate is given of the number of cows that can be kept upon an acre of alfalfa. Where the growth is vigorous and constant,

a cow and a half to the acre will give the animal plenty of feed and allow of storing for the winter, but the average is one cow to the acre. The best cows will net a profit of from \$4 to \$5 per month, or \$50 a year upon the average.

The climate of the county is ideal for this business. During the winter there is no snow, and but very little stormy weather. It is not necessary to house the cattle during the year. Open sheds to turn the rain in winter answer every purpose for protection, and milking is done in the open air for the greater part of the year. Sickness among cattle is particularly unknown. For the convenience of dairymen, skimming



OIL WELL. NEAR HOLLISTER.

stations have been established at central points, and the cream is gathered by route agents and conveyed to market. This does away with the expensive hauling, and enables the product to come a greater distance seeking market.

There is no business better than that of dairying, for it affords a cash income from the start, and there are plenty of opportunities in San Benito County. Land is cheap, and the business has been tried and proven successful. Numerous instances of success might be given, but a brief trip of investigation through the dairy district, with its elegant homes, substantial barns, green fields and sleek-looking stock, will tell the story more eloquently than the relation of a thousand

instances. San Benito County wants more population, more dairymen, poultry-raisers, orchardists, and small farmers.

At Hollister and San Felipe there are about 1,000 acres of alfalfa. At San Felipe, from 400 acres, three cheese factories are supported, all of about the same capacity; 103,246 pounds of cheese, the year's product



ROSES IN HOLLISTER.

from one, worth from 10 to 12 cents per pound. The annual worth of the product at San Felipe is \$40,000 from 400 acres, or \$100 per acre. During the season of 1902-03 San Benito County produced 179,919 pounds of butter and 432,157 pounds of cheese.

TRUCK-GARDENING.

Vegetable-growing for markets outside the State is an assured and popular occupation. All varieties of vegetables are grown to perfection with and without irrigation. The green vegetable shipments from the State are principally cabbage, cauliflower, celery, onions, and potatoes. In 1903 there were shipped out by rail and by sea 81,180 tons of fresh vegetables. Truck-gardeners plant and harvest every month in the year.

SUGAR-BEET RAISING.

The raising of beets has met with success. It is one of the most important branches of agriculture, and gives promise of still greater development. The advantages are: early maturity of the beets, earlier opening of the campaign, longer season for harvesting, longer run of the factory, greater yield per acre, greater per cent of saccharine, immunity from frost and rain at critical periods. The sale of beets is contracted for at the time of planting. The tops are sold to dairymen at \$1 per acre and find a ready sale.

HOP-GROWING.

In the artesian belt hop-growing is quite an important industry, and the business is profitable. In the same section tobacco has been successfully grown.

MINERALS.

The county produces quicksilver, lime, antimony, hematite, manganese, gypsum, coal, asbestos, and copper. Traces of gold and silver have been found in the mountain ranges. Within three miles of Hollister is an immense bed of pottery clay. In the eastern range ledges of copper have been found which have been pronounced by experts to be another Iron Mountain.

TRANSPORTATION.

The Southern Pacific Company runs two passenger trains daily between San Francisco and Hollister, also one freight. Surveyors are now in the field locating the line for a proposed extension of the electric railroad from Watsonville to Hollister, which will give the two great valleys of the county a competitive rail and sea route to San Francisco.

Tres Pinos, 6 miles south of Hollister, is reached by two trains daily on the Southern Pacific. It is one of the most important shipping points of the county, being the depot for the product of the New Idria quicksilver mines, and the Cienega limekilns. It is the site of immense hay and grain warehouses. The annual shipments of grain approximate 6,000 tons, while of hay they total 15,000 tons. The shipments also include live stock, poultry, fruit, and general merchandise.

GENERAL STATISTICS.

Area, 1,476 square miles, or 944,640 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	562,382
Value of country real estate	\$3,890,965
Of improvements thereon	616,900
Of city and town lots	288,035
Of improvements thereon	370,000
Of personal property	1,041,065
Total value of all property	6,525,382

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value
Cattle	16,537	\$248,060	Mules	39	\$1,560
Cows	2,600	65,000	Sheep	14,685	29,370
Calves	7,555	60,440	Lambs	2,495	2,495
Swine	3,030	9,100	Goats	635	1,270
Horses—Standard-bred	28	4,950	Poultry (dozen)	5,840	14,600
American	3,492	127,215	Hay		91,125
Colts	1,579	20,525	Lumber		8,220

Number of acres sown for crop of 1904:

Wheat	6,320
Oats	890
Barley	28,430
Hay	12,310

Acres of bearing grape vines growing in spring of 1904:

Table	15
Wine	175

Number of fruit trees growing in spring of 1904:

	Bearing.	Non-Bearing.		Bearing.	Non-Bearing.
Apple	8,500	1,100	Pear	9,500	2,500
Apricot	14,500		Prune (French)	75,000	7,000
Cherry	2,500		Prune (other kinds)	8,000	
Fig	200		Orange	100	
Olive	300		Almond	8,500	
Peach	14,070	1,230	Walnut	1,000	

Value of grain assessed in storage:

Wheat	\$3,330
Barley	17,885

School statistics:

Total number of census children, 1904	1,675
Number of teachers employed	62
Number of school houses	47
Number of school districts	46
Amount expended for public school purposes	\$35,998 04

SAN BERNARDINO COUNTY.

San Bernardino is not only the largest county in California, but it is the largest in the United States. It is larger than New Hampshire, Vermont, and Rhode Island combined; larger than New Jersey, Delaware, Massachusetts, and Rhode Island combined; very nearly as large as Massachusetts, Connecticut, and New Jersey. There are eight states whose area is less than that of this county.

San Bernardino County is in the southeastern part of the State, there being but two counties between it and the Mexican line. The greater portion is desert. In the north is the Mojave Desert; and in the east, the northern end of the Colorado Desert; the only arable portion being confined to the southwestern part—the San Bernardino Valley. With the exception of a strip along the northern border of the San Bernardino range of mountains, this valley, and the outlying valleys on the flanks of the mountains, are the only portions under cultivation. The San Bernardino Valley forms an almost perfect amphitheater, encircled by mountains and hills, open only on the west, allowing the sea breeze from the ocean to sweep its entire length.

TOPOGRAPHY.

From a topographical standpoint, the county may be considered an elevated plateau or plain, traversed by ranges of mountains, separated by low, broad passes, which give the impression that it is not a range of mountains, but isolated peaks, or masses of peaks, which have a general northwest and southeast trend. There is not what may be called a foothill region, as the mountains rise from the level of the plain to their topmost peaks in one general elevation. The lowest part of this plain is about 900 feet above sea-level. From this elevation, the mountain range at the north of the San Bernardino Valley rises to a height of from 4,000 to 6,000 feet, culminating at the eastern end in a twin-peak mountain, the lower and more conical elevation being Mount San Bernardino, with an elevation of 11,800 feet, and the taller, Mount San Gorgonio, with an elevation of 12,600 feet, possessing the unique distinction of being the highest mountain in the world which rises in an unbroken mass from below the sea-level to its topmost pinnacle. In the north and northeast are many isolated peaks, which evidently, at no distant geological period, were active volcanoes, as in many places the lava flow can be traced for miles. The mountains to the north and east seem as though destitute of vegetation, and ranges and peaks to an elevation of 11,000 feet are covered with forests of pine, cedar, and juniper, but only on the top and north, the south sides being bare except of chaparral, sage, mesquite, and other brush. Mount San Gorgonio is perpetually snow-capped, and from it is derived much of the water used for irrigation in the summer in the valley below, the remainder coming from the mountain range, giving a bountiful supply

for the irrigators. The melting snows being held back in the heavy growth of chaparral and brush along the mountain sides, sink deep into the soil, thence percolate slowly through permeable strata far below the surface of the earth, furnishing the supply of water from which the hundreds of artesian wells in the valley pour forth their nourishing floods. The combined waters of the streams, springs, and wells make this valley one of the best watered in Southern California.

The forests on the mountain ranges furnish the supply of lumber and timber used in the valley, and also a large supply of fuel.

Mount San Bernardino, from its distinctive cone, has been adopted by the United States surveyors as the initial point for land surveys in Southern California, both base and meridian starting from its peak.

The northern and eastern parts of the county are almost absolutely sterile. No amount of water will ever bring these lands under the plow, as the soil is composed largely of sand, in many places covered with a lava flow; in other places, vast stretches of alkali, of which soda, borax, and nitrates are so abundant as to create an efflorescence, the glitter of which is visible for many miles. Yet, along the northern slope of the mountains there are many stretches of fertile land, and small valleys which can be cultivated with profit wherever water is available. Along the Mojave River where it debouches from the mountains to the desert, and for many miles, the land on both sides is fertile, easily worked, and produces abundantly as long as the water supply is available.

WATER SUPPLY.

On the south side of the mountains the water supply, if properly conserved and economically used, is sufficient for the cultivation of all the tillable land, and can be reached by ditches or pipe-lines. From every cañon—and there are scores of them—creeks and rivers find their way to the plain below. As with most streams in mountainous countries, the larger part of these creeks are torrential; during the rainy season and after heavy rains, they flow roaring, raging torrents, but in a few hours or days become dry. Some, however, are perennial, and furnish the greater supply of water for the irrigation of the valley, and nourish and fructify the orchards, the products of which have made this valley famous. Chief among these perennial streams are the Santa Ana River, Mill Creek, Warm Creek, City Creek, Twin Creek, Lytle Creek, and San Antonio Creek. The only perennial stream on the north side of the mountains is the Mojave River.

SOIL.

The soil of San Bernardino Valley varies greatly with locality. In the eastern part, at Redlands and Highland, it is a sharp gravel or sand, with a large admixture of alluvial deposits brought down from the mountains by the wash and torrents of ages. This soil is easily worked, and with sufficiency of water is extremely fertile. In some places clay deposits are found, but these also can be worked with proper care, as they are not of a cement-like character. The soil is heavily impregnated with iron, and is rich in potash and other necessary constituents of plant life. West of Redlands, at Old San Bernardino, the soil changes to a heavy, dark loam, with occasional patches of adobe. Still farther west, between Old San Bernardino and the river, the soil is of a lighter

character, and possesses much more of the soda and potash constituents. North of San Bernardino, and about Rialto and Cucamonga, the soil is a light, sandy and gravelly loam. Immediately about the City of San Bernardino the soil is a strong adobe, with appearances here and there of soda salts. About Colton and Ontario, and especially on Colton Terrace, the soil is a sharp, gravelly loam, similar to that of the Redlands and Highland section. Along the river bottoms the soil is a heavy clay, and in some places a black adobe. It is cold and damp, and not as suitable for fruit-culture as for grazing and the growing of hay.

RAINFALL.

The rainfall varies a great deal, as does the climate. Passing from the lower levels to the high altitudes the rainfall increases. The general rainfall in the lower portions of the valley will average about 13 inches; on the mountain slopes it will run from 15 to 20, and on the mountain ranges and peaks from 40 to even as high as 60. This rainfall is for the valley and south slope of the mountains, and falls between October and May. Showers between May and October are rare. The heaviest rainfall is in February and March. On the north and east of the mountain ranges, on the Mojave and Colorado deserts, the larger portion of the rainfall comes in July and August, with no rains during the winter. The rains are short, sharp, and heavy, frequently accompanied by thunder and lightning, which latter is almost unknown south of the mountains.

IRRIGATION WORKS.

In the number and character of irrigation enterprises, the county stands in the front rank. It has been justly called the "Mother of Irrigation," because here was dug the first irrigation ditch in the State, and here were raised the first crops by irrigation. It is over a hundred years since the mission fathers of San Gabriel established an outlying post, or sub-mission, just west of Redlands, and employed Indian labor to dig what is known as the zanja. This ancient ditch is still in use and within the same banks that were first thrown up by Indian labor almost a century ago.

In 1851, when the party that had been sent to California by Brigham Young, the head of the Mormon Church, to search out a site for an outfitting station for the great wagon trains which were to haul supplies from the Pacific Ocean to Salt Lake City, they selected what is now the city of San Bernardino as the location for the settlement. No sooner had they arrived with their families and household goods than they set about constructing the first irrigation system in the valley. Taking the waters of several mountain streams from their beds, they demonstrated that the use of water for irrigation not only produced bountiful crops, but that it was an absolute insurance against the disasters of dry seasons. From this beginning, the network of irrigation canals, pipe-lines, flumes, and ditches has spread over the larger portion of the arable part of the valley, even extending well up the mountain slopes. As a result, there are hundreds of miles of canals and pipe-lines, with thousands of miles of laterals and individual pipe-lines. In addition to this, hundreds and hundreds of wells have been bored, each producing a flowing stream without other or further expense, which volume

is sufficient not only to irrigate many thousands of acres, but also furnishes the magnificent supply which fructifies and renders fertile the great plain on which the city of Riverside stands. The largest of these irrigation systems is that of the Bear Valley Irrigation Company. This system commences with an artificial lake high up in the mountains, where the waters are held by a solid masonry dam across Bear Creek cañon. In this lake, when full, are stored 10,000,000,000 gallons, or 26,465 acre-feet, of water. This water travels for miles in a natural gorge made by Bear Creek and the Santa Ana River. From this, at the mouth of that river, it is diverted into cement ditches and pipelines, and through them distributed for use.

The Arrowhead Reservoir Company is another gigantic irrigating system furnishing water for many thousands of acres of land in the western part of the valley. This water supply, coming from the high Sierras, and derived from melting snows, is exceptional in purity and freedom from deleterious substances. Almost all the towns in the valley are supplied with pure water by means of subsidiary reservoirs, pipe-lines, and artesian wells, which assure the absolute purity of their domestic supply. The energy and enterprise of the people have turned the droughts of the past years that seemed at first to threaten serious calamity into a blessing, for it has developed a new source of water that has proved an insurance against dry years. Wells have been bored in every section of the valley, in many of which an artesian flow was developed; and where flowing water was not found, pumping plants have been installed, which have added thousands of inches of irrigation water to the available supply in this and in the adjoining county of Riverside. There is no fear of any serious damage to horticulture or agriculture by reason of a failure of rain, for this underground water supply is inexhaustible; its primary source apparently lies far beyond the region of the mountain ranges. Many hundreds of thousands of dollars have been expended in this subterranean exploration for water, and the result amply justifies the expenditure.

FRUITS.

Almost every variety of fruit can be produced in some part of this county. The only exceptions are those strictly tropical. In the mountain valleys and upon the upper plateaus, apples and cherries are grown in as fine a quality as can be found anywhere, and their cultivation, in proper localities, has proven very remunerative. On the lower levels, all the deciduous fruits are produced, the principal varieties being peaches, apricots, prunes, and grapes. The production of oranges, lemons, and pomeloes is large, these fruits being grown to perfection. It is more than forty years since the first orange trees were planted in this valley, although the production of citrus fruits on a commercial scale dates back only about twenty years. The production of oranges has increased rapidly during the last few years, the shipments for last season reaching almost 200,000,000 pounds. The first planting of orange trees were two set out by Anson Van Leuven in his dooryard in Old San Bernardino in the early sixties, and by M. H. Crafts at Crafton, at about the same time or a little later.

The chief fruit-growing sections are, in the order of their importance, Redlands, Ontario, Highland, Colton, and Rialto. The leading fruits

are of the citrus family. Almost one third of the oranges shipped from the State are produced in this county.

Some of the finest apple orchards in the State are in full bearing.

In the western part, in the Rialto, Etiwanda, and Cucamonga neighborhoods, there is produced a large quantity of raisins, which rank equal in quality and appearance with the best. Another section of the county especially adapted to the culture of grapes is that about Hesperia, which lies along the Mojave River.

SUGAR.

In the southwest corner of the valley is located the Chino Ranch, on which is the third largest beet-sugar factory in the world. The acreage devoted to sugar-beet culture is in the neighborhood of 20,000. The factory has a capacity of about 12,000 tons of refined sugar annually. The lands of the Chino Ranch are peculiarly adapted to the raising of sugar-beets, producing roots of an exceptional sugar content and of a high degree of purity. The culture of sugar-beets has been a profitable industry for the farmers. On this ranch are fattened thousands of head of cattle upon the beet pulp, which is siloed for that purpose.

A marmalade factory in Redlands has a capacity of 300 gallons per day.

HONEY.

Along the slope of the mountains, and in the mountain valleys and cañons, are numerous bee ranches, from which is produced a large amount of honey, which commands a high price in the Eastern markets. The county ranks second in the State in the production of honey.

LIVE STOCK—DAIRYING—AGRICULTURE.

The raising of cattle and sheep is carried on along the mountain ranges and in the upper mountain valleys. Several large bands of sheep are grazed on the ranges, and the annual wool clip is about 300,000 pounds. Dairying is carried on in both the upper and lower valleys, the principal dairies and creameries being in the Cajon Pass, Yucaipe, Victoria, Chino, and a section about the city of San Bernardino. Pure-bred or grades of high-class dairy cattle are in general use. A stock company for the breeding of the most desirable classes of horses has purchased a large ranch at Victor to be devoted exclusively to their raising.

Wheat, oats, and barley are grown in considerable quantities, and alfalfa is raised with profit.

Vegetables of nearly all descriptions are raised, the yield being large, and a growing shipping trade to outside markets has been established.

MINES AND MINING.

The northern and eastern portions are heavily mineralized, and although prospecting has been carried on for fifty years, new and greater finds are being made every year. Almost every known mineral has been discovered. Gold, silver, copper, iron, tin, lead, borax, soda, and nitrates are found in abundance and scattered over a wide area. Some of the richest silver mines in the State are in this county. Copper

exists in great abundance, and recent developments have shown some of these properties to be of extraordinary richness. The high cost of freight, the scarcity of water, which renders the life of the prospector precarious as well as interfering with the working of the mines, the scarcity and high cost of fuel—all combined have limited prospecting and retarded mining development. The building of railroads across the desert has partially removed some of these obstacles, and mining has been prosecuted with more vigor during the past year than for almost any time in the last twenty. New mines are being opened, new mills being built, new finds being made, and the outlook for the mining industry is bright indeed. At Declezzville, a few miles west of Colton, immense quarries are being operated, supplying rock for the Government breakwater at San Pedro Harbor. There are thousands of men engaged in mining, so there are thousands of consumers for the products of the farmer and fruit-grower in the arable portion.

GENERAL STATISTICS.

Area. 20,055 square miles, or 12,835,200 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	459,985
Value of country real estate	\$6,732,600
Of improvements thereon	2,400,820
Of city and town lots	2,154,525
Of improvements thereon	2,620,245
Of personal property	1,709,420
Total value of all property	20,818,169

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle—Beef	480	\$12,000	Swine	3,030	\$9,100
Stock	8,730	61,110	Colts	210	1,050
Thoroughbred	92	2,760	Mules	39	1,560
Cows	2,600	65,000	Sheep	14,685	29,370
Calves	7,555	60,440	Lambs	2,495	2,495
Horses—Thoroughbred	55	4,025	Goats	635	1,270
Standard-bred	110	8,250	Poultry (dozen)	725	1,450
American	2,180	44,690	Hay		1,920
Common	1,430	21,450	Lumber		40,950

Acres of grape vines growing in spring of 1904:

	Bearing.	Non-Bearing.
Raisin	8,250	2,300
Wine	6,500	2,800

Number of fruit trees growing in spring of 1904:

	Bearing.	Non-Bearing.		Bearing.	Non-Bearing.
Apple	12,500	1,500	Pear	2,800	800
Apricot	47,500	1,800	Prune (French)	21,500	13,000
Cherry	9,800	2,300	Lemon	165,500	25,500
Fig	1,600	800	Orange	1,150,000	530,000
Olive	21,500	13,000	Almond	1,700	350
Peach	62,000	2,000	Walnut	3,950	250

School statistics:

Total number of census children, 1904	8,927
Number of teachers employed	206
Number of school houses	90
Number of school districts	53
Amount expended for public school purposes	\$197,582 58

SAN DIEGO COUNTY.

By H. P. WOOD,

Secretary Chamber of Commerce, San Diego, California.

San Diego County occupies the southern part of the State, and has an area slightly larger than Massachusetts. The Pacific Ocean washes its shores for upward of 75 miles. The land rises gently from the ocean for a distance of about 50 miles to a chain of peaks forming the backbone of the county, descending again quite rapidly to the Colorado River Valley, the greater part of which is below sea-level.

ARABLE LANDS.

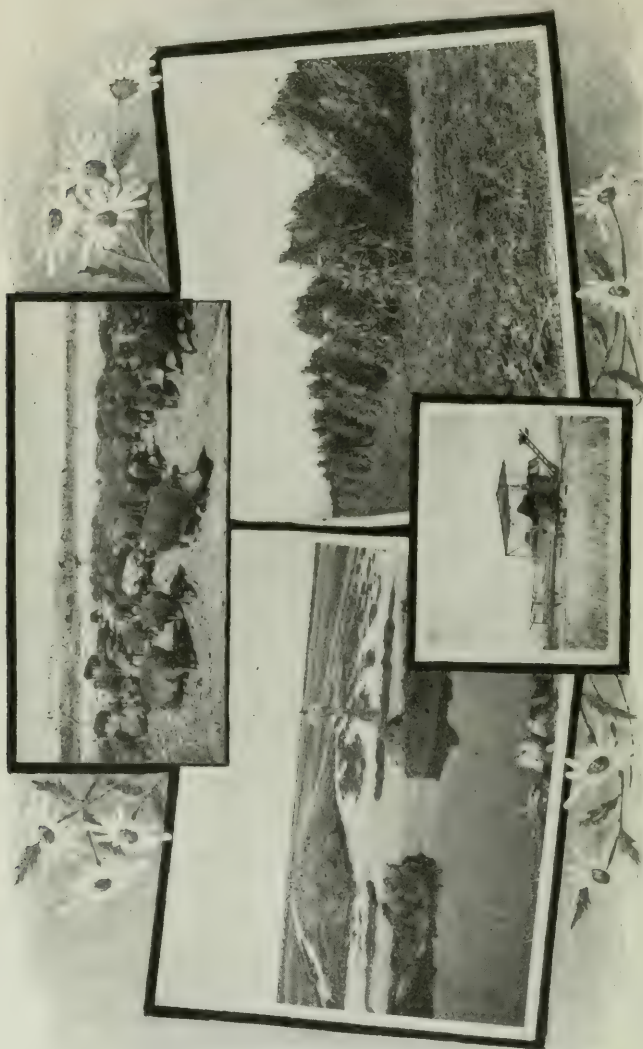
The arable portion of the western slope is divided into a series of irregular terraces or plateaus. The lower or coast terrace comprises the Tia Juana, Otay, Sweetwater, Mission, Soledad, San Dieguito, Agua Hedionda, San Luis Rey, and Santa Margarita or Los Flores valleys, with the intervening mesas. This large acreage is practically frostless. Next come the Jamul, Jamacha, Dehesa, El Cajon, Poway, Bernardo, San Pasqual, Escondido, San Marcos, and Vista valleys, varying in elevation from 400 to 500 feet. The third terrace, the altitude of which ranges from 1,000 to 2,500 feet, comprises the foothill region, consisting of Dulzura, Lyon, Lawson, Alpine, Viejas, Barona, San Vicente, Santa Maria, Ballena, Bear, Moosa, Monserrate, and Fallbrook, with numerous smaller intervening valleys, nooks, and glens. Next comes the mountain region, which includes Potrero, Campo, Moreno, Pine Valley, Descanso, Green Valley, Cuyamaca, San Felipe, Santa Ysabel, Warner, Mesa Grande, Oak Grove, and Palomar. The area of tillable land in these valleys and mesas is approximately 600,000 acres, a still larger area being suited to pasturage and grazing. The elevation of the mountain valleys varies from 2,500 to 4,500 feet. They are chiefly devoted to stock-raising, but many of them are well adapted to the growing of small fruits and vegetables and to diversified farming.

SOIL.

The arable soil of the county may be classed under two heads: granitic and adobe; though there is often a mixture of both, resembling adobe. The granitic soil is formed by the disintegration of the soft red (iron-stained) or gray granite, which forms most of the country rock, and contains an abundance of vegetable matter. The adobe is mainly clay, and will stand a larger cropping without fertilization or rotation than any other soil, but is not as easily worked as the granitic soil.

IMPERIAL VALLEY.

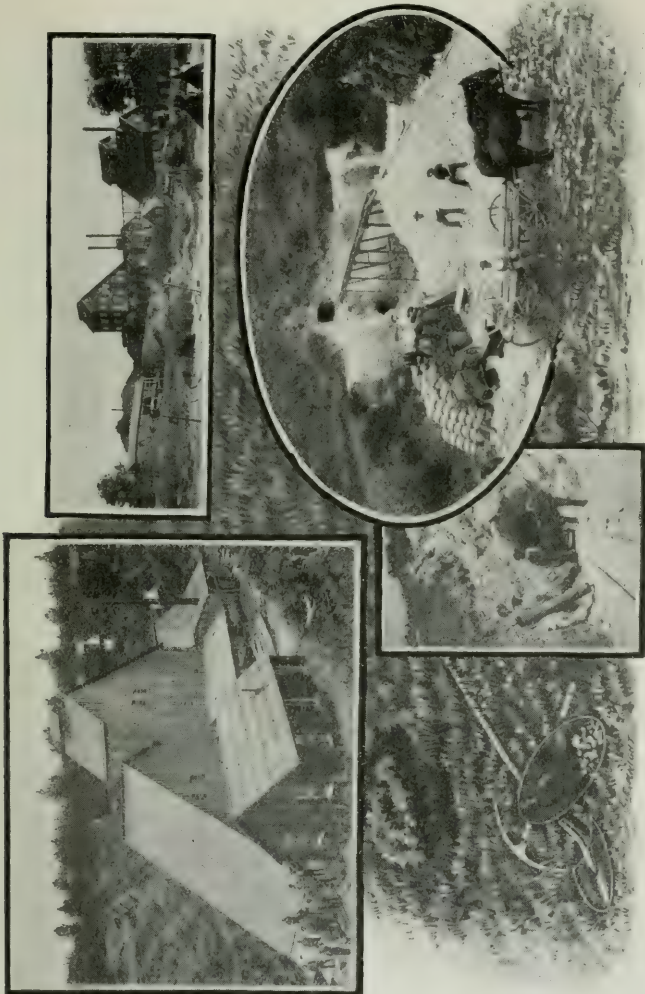
To the east of the mountains, in the delta of the Colorado, is the famous Imperial Valley. After many months of labor, and a large



SCENES IN THE GREAT IMPERIAL VALLEY, IN THE EASTERN PART OF SAN DIEGO COUNTY

expenditure of money, a generous share of the flow of the Colorado River has been diverted into this great valley, the first delivery of water for irrigation being made in June, 1901, and so rapidly have the main

canals and laterals been extended that fully 75,000 acres are now under cultivation. One estimate places the output of the valley for 1905 at 15,000 carloads of ten tons each, principally wheat, barley, cattle, and hogs; this rapid development affording employment and resulting in the building of homes for many thousands of settlers, thus adding



MINING SCENES IN SAN DIEGO COUNTY.

more millions to the wealth of the county. The center of this wonderfully fertile section is reached by a spur from the main line of the Southern Pacific Railroad. It is expected that the efforts now being put forth to build a railway east from San Diego will prove successful, thus affording to the farmers another and more direct outlet for their

products. The census of 1900 makes no mention of this section. To-day the population is estimated at over 6,000. The central town, Imperial, has a national bank, with deposits approximating \$250,000. There is also a good hotel, an ice factory, creamery, and other evidences of prosperity. Brawley is located north of the center of the valley and promises to become quite a good town. Holtville lies some 12 miles east of Imperial. It is proposed to make this place the manufacturing center of the valley, there being quite a drop in the main canal on the outskirts of the town, sufficient to create fully 2,000 horse-power, plans for the utilization of which are under way. An electric railway is being constructed between Holtville and Imperial. Calexico is the border town, being located adjacent to the Mexican line, about 15 miles south of Imperial, and will, in all probability, become the railroad center of that section. The Southern Pacific is building from Calexico toward Yuma, and has a concession for a line to Ensenada. Between Calexico and Imperial is the townsite of Heber. About 15 miles southwest of Imperial is the town of Silsbee, on the eastern shore of Blue Lake, a small but beautiful sheet of water. What until recently was described in our geographies as the dreaded Colorado Desert, bids fair to soon become the leading stock and dairy section of the great Southwest.

MINING.

The intermountain region, the hills and valleys between the plains of Imperial and the western slope of the county, is rich in minerals and affords excellent pasturage for several thousand cattle. The mineral wealth of San Diego County, though known to be great, is largely undeveloped, and offers an excellent field for the prospector and capitalist. From one group of mines at Hedges over \$2,000,000 has been taken out. A partial list of the minerals found in this region is as follows: Gold, silver, copper, lead, galena, zinc, iron, lepidolite, amblygonite, kaolin, cement, kunzite, tourmaline, garnets, crystals of epidote, chalcedony, rutile crystals, aluminum, asbestos, fire clay, fuller's earth, gypsum, limestone, manganese, marble, mineral paint, mineral soap, mica, graphite, sulphur, salt, mineral waters. Lepidolite and amblygonite, containing lithia and other valuable products, exist in greater quantities than in any other known deposit in the world. It is estimated that a million and a half tons of these ores are uncovered in the mines at Pala. San Diego is producing the finest tourmaline in the United States. There are two big deposits, the largest known, one at Mesa Grande and the other at Pala. The crystals are of exceptional hardness, possess exquisite delicacy of coloring, and when cut form gem-stones of great brilliancy. Kunzite, a new gem, not found in any other part of the world, was recently discovered at Pala and is attracting a great deal of attention. Gem experts are manifesting a deep interest in the remarkable crystallizations found in San Diego County.

RAINFALL—WATER DEVELOPMENT.

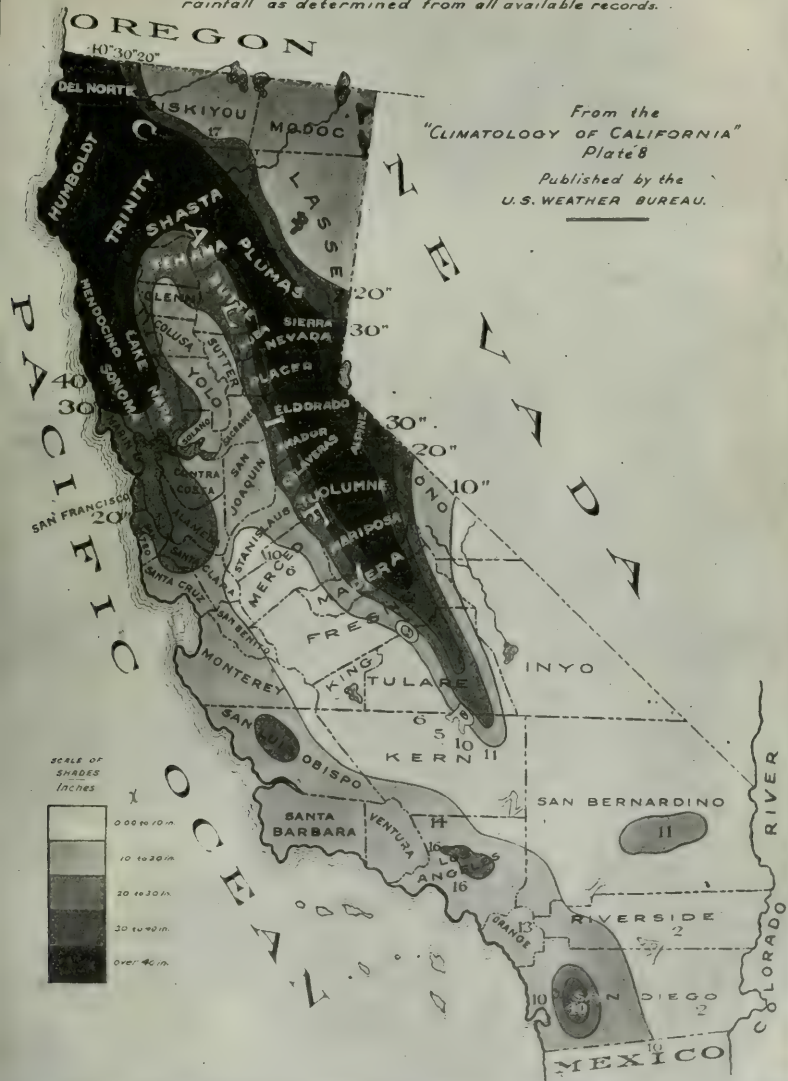
According to a bulletin on the "Climatology of California," recently published by the U. S. Department of Agriculture, San Diego County has the heaviest and most reliable rainfall of any part of Southern California. The rainfall increases, and greater extremes of temperature

TOTAL PRECIPITATION

Based on 20 years' records and 1 year of normal rainfall as determined from all available records.

From the
"CLIMATOLOGY OF CALIFORNIA"
Plate 8

Published by the
U.S. WEATHER BUREAU.



occur, as you leave the coast, the higher mountain peaks being often covered with snow to quite a depth during a part of the winter.

The progress of any locality in the Southwest is largely dependent upon its water supply, and in this line of development the county has made excellent progress, as the following table will show:

PRINCIPAL RESERVOIR SITES IN SAN DIEGO COUNTY.

Name of Reservoir.	Elevation above sea-level at base of dam.	Capacity. in million gallons.
	<i>Feet.</i>	
Barrett (under construction)	1,600	15,226
Cuyamaca (built)	4,650	3,718
Escondido (built)	1,300	1,150
La Mesa (built)	453	2,000
Lower Otay (built)	400	21,653
Moreno (under construction)	3,100	15,226
Sweetwater (built)	145	5,882
Upper Otay (completed to 70 feet contour)	540	1,000

And five other reservoirs contemplated, with estimated capacity of about 75,000,000 gallons.

Water is impounded mainly for the citrus orchards of the coast section, the higher valleys requiring but little or no irrigation for their crops of cereals, deciduous fruits, olives, vegetables, etc.

SCHOOLS.

As an evidence that education keeps pace with the population, the County Superintendent of Schools reports that there are one hundred and fifty school houses distributed through the county, the instruction in which is up to the usual high standard found throughout California.

GOOD ROADS.

The Board of Supervisors has done and is doing good work in the way of road-building, the most distant and mountainous places being readily reached over excellent highways. It is a matter of surprise and favorable comment that so much has been accomplished with such a large mileage of roads to be looked after, and with so small an amount of funds available for their care.

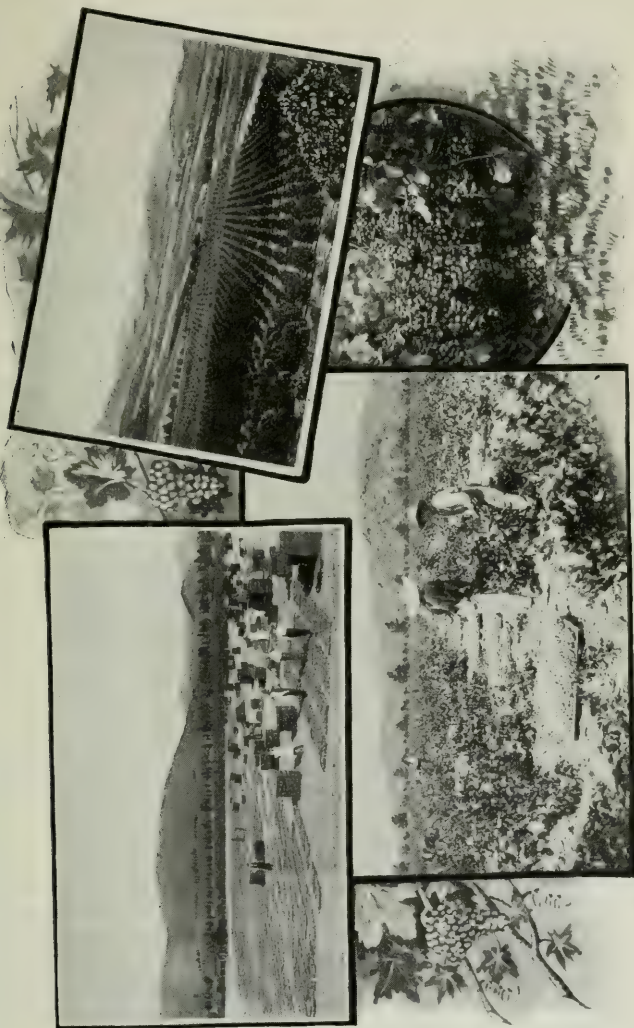
LAND VALUES.

Unimproved citrus land is worth from \$50 to \$350 per acre, with water. Improved orchards from \$200 per acre up. Deciduous fruit, olive, grape and general farming land, \$5 to \$50 per acre. Values are not inflated.

CITRUS FRUITS.

The orange, lemon, and pomelo, or grape-fruit, do well, and last year's output amounted to about 700 carloads. The largest single lemon grove is situated some 8 miles south of San Diego. There are about 800 acres in this orchard, from which last year 105 carloads, containing

2,750 boxes, were shipped. This was in addition to a consumption of 500,000 pounds, or 133 carloads, in the company's citric acid factory at National City.



SCENES IN EL CAJON VALLEY, NOTED FOR ITS SUPERIOR RAISINS AND FINE ORANGES.

RAISINS AND WINE.

Raisin grapes are a profitable crop. In a recent letter to the Secretary of the Chamber of Commerce, R. C. Allen, a prominent and reliable fruit-grower, writes: "In regard to my experience, I may say that last year, off my vineyard of 21 acres, I harvested 93,010 pounds

of raisins, which netted me \$2,714.28 at the packing-house. As the price of raisins this year is higher than a year ago, I expect still better results. I think the raisin industry has a very bright future." Where irrigation is possible, the crop is largely increased, yet most of the vineyards are grown without irrigation, and in the Escondido district the results show that the annual rainfall in that locality, at least, is sufficient. The wine product the past season has been a very good one, amounting to over 160,000 gallons.

OLIVES AND OLIVE OIL.

Olive-growers are making money. An olive grove, to be a commercial success, should be set out with a view to supplying pickling fruit, oil olives being treated as a by-product. The demand for pickled ripe olives is already in excess of the supply, and steadily growing. San Diego County olive oil has taken gold medals at many expositions in competition with oils from other parts of America and Europe.

DECIDUOUS FRUITS.

Peaches, apricots, pears, quinces, plums, cherries, and other deciduous fruits do well. The mountain region around Julian has attained a special reputation for the crisp, finely flavored apples grown there, and samples from this district were awarded a gold medal at the St. Louis Exposition.

WALNUTS AND ALMONDS.

A good walnut orchard, properly located with reference to soil and water, is a safe investment. Small areas well suited to this crop may be found in different parts of the county—notably in the Tia Juana Valley, where there are fully 2,000 acres of good walnut land. Almonds do well, and there are some thriving orchards.

HONEY.

San Diego County is celebrated for its deliciously perfumed and fine-flavored honey, which always finds a ready market at top prices. The apiaries are located for the most part among the hills and valleys back from the coast.

THE SILK INDUSTRY.

There is reason to believe that the cultivation of the silkworm may hold a most important part in the industrial development of San Diego County—the climatic conditions are so perfectly adapted to the delicate constitution of the worm, and the foliage of the mulberry may be had in such wholesome condition practically during the entire year. Many acres have been set out to mulberry trees, and those interested feel greatly encouraged over the outlook.

DAIRYING.

The dairy industry has shown a healthy growth during the past year. In 1902 there were less than 2,000 cows milked; now there are upwards of 5,000.

PRODUCTS OF THE COUNTY.

Some of the county's productions for 1904 were: 700 cars of oranges and lemons; 125 cars of raisins; 100,000 cans of pickled olives; 25,000 gallons of olives in bulk; 20,000 gallons of finest olive oil; 150,000 gallons of wine; 40,000 boxes of Julian apples; 75 carloads of honey; 10 carloads of dried peaches; 10 carloads of dried apricots; 15 carloads of dried prunes; 75,000 tons of hay; 1,500,000 centals of grain.

SMALL INVESTMENTS.

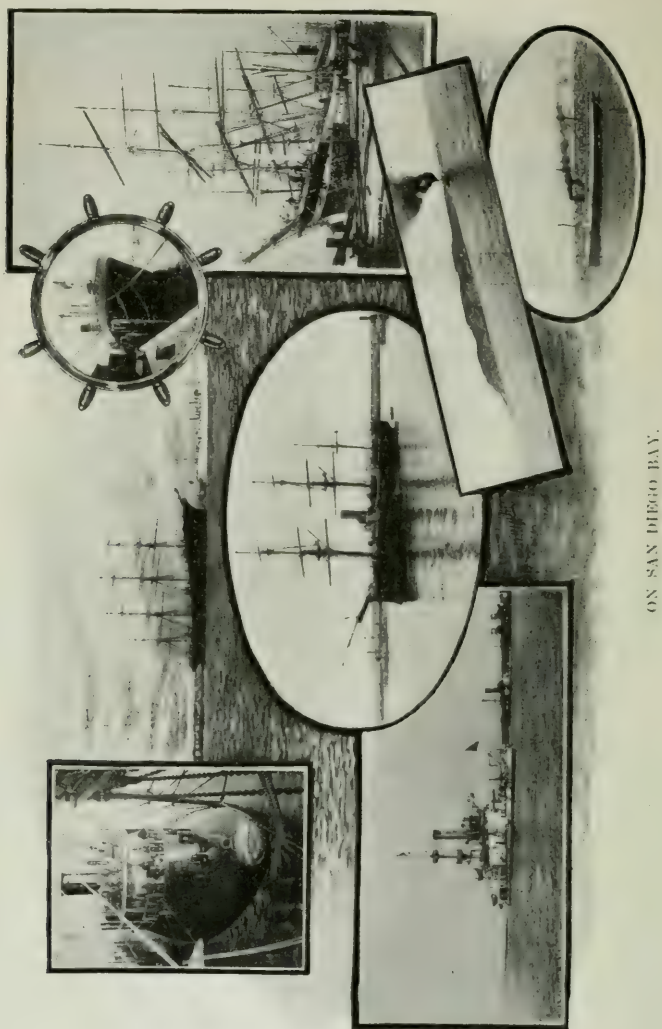
The question is often asked: What can a man do in San Diego County with from \$2,000 to \$5,000? Many instances of success may be cited where a beginning was made with very much less, and it seems that this should be the case where the soil is so rich and productive and the climatic conditions so favorable. The cost of living is reasonable, and the price of building materials compares favorably with other parts of the country.

The population of the county, according to the census of 1900, was 35,090. A careful estimate made January 1, 1904, places the number at 50,000, an increase of over 40 per cent.

SAN DIEGO CITY.

The modern city of San Diego was founded by A. E. Horton, in 1867. The situation is not only sanitary and attractive, with its hills and slopes following the curves of the beautiful bay, but it is also admirably adapted for a large ocean commerce. Numerous wharves extend into deep water, and in their neighborhood may be found lumber yards, planing mills, warehouses, foundries, etc.; then come the retail business blocks, many of them handsome structures; and beyond these, spreading out over the undulating hill land, is the residence portion, hundreds of charming homes filling up block after block. The electric street railway system is equipped with modern cars and complete in every respect. Water is provided in abundance, the supply and distribution being controlled by the municipality. The streets of the city are well lighted by electricity. The schools, private and public, have an excellent reputation. A public library, containing some 22,000 volumes, made possible through the generosity of Andrew Carnegie, supplemented by the liberality of the citizens, is situated on one of the principal thoroughfares. A fine, large opera-house, perfect in its appointments, is on the circuit of the very best theatrical and operatic companies. There are also several smaller theaters. The different religious organizations worship in attractive edifices; secret societies and benevolent associations have their lodge-rooms, and numerous musical and literary clubs are supported by an active membership. The Country Club, a prosperous affair, maintains extensive and well-kept golf grounds. There are several strong banking institutions. The hotel accommodations are excellent, and there are a number of sunny modern lodging-houses. San Diego is thrown into special prominence as being the first port of call on the Pacific Coast of the United States north of Panama, and the magnificent bay, around the shores of which the city is built, will soon become an important naval rendezvous. The Government has concluded arrangements for the erection of a large

coaling station here, and is fast completing the building of a modern military post at Fort Rosecrans, the big guns of which command the entrance to the bay.



OTHER CITIES AND TOWNS.

Just across the bay from San Diego, ten minutes by ferry, is the peninsular city of Coronado, with its world-famous Hotel del Coronado and many beautiful homes. The attractions of this place as an ideal summer and winter resort are well known from Maine to Hawaii. The

resident population is about 1,200, approximately the number that can be accommodated at the big hotel, but scarcely one fourth as many as congregate at the summer city of tents, located on the peninsula about one half mile south of the hotel, which is frequented during the months of June, July, August, and September by colonies from Texas, New Mexico, Arizona, and the interior of California, who here find a delightful refuge from summer heat.

National City, the second largest city, is situated on the southeast shore of the bay. The land here rises gently from the water-front, and is admirably suited for the location of manufacturing establishments or other plants requiring a comparatively large area of level ground with good water frontage. There are a number of attractive homes within the city limits and nestling among the lemon and orange groves in the fertile valleys near-by. The church and school facilities of the place are excellent. A large manufactory of citrus products is in successful operation, turning out citric acid, oil of lemon, lemon extracts, etc. There is also an olive oil factory, and its product is equal to the best.

Passing through Old Town, you come to Pacific Beach, a very attractive suburb of San Diego. The land is quite level near the ocean, affording one of the widest, smoothest, hardest and most attractive beaches along the coast.

Escondido is some 35 miles northeast of San Diego, being connected by a spur with the main line of the Southern California Railway. A large area of productive country is tributary to Escondido, from which last year shipments were made of hay, grain, cattle, hogs, oranges, lemons, raisins, wine, honey, chickens, eggs, butter, etc. The school and church accommodations of the place are excellent.

GENERAL STATISTICS.

Area, 8,400 square miles, or 5,376,000 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	1,246,477
Value of country real estate	\$4,525,687
Of improvements thereon	1,034,237
Of city and town lots	7,239,479
Of improvements thereon	3,429,174
Of personal property	2,858,504
Total value of all property	21,772,166

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle—Beef	800	\$16,000	Swine	6,500	\$20,000
Stock	27,000	324,000	Colts	600	6,000
Cows—American	750	18,750	Sheep	4,000	8,000
Common	12,500	250,000	Lambs	250	125
Calves	4,500	22,500	Goats	900	900
Horses—Standard-bred	20	2,000	Poultry (dozen)	1,000	3,000
American	1,200	48,000	Hay	—	16,000
Common	5,200	78,000	Lumber	—	83,290

Number of acres sown for crop of 1904:

Wheat	70,000
Oats	35,000
Barley	50,000
Corn	2,000
Hay	225,000

Acres of bearing grape vines growing in spring of 1904:

Table	200
Raisin	4,500
Wine	500

Value of grain assessed in storage:

Wheat	\$3,000
Oats	1,500
Barley	3,500

School statistics:

Total number of census children, 1904	8,318
Number of teachers employed	246
Number of school houses	153
Number of school districts	124
Amount expended for public school purposes	\$160,970 37

SAN JOAQUIN COUNTY.

BY THE STOCKTON CHAMBER OF COMMERCE.

San Joaquin County lies at the lower end of the San Joaquin Valley. The two great rivers that drain the State, the Sacramento from the north and the San Joaquin from the south, have their junction near the northwest corner of the county and pour their united waters into Suisun Bay. The San Joaquin River intersects the county, and is navigable to its southern boundary the year round. The area of the county is, generally, level valley land. In the northwest, along the rivers, is a region of reclaimed tule land and marshes, through which the San Joaquin and its tributaries flow in many channels to their junction with the Sacramento.

THE DELTA LANDS.

That part of the delta of the San Joaquin lying within the county embraces an area of 300,000 acres. Originally this entire area was covered with water during the late winter and early spring. The receding waters left it a marsh threaded with many navigable channels. Within the county, the number of miles of this navigable channel is 263. For centuries prior to the reclamation, this delta produced a crop of tules annually, growing from twelve to fifteen feet high, to die down in the fall. For hundreds of years these tules have thus died down, forming a compact, spongy mass of decayed vegetable matter, which, were it not mixed with sediment, would be purer than the peat in the bogs of Ireland. The flood waters covering this delta in the centuries gone by have been heavily charged with sediment washed from the mountains and foothills. This sediment was deposited with the layer of decayed vegetable matter, thus forming a mixture of peat and sediment soil. The soil thus formed is wonderfully rich in all those chemical elements essential to plant growth, and contains the proper proportion of grit which all arable land must contain. The chemical analyses of these soils have demonstrated that the amount of pure humus contained ranges all the way from 10 to 24 per cent.

RECLAIMING THE LAND.

It was evident to the early settlers that if any method could be found for the reclamation of the land in this delta it would result in throwing open to agriculture one of the most fertile districts in the world. Many men of experience believed that these lands could never be reclaimed because of the immense amount of dirt necessary to build proper levees. It was claimed that the spongy nature of the soil would result in a continual settling of levees; that their base would spread, and new dirt would have to be heaped on continually. Then, at that

time, there was no known machinery capable of building levees cheaply enough to be practical. The solution of the problem came with the invention of the clamshell dredge, a machine capable of handling two tons of earth at a bucketful. These dredges were sent through the navigable channels of the delta, taking the muck and clay from the bottom of the channels and depositing it upon the bank. Whenever a sufficient levee had been built around any given tract the next succeeding high water would not get over the land, and the work of reclamation was temporarily completed. The prediction that these levees would settle was found to be correct, and new dirt had to be thrown upon the first construction at intervals of from one to three years for a period of from five to ten years; and, in fact, it is doubtful if there are any levees which at some time in the future will not have settled to that point where a little labor will be necessary to further raise the crest. After the foundation levee has been substantially built, however, the additional work necessary taxes the land to a very small degree. The cost of the work of reclaiming any given tract varies greatly, according to the extent of the levee necessary. It has been claimed that an original levee can be constructed at a cost of \$1,000 a mile. If a tract to be reclaimed was an exact square, containing 640 acres, the reclaimed tract would require about 4 miles of levee, at a cost of \$4,000, which would be less than \$7 per acre. Such symmetrical tracts, however, are never found. To reclaim that amount of land would probably require from five to six, or seven, miles of levee, and, as conditions vary and accidents are met with, it is safe to say that the cost of reclamation is nearer \$20 than \$7 per acre.

IRRIGATING THE DELTA LANDS.

The irrigation problem upon these reclaimed delta lands is the cheapest and simplest known to agriculture. The surface is slightly lower than the surface of the water in the neighboring channels at high tide; consequently, all that is necessary is to tap the levee, and, by means of a floodgate, let the water flow in on the land as needed. As the water in the channels is navigable and belongs to the Government, it can be taken without cost by the farmer. Surface irrigation on these lands is not practiced. The lands are watered by the method known as "sub-irrigation." A main canal is dug along the high side of the land, and from this shallow laterals are dug across at intervals of 200 feet, more or less. The porous nature of the soil is such that water run into these laterals will find its way through and beneath the surface in all directions. Lands so irrigated yield wonderfully.

DAIRYING.

Of all the industries upon these lands, that which promises most for the future is dairying. Australian rye grass, mixed with alsike, white and red clover and orchard grass, makes a pasture peculiarly suited to these moist delta lands. If cut, this grass will yield from eight to ten tons of splendid hay per acre, and makes excellent pasture in the fall and winter. If pastured throughout the season, three acres will support four cows eight months in the year, and one cow during the four winter months. The cattle raised upon these lands are given no dried

feed whatever. The pasture furnishes green feed all the year. Beef stock are sent to the butcher right from the grass in prime condition.

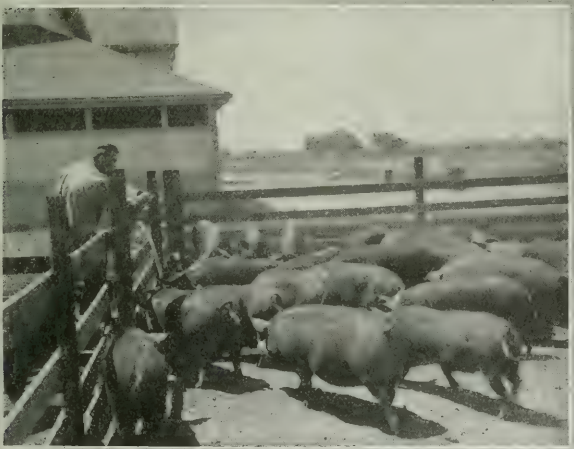
Dairy cattle that have no feed other than the grass make world's records in milk and butter. The greatest herd of Holstein-Friesians in the world, presumably, is located upon these delta lands several miles west of the city of Stockton. This wonderful herd is less than five years old, and yet, at the time this is written, it has eighty-five head of stock in the



HERD OF DAIRY CATTLE.

Advanced Registry, and it is doubtful if there is another herd in the United States or Canada that has over forty head in that registry. Since its organization it has had three world-record cows in its ranks. One of these, Juliana de Kol, holds the world's record for a two-year-old

with her first calf over all breeds, both for milk and butter, in seven, thirty, sixty, and one hundred days. She produced ninety-two pounds seven and one half ounces of butter in thirty days. She produces her own weight in milk every fourteen days. In one hundred days the milk that she has given will weigh



TURNING SKIMMED MILK INTO PORK.

three tons. No cow of her age in the world with first calf ever made such a record as she has made. This cow was sent to the Louisiana Purchase Exposition at St. Louis by the California Promotion Committee as a delegate to the National Buttermakers' Association Convention. Her mission was to bear silent testimony to the character of dairy stock produced on the delta lands of California, and to use that

testimony as an inducement to the association to hold its next convention in California. In this mission she was successful. This cow was sent to St. Louis in a private car attached to an overland passenger train, and received an ovation all along the line. Such a wonderful showing as has been made by this herd, of which Juliana is a member, would not have been possible were it not for local conditions. Those local conditions are that cattle graze upon the very best of green pasture every day in the year, in a climate which is peculiarly suited to their health. Every dairyman knows that the greatest quantity of milk is produced from green feed, and that the best results are obtained where the season of green feed is the longest. On these delta lands the season lasts from January to January.

It is the belief of those familiar with conditions on these delta lands and their wonderful possibilities, that the time is not far distant when they will be among the highest priced agricultural lands within our State. To-day the values are low compared with many other districts. The prices of these lands range from \$75 to \$150 per acre, according to distance from navigable water. Many thousands of acres are rented at a cash rental of from \$10 to \$20 per acre per year, in advance. Some of the best of the lands command even a higher rental.

VEGETABLES.

The delta lands to the west of Stockton are known to produce men as producing the heaviest yields of vegetables in the United States, if not in the world. Notwithstanding some of the reclamations in the lower part of the delta had been flooded in 1904, the total acreage of potatoes alone was 14,000 in this district. The yield from this acreage was estimated to be 3,200,000 bushels, or an average of 250 per acre. The crop reports show that San Joaquin County produces one fourth of all the potatoes grown in California. Of the 2,744 counties in the United States it stands fifth in yield per acre, and first in value of crop per acre. The Federal census of 1900 gives the value of acre yields of potatoes in the United States, and states that the money received from the sale of the San Joaquin County crop shows that it brought a gross return of \$62.05 an acre. The next highest returns in the United States, according to this report, were from the vicinity of Aroostook, Maine, where the value of the potato crop per acre was stated to be \$58.50. The next highest returns were from Franklin, New York, where the figures are given at \$55.22. From this the figures run down to less than \$20 per acre. The city of Stockton shipped 2,000 carloads of potatoes last year, most of which went to Texas and Missouri River points.

In the matter of onions San Joaquin County stands sixth in the United States in the yield per acre, and fourth in value of crop per acre. The returns from certain favored sections of the delta are phenomenal. One grower reported to the Stockton Chamber of Commerce, in 1904, that he had harvested 4,500 bushels from three acres. The report was not investigated, but the man from whom the report came is reliable, and almost as phenomenal yields were reported from other parts of the district. The total onion shipment out of Stockton last year was 1,800 carloads. The bulk of these shipments went to points east of the Rocky Mountains. The harvest of onions in the delta is

over by the middle of June, long before the Eastern onions are ready to be gathered. This gives the California onion a practical monopoly of the market at good prices.

According to the Federal census of 1900, San Joaquin County's bean crop the preceding year showed the greatest yield per acre of any county in the United States, and it also led all other counties in the gross returns in cash per acre, they being stated at \$55.03. According to a crop report issued in 1904 by the producers, the total acreage planted to beans that season was 74,960. Of this amount, 7,000 acres, about one tenth of the entire bean area of the State, is credited to San Joaquin County. The total yield is said to have been 96,264,000 pounds, or 2,400 carloads. Of this amount 11,000,000 pounds, or about one ninth of the total yield, is credited to San Joaquin County's ten per cent of area.

San Joaquin County is, area considered, the largest asparagus producer in the world. It contains 2,500 acres of asparagus farms, including one of 1,700 acres. This industry alone employs 1,700 men in season.

The wonderful yield of vegetables on the delta lands is also attributed to the character of the soil and the nature of the climate. The soil is of mixed peat and sediment, and peculiarly rich in the chemical elements essential to plant growth. The climate is mild and even. It is probable, however, that the facilities for irrigation of these lands have as much to do with their suitability for the growth of these vegetables as any other one factor. Examples of enormous yields on the sub-irrigated reclaimed lands could be recited without number, but it is best to adhere to the reports of the Government and produce buyers; these, while strictly conservative, tell a sufficiently interesting story of the possibilities of this section of the State.

GRAIN.

San Joaquin was among the first of California counties to raise wheat, and some of its lands have been growing wheat almost continuously for fifty years. Yet, notwithstanding the diversification of products, it remains the leading wheat county of the State. Some others plant a larger area to this cereal, but none approach it in production. The Federal census of 1900 places San Joaquin County several hundred thousand bushels ahead of any other county of the State in wheat output. The census figures for the crop of 1899 show some enormous outputs for counties in North Dakota, Washington, and Minnesota; but out of the 2,744 counties in the United States, San Joaquin is in the list of ten counties producing the most wheat. Among the ten leading counties of the United States it is least in wheat acreage, seventh in production, second in yield per acre, and first in value per acre for its crop.

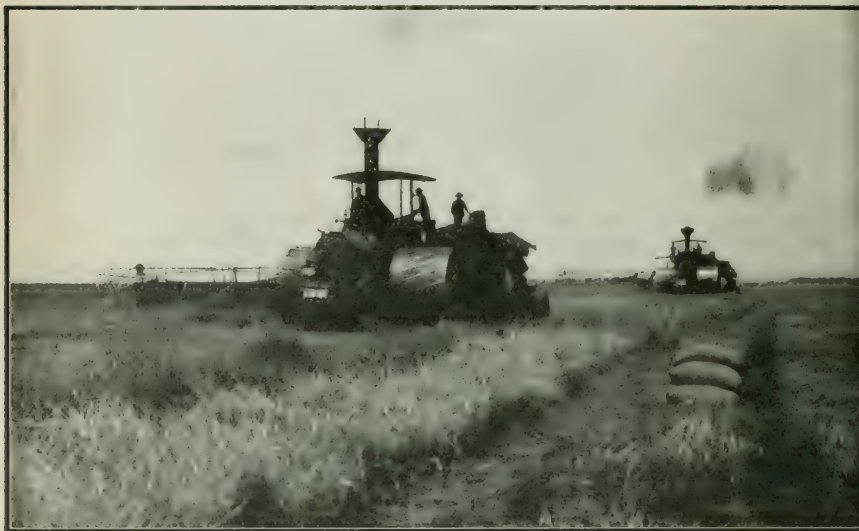
California is the leading State in the Union in the production of barley. Its production in 1899 was over 25,000,000 bushels. Of the ten leading counties of the United States in the production of barley, five of them are in California. Of the 2,744 counties of the United States the only one that had over 100,000 acres in barley was San Joaquin County. Not only is it the leading barley county in the State in area and production, but also in the United States.

In the production of rye, San Joaquin County ranks seventh in gross production, fourth in area, and eighth in yield per acre, in the United

States. It is half a bushel per acre above the average yield in the United States, and 4.6 bushels per acre above the average yield in California. The returns per acre were valued at \$6.19 for the 12.9 bushels, or 21 cents above the average in the United States.

GRAPES.

Both wine and table grapes are profitably grown in all parts of the county, and thousands of acres are devoted to their cultivation; an acreage fast increasing. Vines were first planted in the earliest pioneer days by Captain C. M. Weber, the founder of Stockton, who brought them from the old Spanish missions of Southern California. In 1852, a collection of over fifty varieties of foreign vines was brought in by



CUTTING GRAIN.

George and William B. West, and although it was soon demonstrated that its soils were well adapted to the growth of the vine, it was many years before much attention was paid to the industry. Grain farming was then so very profitable that farmers were unwilling to give up for the necessary three or four years the annual income from lands which should have been devoted to grape culture long ago. Those who did plant vines, even in a small way, made money, and have had an un-failing source of income in later years when grain was grown only at a loss. The profits of grape-growing the last few years have ranged from \$50 to \$200 per acre, according to local conditions; table grapes having, in some cases, yielded the last named figure and even more. These profits have attracted the attention of grain-growers as they did not in past years, for the reason that grain is not so profitable on our uplands as in early days, and something else must be grown. Then, again, many of our farms are being subdivided and sold in small tracts to

Eastern people who are not wedded to grain farming and who, of necessity, must look for greater profits per acre from some other source, and so are turning to the vine as the most attractive venture. Many thousands of acres are being planted under widely varying conditions and by all possible methods, and it is easy for the settler to see for himself how the work is done and to draw his own conclusions as to what is most advantageous. Nearly all the vines are non-resistant, but quite an acreage is planted every season in resistant stock whose permanency is assured. In fact, the growers are really divided into two classes: one, attracted by a smaller investment of capital and a more prompt return on that capital, choosing to plant non-resistant vines and take the chance that the vine will live a reasonable time; while other, more conservative growers, elect to plant resistant vines, waiting



BARGE LOAD OF GRAIN.

a little longer for the crop and being content to think their vineyards a permanency, worth from \$30 to \$500 per acre. The non-resistant vineyard has no established value beyond that of bare land plus a few crops. The cost of planting and growing a vineyard depends entirely upon local conditions, and upon the character of the work done; but when once in bearing, the cost of cultivation and care does not vary much from \$15 per acre per annum. This, of course, does not mean that a farmer having ten or twenty acres in vines will pay out in cash \$15 per acre, but that to hire the work done and pay for everything used in the way of hay and feed, horse hire, labor and incidentals, will cost that much. A farmer owning a vineyard in connection with general farming, is out of pocket only a very small sum in cash, for the reason that the work in his vineyard is done when nothing else could be done. To this \$15 add \$2 per ton for the actual cost of harvesting a crop, and it is evident that a very small crop will pay a profit even if the present prices of grapes were cut in two. Ten dollars per ton

will pay well, for an average of four tons per acre can be relied on. Many instances can be cited to show that even at lower prices enormous profits have been made. In 1897 many vineyards yielded from ten to twenty tons per acre and, even at the low prices then prevailing, paid from \$50 to \$120 per acre.

ORCHARD FRUITS.

San Joaquin is one of the leading orchard fruit counties. First in importance is the peach, there having been 158,220 of these trees in 1904, according to the figures of the County Assessor. Apricots come next with 99,692 trees. Other fruit trees are as follows: Prune 42,282, pear 24,861, cherry 27,207, olive 23,151, almond 19,385, apple 11,580, figs 462, orange 3,446, walnut 913, lemon 310.

STOCK.

The Assessor's figures for 1904 show San Joaquin County to be an important stock section. The figures are as follows, each indicating the number of head of each kind in that year: Beef cattle 15,764, dairy cows 15,777, mules 5,381, horses 128,353, sheep 5,000, poultry 6,300.

FLAX EXPERIMENTS.

The year 1905 opens with an organized effort looking toward the establishment of the varied flax, linen, and linseed oil industries in San Joaquin County. This work was taken up in 1904 under the direction of Justin Kay Toles, an expert of recognized ability and experience, on some of the island lands near Stockton. In spite of late sowing and extreme weather conditions, the showing made was a good one and led to the calling together of a number of representative men of Stockton and vicinity, who assembled at the Chamber of Commerce. Plans were made to extend the experiments throughout the county. A flax-fiber association was formed, a committee appointed, and funds provided for the carrying on of the work. This committee is known as the Flax-Fiber Association Committee, and is composed of such well-known men as Lee A. Phillips, secretary and manager of the Middle River Navigation and Canal Company's properties; Fred. M. West, president of the Stockton Savings and Loan Society; George W. Tatterson, ex-president of the Stockton Chamber of Commerce, and president of the Stockton Woolen Mills; and Ralph P. Lane, secretary of the Old River Land and Reclamation Company. On January 11, 1905, the Board of Regents of the University of California, on recommendation of the committee on finance, the committee on agriculture and agricultural experiment stations, and Benjamin Ide Wheeler, President of the University, adopted the Flax-Fiber Association's experiments as a part of the coöperative experimental work of the Department of Agriculture of the University, and appointed Justin Kay Toles the University's representative as an expert in charge of these investigations. At each of the agricultural experiment stations in the State, flax seed for both fiber and seed is being sown this season as part of the coöperative plan to determine the limits, if any, of the zone of flax culture in California. This will be better understood when it is remembered that the State is large, and that there are in California such marked variations of temperature, atmospheric and soil moisture, and such varieties of soil, that

any experiment which would not include tests in the different soils and under the varying climatic conditions could not be said to be conclusive. So broad and so comprehensive is the present plan of coöperative investigation that these experiments will, when completed, be fair to all communities, and should be conclusive. Flax has been grown in California, but for seed only. The general lack of expert knowledge of fiber preparation would tend to discourage this branch of the industry in its inception, unless first directed by some person technically acquainted with this phase of the subject.

In reference to the oft-repeated question relative to soil exhaustion, Professor Snyder, Bulletin No. 47, Minnesota Experiment Station, page 5, according to Prof. H. S. Bolley of Fargo, North Dakota Experiment Station, has shown quite conclusively that a normal flax crop does not make a heavy draft upon the soil. He says: "Flax does not remove an excessive amount of fertility," and closes with the following statement, placing flax last in the list: Wheat 20 bushels, barley 40 bushels, oats 50 bushels, corn 65 bushels, mangels 10 tons, potatoes 150 bushels, and flax 15 bushels of seed.

That the spirit of commercialism prompts these investigations must be admitted, else they would be only of botanical value. In view of this fact, and for no other reason than that these investigations have so vital and direct a bearing on this particular community, the members of the association in San Joaquin County are unanimous in expressing the wish to see every citizen of this county who can interest himself in promoting these investigations.

CLIMATE AND HEALTH.

The climate of the county is even and healthful, being practically the same as that of Southern California and of the countries of southern Europe bordering on the Mediterranean. Under the influence of the prevailing westerlies the winters are mild, while in summer the local sea breezes calm all extremes of temperature. The nights are always cool. Within a radius of five miles from Stockton may be found practically all products of both temperate and sub-tropical countries. The orange and the cherry, the grape and the pear, the fig and the hardy grains, the palm and the prune, are growing equally well side by side. Flowers are in bloom in the open air all the year. The mean average temperature (United States Weather Bureau records, 1871 to 1904) varies from 46.14° Fahrenheit in January to 72.7° in August; average mean annual temperature, 60.1°; average annual rainfall, 15.54 inches. In 1903 there were 46 rainy days, 56 cloudy days, 34 partly cloudy days, and 275 clear days.

GENERAL STATISTICS.

Area, 1,370 square miles, or 876,800 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	874,347
Value of country real estate	\$15,051,153
Of improvements thereon	1,811,953
Of city and town lots	6,054,170
Of improvements thereon	5,146,703
Of personal property	4,200,043
Total value of all property	35,982,206

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle—Beef	210	\$6,300	Mules	5,381	\$139,910
Stock	15,372	230,580	Sheep	23,157	46,314
Thoroughbred	182	9,100	Lambs	2,550	1,275
Cows	9,345	196,430	Goats	140	140
Calves	7,423	37,115	Poultry (dozen)	3,435	10,305
Swine		27,169	Hay		14,300
Horses—American	11,794	294,860	Wool		4,780
Common	4,617	83,110	Lumber		140,740
Colts	3,794	37,945			

Number of acres sown for crop of 1904:

Wheat	408,520
Oats	6,230
Barley	130,900
Corn	415
Hay	6,990

Acres of grape vines growing in spring of 1904:

	Bearing.	Non-Bearing.
Table	1,640	1,890
Wine	1,120	2,035

Number of fruit trees growing in spring of 1904:

	Bearing.	Non-Bearing.		Bearing.	Non-Bearing.
Apple	9,760	1,820	Prune (French)	30,900	5,930
Apricot	95,745	3,980	Prune (other kinds)	5,840	610
Cherry	21,985	5,220	Lemon	310	
Fig	4,430	1,030	Orange	2,245	1,200
Olive	18,820	4,330	Almond	12,970	6,415
Peach	138,710	19,510	Walnut	500	410
Pear	23,145	1,715			

Value of grain assessed in storage:

Wheat	\$312,645
Oats	4,220
Barley	160,735
Corn	1,560

School statistics:

Total number of census children, 1904	7,726
Number of teachers employed	182
Number of school houses	97
Number of school districts	88
Amount expended for public school purposes	\$156,248 07

SAN LUIS OBISPO COUNTY.

Bordering the Pacific Ocean for a distance of 90 miles northward from the point where its area is divided from that of Santa Barbara, lies the county of San Luis Obispo. Its area extends from the sea-line over height and valley until its eastern border is well up toward the summit of the Mount Diablo range, which separates the county from the great basin of the San Joaquin. From northwest to southeast it is divided by the mountains of the Sierra Santa Lucia, which, with their elevation of 2,500 feet, are the distinguishing line between the two sections, each of which presents entirely different characteristics in both climate and production. To the south and west, that portion of the county which opens upon the sea, presents attractions rivaling those of any part of the State. Here grow, in a climate truly semi-tropical and under skies even bluer than those of Italy, all of those products that have made Southern California famous. The orange, lemon, lime, pomegranate, and nectarine, the grape and the olive, the walnut and the prune, all thrive on the broad mesas and in the sheltered valleys which break the southern slopes of the Sierra Santa Lucia.

WATER SUPPLY.

One great factor in the development of this prolific area lies in the amount and quality of the water which finds its way to the valleys from the heights of the Santa Lucia. At extremely short distances along the entire southern slope of the mountains are perennial streams, many of them large enough to be successfully used for irrigation, although so far the development of irrigation possibilities is in its infancy. Allied to this is an average annual rainfall of 21 inches, as recorded at San Luis Obispo, the county seat, which combined with the precipitation from ocean fogs, as noted along the seacoast, effectually solves the water question for southwestern San Luis.

PRODUCTS.

On the southern border lies Arroyo Grande Valley, noted for the perfection of its crops of all classes of fruits and vegetables. The soil is wonderfully fertile, and particularly adapted to the raising of seeds and bulbs—in fact, several large seed farms are in operation, and their product finds its way to every corner of America. In the Arroyo Grande there is an abundant water supply, and a climate of agreeable mildness.

CITY OF SAN LUIS OBISPO.

It is, however, to the district directly surrounding the city of San Luis Obispo that the county owes its climatic reputation. In a beautiful valley, hemmed in on all sides by rugged foothills, lies this most attractive city. Like all the principal population centers of the South-

land, the site was first chosen by the padres who founded the Mission of San Luis Obispo de Tolosa one hundred and thirty-two years ago. For the greater part of a century this mission prospered, and was noted among the religious outposts in California for the number and quality of its cattle, its beautiful gardens, and the hospitalities extended within its gates. Of the old mission there remains only the little church and one adjoining building occupied as the parochial residence.

The population of San Luis Obispo numbers 5,000, who live under an excellent municipal system, which has done much to beautify and improve the city. There are four banking institutions carrying large deposits. Light is supplied by both electric and gas plants, and there is furnished an unfailing supply of excellent water.

Commercially, San Luis Obispo occupies a position of importance. Nine miles to the westward lies the harbor of Port Harford, which the Government is making, by means of an extensive breakwater, one of the safest and most commodious anchorages on the Pacific. This port is connected with San Luis Obispo by the Pacific Coast Railway, whose lines, extending on beyond into the Arroyo Grande Valley and the northern part of Santa Barbara County, render this whole section tributary to San Luis and her seaport at Port Harford. The main transportation artery is the coast line of the Southern Pacific system, of which San Luis is a division headquarters. This coast line cuts through the county north and south, giving daily communication with the great centers of California.

STOCK-RAISING—DAIRYING.

To the north and west of the county seat, in the great angle formed between the Santa Lucia range and the coast, lies an area which is among the most productive in the county. Its principal industries are cattle and dairying, both of which are carried on with a full measure of success. Possessing several little ports where calling steamers give direct outlet to their products, this section is independent of transportation problems, which assertion applies to the whole southern section of the county as well; for the great waterway of the Pacific can never be closed to San Luis, and thereby the transportation question ceases to be a factor when considering possibilities of market.

MINING.

Still farther north than the dairying section, and well up in the mountains, lies one of San Luis Obispo's several mining districts, noted for its quicksilver deposits. This is only one of the sections of San Luis where there is mineral in paying quantities. The mines of the county produce gold (both quartz and placer), copper, asphalt, manganese, salt, and iron, while of building materials there are lime, alabaster, onyx, and building stone in great variety.

SALINAS RIVER DISTRICT.

To the northeast of the Sierra Santa Lucia, and between that range and the crests of the Diablo, lies a section drained by the Salinas River and its tributary creeks. Possessing a much higher altitude than the country to the south of the mountains, its climate varies accordingly.

the winters bringing more chill and the summers a greater degree of heat. The horticulture of this section, while limited to deciduous fruits, is none the less attractive, the lands to the west of the Salinas River showing many successful examples in this industry. The greater portion of this area is, however, given over to the production of cereals, in which it is particularly fruitful. To the east of the Salinas the land slopes gradually up to the foothills of the Diablo range, and is less valuable from an agricultural standpoint, but specially adapted to grazing, thousands of cattle being fed upon the native grasses of these plateaus.

MINERAL SPRINGS.

The principal town of this northern section is Paso Robles, with about 2,000 inhabitants. It is noteworthy for its thermal springs and their accompanying baths. Another noted mineral spring lies 9 miles from San Luis and less than 2 miles from the beach at Port Harford. Those known as the San Luis Hot Springs are noted for their wonderful cures of rheumatic complaints. It is asserted that no instance is recorded of their failure to effect a cure where the treatment was maintained. In spite of their wonderful effects, these springs have until recently been operated without perfected accommodations for visitors and patients, but Eastern investors have taken up the work of developing their features and attractions. Excellent accommodations in the way of a hotel and cottages have been erected, making the spot intensely attractive.

San Miguel, another of the sites selected by the padres for the founding of a mission, lies north of Paso Robles, on the banks of the Salinas.

With its diversity of climate and variety of productions, San Luis Obispo County presents an inviting field excelled by no other county.

GENERAL STATISTICS.

Area, 3,500 square miles, or 2,240,000 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	1,539,654
Value of country real estate	\$7,615,989
Of improvements thereon	800,917
Of city and town lots	997,978
Of improvements thereon	1,122,835
Of personal property	2,164,305
Total value of all property	14,128,060

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle—Beef		\$3,150	Swine	8,620	\$25,860
Stock	34,733	520,900	Colts	1,219	21,952
Thoroughbred		6,400	Mules	375	11,240
Cows	17,547	298,300	Sheep—Graded	2,144	5,360
Calves		50,010	Common	2,773	2,506
Horses—Thoroughbred		1,975	Lambs	175	350
American	1,244	43,545	Goats	2,866	5,732
Common	6,658	159,780	Poultry (dozen)	10,770	23,125

Number of acres sown for crop of 1904:

Wheat	330,850
Oats	10,400
Barley	170,660
Corn	1,320
Hay	80,720

Acres of grape vines growing in spring of 1904:

	Bearing.	Non-Bearing.
Table.....	1,820	140
Wine.....	920	230

Number of fruit trees growing in spring of 1904:

	Bearing.	Non-Bearing.		Bearing.	Non-Bearing.
Apple.....	72,200	11,900	Prune (French)....	160,400	31,020
Apricot.....	59,850	6,200	Prune (other kinds).	44,200	9,600
Cherry.....	7,840	2,700	Lemon.....	14,800	7,560
Fig.....	2,440	1,250	Orange.....	4,210	1,580
Olive.....	3,230	860	Almond.....	6,000	720
Peach.....	65,350	19,100	Walnut.....	25,250	10,780
Pear.....	37,300	8,900			

Value of grain assessed in storage:

Wheat.....	\$62,960
Oats.....	520
Barley.....	20,650
Corn.....	145

School statistics:

Total number of census children, 1904.....	4,723
Number of teachers employed.....	132
Number of school houses.....	96
Number of school districts.....	91
Amount expended for public school purposes.....	\$90,167 35

SAN MATEO COUNTY.

San Mateo County is 5 miles wide where it adjoins the City and County of San Francisco. To the southward it rapidly widens, and attains a width of 20 miles in the center, and much over that distance at its southerly line. Its length is 42 miles on a straight center line. It has a frontage of 65 miles on the Pacific Ocean, and 35 miles on the bay of San Francisco. Its frontage on the bay is a gradual slope from the foothills of the Santa Morena range to tidewater. This slope skirts the bay shore, and is flanked by the Santa Morenas, which separate it from the ocean. San Mateo County covers the larger part of the peninsula which bounds the bay of San Francisco on the southwest, being separated from the Golden Gate only by the city of San Francisco. Beyond the southern verge of the San Francisco hills the bay sweeps abruptly inland. Low headlands extend southerly in irregular indentations to the county line, where the bay curves gently inland, again forming a crescent at the foot of Visitacion Valley. South of this valley the hills rise abruptly to the summit of Mount San Bruno. The Coast Range, which runs through the west of the county, has at the southern line a width of fully 9 miles of broken and semi-detached ranges, and an average altitude of about 2,500 feet.

TOPOGRAPHY.

The topography governs the climate. The Santa Cruz Mountains continue their course through the county. They trend to the northwest, and at a point 14 miles from the straits through which the waters of the Pacific Ocean flow into the bay of San Francisco, they rapidly fall in height, and seem to lose themselves in the ocean. From this point to the south side of the Golden Gate the face of the ground is broken into low, rolling hills and sand dunes of variable heights. South of the point of the peninsula the mountains rise rapidly, attaining a height of 2,500 feet above the level of the sea. This range turns the current of the sea breeze, and holds back the fog which crawls up the slope and banks itself along the summit, as though it had become entangled in the trees and shrubs which crown the crest. This mountain fog bank is the condensed freshness of the sea, out of which a cool breeze flows down the easterly slope of the range to the bay shore, cooling the atmosphere without the inconvenience of the propelling winds or actual contact with the fog. In other words, the air, warmed by the morning sun, rises up and checks the fog, while a cool breeze flows down the slope to replace it.

SOIL.

The soil is generally a warm, sandy loam, with an admixture of adobe in some places. There are about 23,000 acres of salt-marsh land on the bay side.

CULTURAL PRODUCTS.

The great interests are dairying and vegetable-growing for the San Francisco market. Orchards, up to within a few years ago, were confined practically to the "family orchard" for home use, but are now being set out, and fruit is grown for market, being found very profitable. At Pescadero some excellent apples are grown, also peaches, prunes, and other fruits.

Berries are coming to the front as a good paying crop, and the acreage is being increased very materially. Owing to the nearness to market, and adaptability of soil and climatic conditions, they are one of the best paying crops.

The olive has passed the experimental stage and been proven a paying product, and olive oil has been on the market for some time, and is considered equal to the best imported grade. An orchard of fifty acres is in bearing, and the acreage is being added to steadily. In the near future this will be one of the best producing and revenue-yielding crops.

Cut flowers and potted plants yield a good revenue. This county is now furnishing the major portion of the cut flowers to the florists of San Francisco. Raising of flowers is not confined to greenhouses, but, owing to mildness of climate, they are successfully cultivated out of doors.

STOCK AND DAIRYING.

A large amount of butter and cheese is manufactured for the San Francisco market, and thousands of gallons of milk are daily shipped to that city. There are a number of large dairies famous for their output, where extensive experiments have been made in the grasses best adapted to the soil and giving the best results in milk. Most of the dairying and manufacture of butter and cheese is carried on in the coast section, and the products shipped to the metropolis by sea. Creameries are in successful operation at Pescadero and Halfmoon Bay, and in other portions of the county.

Stock-raising, on the grazing lands of the mountain ranges, is another profitable industry. There is practically no export of stock raised, as the packing works at South San Francisco, in the county, buy up the supply and it is exported as a finished product.

Considerable capital is invested in the raising of high-class light-harness and superior carriage horses.

Poultry-raising pays. Heretofore this industry had been merely an adjunct to the general farm and orchard, but the returns have been so satisfactory that poultry ranches are being started in several places, and past experience and future outlook fully warrant capital being invested in this enterprise.

TIMBER.

It is surprising to find as extensive a tract of virgin timber so near a large city as exists in this county. In the extreme southwestern portion, in what is termed the Big Basin, there are estimated standing 100,000 acres of redwood of great size, rivaling, in some cases, the gigantic sequoias of the Sierra Nevada.

Oil has been discovered in paying quantities near Halfmoon Bay; it is of high grade, with a paraffine base.

GENERAL STATISTICS.

Area, 477 square miles, or 305,280 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	289,642
Value of country real estate	\$8,349,505
Of improvements thereon	2,922,110
Of city and town lots	2,010,635
Of improvements thereon	1,050,755
Of personal property	2,682,720
Total value of all property	17,461,713

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle—Beef	58	\$2,180	Calves	1,283	\$8,760
Stock	2,860	56,750	Swine	1,462	4,685
Cows—Graded	3,582	106,450	Colts	162	3,875
Common	6,840	168,950	Mules	38	1,540
Horses—Thoroughbred	1	2,500	Sheep	312	780
Standard-bred	5	2,250	Poultry	---	1,690
American	285	28,500	Hay	---	1,650
Common	2,462	112,680	Lumber	---	9,840

Number of acres sown for crop of 1904:

Wheat	10,000
Oats	15,000
Barley	4,000
Corn	200
Hay	35,000

Acres of bearing grape vines growing in spring of 1904:

Wine	200
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Number of fruit trees growing in spring of 1904:

	Bearing.	Non-Bearing.		Bearing.	Non-Bearing.
Apple	27,000	3,800	Pear	4,000	---
Apricot	11,800	640	Prune	31,000	---
Cherry	1,350	---	Lemon	110	---
Fig	100	---	Orange	120	---
Olive	8,750	800	Almond	560	---
Peach	1,200	---	Walnut	550	---

Value of grain assessed in storage:

Wheat	\$500
Oats	650
Barley	1,520

School statistics:

Total number of census children, 1904	3,363
Number of teachers employed	78
Number of school houses	37
Number of school districts	33
Amount expended for public school purposes	\$55,553 48

SANTA BARBARA COUNTY.

Santa Barbara County lies in the angle formed by the eastward trend of the coast from Point Concepcion. Parallel with the southern coast, and distant from 2 to 5 miles, is the rugged range of the Santa Ynez Mountains, from 3,000 to 4,000 feet in altitude. The eastern part north of this range is occupied by the San Rafael Mountains, forming one of the Government forest reserves. The western part north of the Santa Ynez is broken into several valleys, separated by ranges of hills, the larger of these being Santa Maria, Los Alamos, Santa Ynez, and Lompoc. That portion lying south of the Santa Ynez range and along the channel is the Santa Barbara Valley. The channel islands of San Miguel, Santa Rosa, Santa Cruz, and Anacapa are also included in the county.

AVAILABLE ARABLE LAND.

Traversed by mountains, there must be waste land, but there is a total of 1,088,000 acres available for practical uses, as follows: Santa Maria Valley, with the valleys that open out of it and that pertain to it, and the slopes of the foothills that bound it, 250,000 acres; Los Alamos Valley, 150,000 acres; Lompoc Valley, 230,000; Santa Ynez Valley, 200,000; Santa Barbara Valley, 108,000; two islands, 150,000.

Santa Barbara Valley lies between the Santa Ynez Mountains and the sea. It has a world-wide celebrity for fertility of soil and healthfulness of climate.

Santa Ynez Valley, between the Santa Ynez and San Rafael ranges, comprises about 120,000 acres of excellent arable land, mostly rolling. Santa Ynez River runs the whole length of the valley, which is also watered by numerous creeks. The climate differs from that of Santa Barbara, being warmer in summer and cooler in winter, but the heat is dry and not oppressive, cool nights being the rule, while the winter is clear and bracing.

Los Alamos Valley comprises about 40,000 acres of rich agricultural land, and as much more of excellent grazing land in the hills that are tributary. It lies between two ranges of hills or low mountains that separate the Santa Maria and Santa Ynez valleys, and is about 25 miles back from the coast.

Santa Maria, the largest and northernmost, lies along the river of that name. This valley, including its upper extension, the Sisquoc, is 30 miles from the foothills to the sea. Its width, including the adjacent mesa lands, is from 3 to 10 miles. Many tributary cañons break into it through the hills, mostly small, but containing rich, protected, and generally well-watered land, adapted to all kinds of deciduous and citrus fruits. The main valley has as varied resources as any in the State, on account of its large extent and differences in climate and soil. On the west it opens to the sea, and has a heavier soil and more fog. The soil of the middle valley is a sandy loam, while that of

the Sisquoc and the tributary cañons is deeper and richer. The lower and northern valley, especially the Oso Flaco side, grows large crops of beans, potatoes, etc., while farther up wheat and barley are grown. The beet-sugar industry is now assuming large importance in this valley, a sugar plant, costing \$1,000,000, having been built in 1898, and employing 500 hands in the sugar-making season. In 1904 over 100,000 tons of sugar-beets were produced, making 115,000 sacks of granulated sugar.

PETROLEUM.

The oil development about Santa Maria is attracting much attention. Many wells have been drilled, and the oil is found at a great depth, showing its permanent and inexhaustible character. The wells are from 2,000 to 3,000 feet deep, and in some instances the stratum of oil sand is 1,000 feet thick. Several gushers have been struck, and one which began throwing oil 80 feet into the air at a rate of 15,000 barrels per day on December 2, 1904, at this time (February, 1905) is spouting petroleum at the rate of 6,000 barrels per day. The product is of good quality, running from 22 to 32 degrees gravity. Indications are that there is here one of the greatest oil fields in the world. Surface indications show that it covers an area of at least 500 square miles.

LOMPOC AND VICINITY.

Lompoc is the center of a fertile farming and dairying section. It has a population of 1,500, a bank with \$145,000 in deposits, a fine high school building, and a grammar school building costing \$15,000. It is on a branch of the Southern Pacific, 9 miles from the main line at the ocean, and is an up-to-date town. It owns its water-supply, maintains a fire department, and has well-graded streets. The section tributary is well adapted to dairying, and the people are justly proud of their creamery, the product of which is the most popular butter made in this section of the State. Lompoc seems the natural home of the apple, and its exhibit took the first prize at the great fair at New Orleans, and at Chicago was awarded a diploma for excellence. The codling-moth is unknown, and the apples are never "wormy," so there is every prospect that this industry will eventually become of the first importance, especially as the demand for them always exceeds the supply. Another production of which Lompoc has a monopoly for the United States is English mustard, which is grown on a large scale.

The rainfall of the county for the year was 20.82 inches, being 3.82 above the average. The average hourly movement of the wind was but 2.5 miles, the lowest since a record has been kept, and being 1.5 miles below the normal. The greatest movement on any one day was 221 miles, or 9 miles per hour.

PRODUCTS OF THE SOIL.

The arable soils are mostly alluvium and adobe. The alluvial soil is generally deep and rich, and will grow all kinds of field crops, such as beans, potatoes, corn, vegetables, strawberries, and all other varieties of small fruits. In addition to the fruits usually grown in the Eastern States, this soil will produce prunes, figs, olives, peanuts, English walnuts, grapes, plums, lemons, limes, oranges, loquats, guavas, persimmons,

cherimoyers, dates, bananas, and other semi-tropical fruits. In fact, nearly every tree, shrub, or plant that grows in the world can be grown out of doors in the southern part of the county. The adobe soil is rich, but more difficult to work. It produces large crops of oats, wheat, barley, flax, and mustard, and affords the richest of pasturage. The principal crops are hay, barley, wheat, English mustard, apples, olives, lemons, walnuts, beans, and sugar-beets. The principal mineral productions are asphaltum and petroleum. A large portion of the county, especially that of a hilly or broken character, is devoted to stock-raising, which is the principal industry.

The following figures for the agricultural products of 1904 and the horticultural output indicate that Santa Barbara County is entitled to a very creditable standing: Barley, 500,000 sacks; wheat, 200,000 sacks; oats, 100,000 sacks; hay, 60,000 tons; beans, lima, 50,000 sacks; beans, navy, 225,000 sacks; English mustard, 2,500,000 pounds; olive oil, 40,000 bottles; walnuts, 1,500 tons; sugar, 100,000 sacks; lemons and oranges, \$200,000 worth; butter and milk, \$500,000 worth. The many other products bring the total output for the year to about \$6,000,000.

CITY OF SANTA BARBARA.

The decided improvement in the industrial and commercial conditions in the county, which began in 1901, continues unabated; every line of effort shows improvement. Not only has the wonderful oil development made the northern part most prosperous, but Santa Barbara City and the contiguous valleys are going ahead at a satisfactory rate. In main sewers and bridges the city expended \$40,000 in the past year. One and one half miles of the ocean front boulevard have been paved with asphaltum, at a cost of \$33,000. The city has let a contract for boring a tunnel through the Santa Ynez range, a distance of four miles, for the purpose of bringing the waters of the Santa Ynez River in for irrigation. This tunnel, over 2,000 feet of which is already constructed, is 5 feet wide and 7 feet high. It will connect with two reservoir sites on the Santa Ynez River, together impounding some twelve billion gallons of water. During the past year many residences have been erected in Santa Barbara, the building permits having amounted to one for each working day. The mammoth hotel erected on the shore of the bay in 1902-03 has been successful, and another is projected in the suburb of Montecito. The population of the county is about 23,000, and that of the city between 10,000 and 11,000.

PRICES OF LANDS.

The cost of farming lands remains about the same as for several years past, though an improvement is manifest in some sections. Good land in the Santa Maria Valley is worth from \$50 to \$75 per acre, unimproved, while land in the Lompoc Valley brings from \$75 to \$100 per acre. There are sections where purchases may be made at a cheaper rate, but the locations are not so convenient as regards railroad and shipping facilities. Grazing lands can be bought for from \$10 per acre upward. Land in the vicinity of the city of Santa Barbara is worth from \$200 to \$300 per acre, unimproved. Sometimes choice residence property is sold for a much higher figure, but these prices repre-

sent a fair average for Goleta and Carpinteria valley lands, and these are among the richest. The outlook for small fruits and vegetables in the vicinity of Santa Barbara is having the effect of creating a demand for limited holdings, and there is a marked increase in the values of such property.

GENERAL STATISTICS.

Area, 2,450 square miles, or 1,568,000 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	1,078,638
Value of country real estate	\$7,748,461
Of improvements thereon	1,067,735
Of city and town lots	3,362,815
Of improvements thereon	2,492,020
Of personal property	2,085,516
Total value of all property	18,797,172

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle	18,470	\$266,895	Swine	3,720	\$23,135
Cows	5,480	99,730	Colts	342	5,520
Calves	1,585	8,010	Mules	1,340	52,790
Horses—Standard-bred	23	1,860	Sheep	51,865	103,730
American	1,715	72,280	Poultry (dozen)	4,280	8,560
Common	3,485	87,810	Lumber		52,150

Number of acres sown for crop of 1904:

Wheat	26,480
Barley	34,920
Corn	680
Hay	18,940

Number of fruit trees growing in spring of 1904:

	Bearing.	Non-Bearing.		Bearing.	Non-Bearing.
Apple	13,590	7,490	Prune (other kinds)	1,365	385
Apricot	7,120	1,865	Lemon	79,280	53,520
Olive	19,470	10,620	Orange	985	540
Peach	5,405	2,045	Almond	1,310	
Pear	1,210	480	Walnut	18,460	15,920
Prune (French)	1,245	450			

School statistics:

Total number of census children, 1904	4,974
Number of teachers employed	135
Number of school houses	76
Number of school districts	63
Amount expended for public school purposes	\$98,311 61

SANTA CLARA COUNTY.

Santa Clara County is near the geographical center of California, and immediately south of San Francisco. Its eastern boundary is the summit of the Coast Range, and its western the crest of the Santa Cruz Mountains. It extends southward 52 miles, and has an average width of 34. The principal valley is the Santa Clara, which is 34 miles broad at the north, and has an average width of 15 miles. Encircling the level lands of the valley is a wide region of rolling hills, beyond which rise the mountains, culminating at the western side in Mount Bache, 3,780 feet, and on the east in Mount Hamilton, 4,250 feet. Of the total area it is estimated that 800,000 acres are suitable for the cultivation of fruits and vines; of these something more than 250,000 acres are in the valley and 300,000 in the foothills. Looking down the valley from some elevated point in the surrounding hills, the general contour presented is that of a level plain, but it is a series of gentle undulations, with marked variations in the character of the soil. In what is now, or recently has been, the lower portion of this plain, the soil is a black, tenacious, adobe clay. While productive, it requires care as to the time and manner of cultivating it, and is well adapted to hay and grain, apples, pears, and all vegetables. The higher lands of the valley are a light, loamy, and sometimes gravelly soil. This is easily cultivated, and adapted to all kinds of cereals and most varieties of fruits. The "warm belt" is a tract upon the slopes of the hills which environ the valley. It has an altitude of from 600 to 2,000 feet. It is generally, and in some localities wholly, free from frost. In this belt, to the east of Milpitas, potatoes, peas, tomatoes, asparagus, strawberries, etc., are grown through the winter for the San Francisco market.

SOIL.

Upon the Los Gatos and Guadalupe rivers, in the immediate vicinity of the city of San José, are hundreds of acres, formerly dense willow thickets, but now in the highest state of cultivation. These lands, known by the general name of "The Willows," are regarded as among the most desirable in the valley. They are dotted with lovely homes, surrounded by splendid orchards. The soil is a sedimentary deposit, easily cultivated, requiring but little irrigation, and producing every variety of fruit and vegetable common to California. In the southern portion of the valley the soil is especially productive. Over a considerable portion the subterranean moisture maintains the growing pastures throughout the year, and some of the most successful dairies in the State are established there. The more elevated portions are well adapted to fruits and vines. So wide is the divergency in the character of soil in different localities, that agriculturists are reluctant to express an opinion as to comparative merits, each section having demonstrated

its fitness for growing some of the almost endless varieties of fruits and vines, which are cultivated at almost fabulous profits. While there is no better soil in the world for the production of wheat and barley, the area devoted to the cultivation of these cereals is yearly decreasing, owing to the much greater remuneration obtainable from the growing of fruits, grapes, berries, and vegetables.

Alviso district has rich black loams, highly prized for small fruits and vegetables, and the artesian belt for splendidly flowing wells. The San José and Santa Clara regions have lighter loams and sedimentary deposits, valued for stone fruits. The shallower gravelly loams of the hillsides are desirable. Along the streams the soil is deep, well drained, and rich in desirable elements. Red chemical and chaparral land on the hillsides of Santa Clara Valley has been put in fruit. Although reddish brown when dry, and inclined to form hard lumps, its supply of potash, lime, and humus is such as to promise well under good cultivation.

The higher lands are of light loam, and in some places gravelly. They are composed of a black, tenacious, and wonderfully fertile clay loam. Along the banks of the streams the soil is of great depth and richness, while on the borders of the bay are thousands of acres of salt marsh, which, when reclaimed, is most productive.

There are many small farms, and diversified farming is the rule.

WATER SUPPLY.

The valley is drained by a number of streams, the principal ones being the Los Gatos, Guadalupe, and Coyote rivers. In summer these watercourses greatly diminish, and the smaller ones wholly disappear. Having their sources in the surrounding hills, and sinking as they approach the valley, they augment the subterranean supply of the artesian wells. These are all over the valley, usually from 60 to 100 feet in depth, though some find a larger and more permanent supply at a much greater depth. The water is raised by windmills into tanks, furnishing an ample supply for household and gardening purposes. The cities and larger towns are provided with reservoirs and waterworks.

LEADING INDUSTRIES.

Santa Clara is preëminently the horticultural county of the State. Every variety of fruit grown in California is produced, but the chief of all its horticultural pursuits is prune-growing. Of the prune crop of California, this county produces nearly two thirds. With improved facilities for marketing, this industry has, within the last ten years, assumed marvelous proportions. The largest fruit canneries in the world are operated at San José, the leading city of the county.

Olive-growing is assuming prominent proportions, and it is only a question of a few years when it will become one of the leading industries. Almond culture is extensively followed, and the nut grows to perfection in both size and flavor.

Pears do exceedingly well and grow in any part of the county. Large quantities are shipped East, and a considerable portion of the crop is canned or dried.

Apples, especially those raised in the foothills or on the mountain

sides, are of a very superior flavor and size. The Alviso, Sunnyvale, and Mountain View sections, near the bay, in the artesian belt, are producing apples of splendid quality.

Apricots are grown and reach a high standard. The bulk of the crop is canned or dried, but a large quantity is shipped green, and, next to prunes, is the important fruit industry.

The peach is largely cultivated, and much of the crop is canned or dried, though a considerable portion is shipped green. Santa Clara peaches find a ready sale in the East, on account of their excellent flavor and large size.

The cherry grows in profusion. It is one of the best shipping fruits in the county, and is profitable.

While the culture of citrus fruits is not extensively carried on, those grown compare favorably, as to flavor and size, with any in the State.

Grapes flourish, particularly the wine varieties, and many new vineyards have been planted. The outlook for this industry is bright. The product of the vineyards finds a ready sale to the numerous wineries throughout the county.

Berries of every description are grown, and the crop is prolific.

Vegetable farming is increasing, and great quantities of all kinds are shipped to the San Francisco market. Asparagus, in particular, is one of the most profitable vegetables grown. Many tons are shipped green, and several hundred tons are canned directly for the Eastern market.

The raising of seed, both flower and vegetable, is on a very extensive scale, and large quantities are shipped to all parts of the world. Santa Clara has upward of 9,000 acres in seed farms, over 3,000 acres being devoted to the growing of onion seed alone.

The dairy interest is worthy of mention. The butter and cheese yield is of a high standard, and the product is of superior quality. There are several up-to-date creameries in operation.

Poultry-raising, in all its branches, receives considerable attention, and is a profitable industry. Some of the finest chicken yards, stocked with the choicest birds, are located in the county.

The raising and feeding of cattle for market is not, owing to the increased value of land, carried on as extensively as in former years. Natural grasses are on the remaining ranges, and very nutritious pasturage can be obtained the year round.

PRINCIPAL TOWNS.

San José is the county seat; it has fine educational establishments. Palo Alto is a rapidly growing town. The Leland Stanford Junior University is located there. Sunnyvale, between Palo Alto and Santa Clara, is a growing town, and is a coming industrial city, having been selected for one of the best equipped medium-heavy and light machinery manufactories in the world, and also for the Western branch of one of the largest breakfast manufacturing concerns in the United States. Gilroy, Santa Clara, Mayfield, Los Gatos, and Saratoga are prosperous, as are many other of the smaller towns.

Information concerning this county can be had with the best of descriptive and illustrative literature by addressing the Chamber of Commerce, San José, California.

GENERAL STATISTICS.

Area, 1,355 square miles, or 867,200 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	719,247
Value of country real estate	\$28,619,495
Of improvements thereon	7,305,180
Of city and town lots	12,038,455
Of improvements thereon	7,427,130
Of personal property	5,022,040
Total value of all property	55,470,132

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle—Beef	805	\$24,150	Colts	1,497	\$22,455
Stock	8,700	139,200	Mules	132	5,940
Thoroughbred	259	12,950	Sheep	1,750	5,250
Cows	6,121	183,600	Lambs	270	540
Calves	3,391	27,128	Goats—Angora	90	450
Swine	3,713	14,855	Common	270	270
Horses—Thoroughbred	97	21,825	Poultry (dozen)	20,175	60,525
Standard-bred	249	31,125	Hay	---	11,800
American	8,340	417,000	Lumber	---	56,320
Common	3,570	71,400			

Number of acres sown for crop of 1904:

Wheat	10,120
Oats	80
Barley	10,950
Corn	85
Hay	24,850

Acres of grape vines growing in spring of 1904:

	Bearing.	Non-Bearing.
Table	280	220
Wine	2,900	2,250

Number of fruit trees growing in spring of 1904:

	Bearing.	Non-Bearing.		Bearing.	Non-Bearing.
Apple	17,100	39,000	Prune (French)	3,920,140	357,400
Apricot	541,250	9,400	Prune (other kinds)	48,710	37,900
Cherry	129,100	21,600	Lemon	365	695
Fig	1,600	530	Orange	990	725
Olive	9,320	4,750	Almond	15,420	4,940
Peach	510,700	37,900	Walnut	9,250	2,450
Pear	122,150	15,700			

Value of grain assessed in storage:

Wheat	\$1,960
Oats	3,840

School statistics:

Total number of census children, 1904	15,535
Number of teachers employed	334
Number of school houses	101
Number of school districts	82
Amount expended for public school purposes	\$270,567 46

SANTA CRUZ COUNTY.

By G. W. GRETTTER,

Secretary Pajaro Valley Board of Trade.

Santa Cruz County fronts its entire length on the Pacific Ocean. It lies midway between Oregon and Lower California, and is in the heart of Central California. It is separated from San Mateo and Santa Clara counties by the Santa Cruz Mountains, and from Monterey by the Pajaro River. It is one of the smallest counties, and comprises a narrow strip of mountainous land about 40 miles long and 18 broad, forming a vast amphitheater, and sloping from the summits of the Santa Cruz range, whose highest elevation, Loma Prieta, is 4,000 feet southward and westward to the bay of Monterey.

TOPOGRAPHY.

The curving line of shore and the corresponding curve of the mountain line inclose an irregular, crescent-shaped tract of country, with an average width of 20 miles, which for grandeur, beauty, and variety of scenery equals any expanse of similar size in the world. The innumerable ridges and spurs of the Santa Cruz range are intersected and furrowed by gorges, cañons, and narrow valleys, trending for the most part seaward. The sides of these are closely set with forests of pine, redwood, madrone, and other trees, the redwoods having, in many cases, attained gigantic growth. A number of streams rise in these hills, and bring down the rich alluvial loam into the valleys, which, in their normal condition, teem with native grasses and flowers, and when cultivated yield phenomenal results. These streams are, agriculturally as well as topographically, an important feature, watering as they do every section of land. Besides these, natural springs are innumerable. Nearing the coast, there are many interesting topographical features. The leagues of wide, high, wind-swept grassy plateaus which form remarkable grazing and dairy lands; the succession of chalk terraces, the broad amphitheatrical valley of the Pajaro; the salt lagoons, picturesque in configuration and surrounded by park-like groves of live oaks; the high sandstone cliffs along the shore; the magnificent ocean drives—all are materials for pleasant investigation.

SOIL.

Along the coast-line (except in the northwestern corner of the county at which point the mountains come down nearly to the water's edge) a series of raised benches form a strip of more elevated land along the sea shore. This widens to the south of the city of Santa Cruz, and affords a large area of fruitful soil, which has been brought into a high state of cultivation. From Santa Cruz City south the soil consists of a light

loam, abounding in lime, potash, and phosphoric acid. In the Pajaro Valley there is a great variety, from the rich sedimentary alluvial wash to the light sandy soil of the foothills. In the lower part of the valley a clayey loam predominates. This is followed by a heavy adobe higher up, and then the dark, reddish loam of the plains. The latter is the favorite with fruit-growers, and it is here that flourish the best orchards.

The average annual rainfall, taken from a record of thirty-two consecutive years, is 25.26 inches, showing that this is a well-watered district.

THE VARIED INDUSTRIES.

The charm of Santa Cruz is her infinite variety. In lumber products she ranks third in the State. Her butter, cheese, and cream might well win her a place in the dairy districts. Hay, grain, potatoes, and the whole range of cereals and vegetables give enormous yields, and while she does not claim to wear the citrus belt, yet oranges are raised for home consumption, and the cultivation of the lemon is a profitable business, since the immunity from frosts and the equable seasons favor its arriving at fine maturity. But her deciduous fruits, large and small, her table and wine grapes, her fine wines, are winning renown. From the summits of the range, more than 2,000 feet above the sea, down to the wide and fruitful valleys along the coast, grow and flourish delicious fruits. Prunes, pears, apricots, lemons, peaches, cherries, Japan and native plums, figs, walnuts, persimmons, olives, and nectarines thrive, but the crop of the largest profit is that of apples. The quality and size are astonishing, and the yield as much so. From Bellflowers in September to Newtown Pippins in December, the supply is steady. From two depots, in a late season, there were shipped to Eastern points, exclusive of other sales, 420,000 boxes of apples, weighing 21,000,000 pounds. The market for apples extends to England and the Continent, Germany being a large buyer. The acreage in bearing will supply not less than 2,000,000 boxes annually. The especial home of the apple, as well as of the strawberry, is the fertile valley of the Pajaro River, and the flavor and color of the foothill apples are renowned.

Of the small fruits, the strawberry is most widely grown, and furnishes a practically continuous crop. Last year it amounted to 100,000 chests. Raspberries, blackberries, Japanese wineberries, and the loganberry, which originated in Santa Cruz, yield unfailing crops. The loganberry is a cross between the wild blackberry and the Antwerp raspberry, and fruits in two varieties, red and black. The berry is large and luscious, and is grown widely in the Eastern-Southern States, as well as in California.

The wines of this county are winning the place they deserve, and the product of our vineyards is shipped to the heart of the wine countries of Europe. Our white wines go to the Rhine; our red wines to Bordeaux. The Ben Lomond wines were exhibited and won gold medals at the World's Exposition in Paris, at the Columbian Exposition in Chicago, at competitive exhibits in Bordeaux, and at the San Francisco Midwinter Fair. The Santa Cruz wine trade with China and Japan is good and growing.

The sugar-beet industry is profitable. A large acreage in the southern part of the county is devoted to the growth of the beets, and a well-equipped factory reduces them to sugar.

Santa Cruz ships thousands of tons of hay and many train-loads of potatoes annually. Potatoes yield phenomenally in the rich bottom lands; asparagus is grown for outside markets; hops and beans are each good enough in results for farmers to give them special attention.

Market gardening is profitable, and many comparatively small industries are making a good living for those who follow them. Among these are cucumber-growing for San Francisco and Eastern cities; seeds, bulbs, and cut flowers for metropolitan markets.

Dairying is a flourishing and profitable interest, and the fifty thousand and more acres of grazing lands have for years supported herds of well-selected stock. The grasses are rich, and the county's products of cream, milk, butter, and cheese have a good repute at home and abroad. The butter production of the Watsonville Creamery last year was 220,000 pounds. A typical dairy and creamery farm lies just north of the city of Santa Cruz. It comprises 2,330 acres, rolling up from the ocean rim, and well watered by mountain streams. The principal of these furnishes power that generates electricity, and it is probable that there are few creameries in the United States where the electric current is harnessed down to so many and varied duties. Only about 500 cows are kept, but they are of the choicest. Many other dairies graze herds of from 300 to 500 cows, and make cheese and butter.

The poultry interest needs fostering all over California. The large importations of eggs and fowls from Eastern districts are discreditable, in view of the fact that here there is no winter weather from which to defend the poultry, while every condition is favorable to profit and prosperity. While Santa Cruz produces and ships many eggs, and while they are of so good a keeping quality that they are in special demand for exportation to the Orient, the business might easily be increased many hundred per cent, especially as not enough chickens and turkeys are raised to supply the home market. The wholesale dealers of San Francisco do not hesitate to express their preference for Santa Cruz County eggs.

The deep-sea fisheries are important factors, and here again is room for indefinite expansion. The waters of the bay teem with food fish, the pools and rocks along the shore support quantities of shell-fish, and the streams that come down to the ocean and bay are the home of the mountain trout.

Many industries have developed to the profit-producing point, and the general air of thrift and prosperity is satisfactory. From what has been said, it will be evident that one vast source of wealth of the county, past, present, and prospective, is its forests. Redwood lumber is durable, not inflammable, and capable of receiving a rich finish for interior and cabinet work. The output has been large for many years, but great tracts of forest remain, and the redwood is rapidly reproductive, giving promise that the supply shall be continuous. There are fifteen lumber mills in active operation. Many of the trees are giants of ancient growth, and it is not uncommon to see 35,000 feet of clear lumber cut from a single tree. The by-products of shakes, shingles, railroad ties, piles, telegraph poles, fruit-box shooks, pickets, posts, etc., are manufactured in large quantities. Eight varieties of oak grow, among them the chestnut oak, which supplies tanbark for the making of superior leather. The manufacture of powder, besides requiring redwood and oak for fuel, utilizes willow, alder, and madrone. Redwood, laurel, and

madrone are all practically used as cabinet woods, and this industry is susceptible of an indefinite development, so numerous and varied are these products. Naturally, wood is the fuel in general use, and it is of the best quality and cheaper in Santa Cruz than in any Central California county. Especially interesting to lovers of trees are two localities within easy reach of Santa Cruz. "Big Tree Grove" is but five miles from town, on the line of the railway in the cañon of the San Lorenzo. This is an ancient grove of giants, not the *Sequoia gigantea* of the Sierras, but the *Sequoia sempervirens*. It covers twenty acres, and numbers scores of trees from 10 to 20 feet in diameter, and a dozen or more which exceed that diameter and reach a height of 300 feet.

In the mountains near the coast there were discovered years ago deposits unique and strange in substance, which, under the name of bituminous rock, have proved of untold value as a natural pavement material. It has been used on the streets and sidewalks of Santa Cruz and other places for years, and when laid on a proper foundation is durable, clean, and elastic. It is a natural combination of bitumen, sand, and crude petroleum. It is shipped to all nearby cities, and goes as well to Salt Lake, Tacoma, Seattle, Phoenix, and to Honolulu.

Similar conditions exist regarding the vast deposits of high-grade lime rock throughout the mountains. Five kilns are in active operation, and many cargoes per month are shipped to distant points. The employes and their families, like those of the lumber mills, constitute populous little settlements.

PRINCIPAL TOWNS.

Santa Cruz is the county seat, with a population of over 9,000.

Watsonville has a population of 5,000, and is one of the chief shipping points; last season there were over 2,000 carloads of apples shipped.

Other growing towns, with fine educational facilities and thriving surroundings, are: Soquel, Aptos, Felton, Glenwood, and Boulder Creek.

GENERAL STATISTICS.

Area, 425 square miles, or 272,000 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	260,063
Value of country real estate	\$4,517,905
Of improvements thereon	1,655,005
Of city and town lots	2,655,285
Of improvements thereon	1,802,105
Of personal property	1,485,190
Total value of all property	12,917,059

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle		\$15,070	Colts	210	\$3,565
Cows—Graded	1,475	17,415	Mules	1,215	3,525
Common	4,220	105,495	Sheep—Graded	125	380
Calves	315	1,575	Common	702	1,505
Oxen	80	2,000	Goats—Angora	700	1,050
Swine	1,150	5,665	Common	300	370
Horses—Standard-bred	10	1,760	Poultry (dozen)	3,200	8,000
American	3,210	86,390	Hay		3,850
Common	1,185	23,695	Lumber		68,015

Number of acres sown for crop of 1904:

Wheat	180
Oats	1,100
Barley	280
Corn	560
Hay	2,545

Acres of bearing grape vines growing in spring of 1904:

Table	530
Wine	1,100

Number of fruit trees growing in spring of 1904:

	Bearing.	Non-Bearing.		Bearing.	Non-Bearing.
Apple	285,365	272,325	Prune (French)	112,990	16,140
Apricot	36,245	33,740	Prune (other kinds) ..	19,265	4,995
Cherry	18,095	5,170	Lemon	165	90
Fig	360	150	Orange	145	80
Olive	720	620	Almond	340	90
Peach	17,575	1,420	Walnut	1,370	4,555
Pear	15,600	2,480			

School statistics:

Total number of census children, 1904	5,604
Number of teachers employed	131
Number of school houses	65
Number of school districts	55
Amount expended for public school purposes	\$91,237 85

SHASTA COUNTY.

Shasta County is at the head of the Sacramento Valley. Its greatest length from east to west is 90 miles, and its greatest breadth from north to south 60 miles.

The mountains of the Sierra Nevada and Coast Range cover a large portion of the county on all sides except the south. They are rugged and lofty, rising more than 5,000 feet above the sea. On the east there are four peaks of special prominence, that stretch far into the county from the Sierra, separated from each other by a space of from 10 to 12 miles. Lassen Peak has an altitude of 10,577 feet, and is timbered for two thirds of the way up; the others are bald, and usually covered with snow. Other peaks and buttes are numerous, and all indicate volcanic origin, as shown by extinct craters, cones, sulphur deposits, beds of lava, etc. Hot and boiling springs are of frequent occurrence. In the southern portion is a foothill region, half circular, forming the northern end of the Sacramento Valley proper, and embracing about 500,000 acres, the altitude of which is from 500 to 2,500 feet above sea-level. The southwestern portion of this region is a succession of rounded hills, varying in height from 50 to 200 feet, and the central and southern portions consist of tablelands, varying in altitude from 500 to 700 feet. It has many narrow valleys. From this section eastward there is a gradual ascent to the mountains, embracing the higher foothills of the Sierra.

WATER SUPPLY.

Shasta is noted for the number and beauty of its streams. First in importance is the Sacramento River, flowing through the county north to south; all but 20 miles is through a rocky cañon. The McCloud River, bursting from Mount Shasta's side, rushes through the mountains of the north in a southerly direction and empties into Pitt River. The most beautiful stream of the northeast is Fall River. In its meanderings it is 40 miles in length, and empties into the Pitt. Besides these larger streams there are a score of tributaries, while springs abound in the foothills and mountains. Among the minor streams are Hat Creek, Roaring River, Hatchet Creek, Montgomery Creek, and on the north Squaw Creek, McCloud River, and the Little Sacramento. These three have many features in common. They take their rise in the highest regions around Mount Shasta, flow south, are clear, cold, and rapid, each about 100 miles in length, and fall into Pitt River within a distance of 15 miles. Below this point comes Clear Creek from the west; Churn Creek, Stillwater Creek, Cow Creek, and Butte Creek from the east. Cow Creek is a large one, having many branches, all rising in the high Sierra. Battle Creek receives the waters from the west side of Lassen Butte, as does Hat Creek on the east side. These

two have sources close together; each is from 30 to 40 miles in length. The former empties into the Sacramento River, the latter into Pitt River 80 miles above, at an elevation of 2,500 feet. Besides these streams there are many others smaller. Springs are numerous and water in abundance.

SOIL.

The soil of the valleys is an alluvium, a rich sedimentary deposit, largely intermixed with disintegrated rock, and in some parts with a gravel. The usual color is a light red or reddish brown. It is very fertile, and excellent for plums, prunes, pears, figs, and small fruits. The mesa lands bordering the valleys are of a sandy loam, with a large percentage of clay, and carrying in many portions, especially in the higher parts, considerable gravel and boulders. Fruit does well on these mesa lands. On the foothills is a red loam or clay, productive, and adapted to berries. On the elevated plateaus of the north and northwest the soil varies from a black, sandy loam to a red loam or clay, while to the southwest the soil is generally adobe, productive of grain and rich in natural grasses.

Irrigation is unnecessary for most crops, as the rainfall is sufficient. The rainy season begins in September, never later than October, and extends, at intervals of two or three weeks, from that time until the middle of June. During this time the ground is thoroughly saturated with moisture, and the rainy period covers the entire growing season. At the end of the wet season grains, grasses, etc., are ready for the harvest, and fruits, grapes, etc., are beginning to ripen. The dry season embraces July, August, and September. Under a cloudless sky crops are harvested and stored, and fruits mature. The dry season is as much a necessity as the wet, for only under these conditions can perfect grain and fruit be grown.

NATURAL RESOURCES.

Beautiful resorts and health-giving springs abound. The high mountains are heavily timbered with sugar pine, cedar, fir, and other valuable timbers. There are some large valleys and extensive plateaus, mostly devoted to general farming, stock-raising, and wool-growing. The foothills, varying in altitude from 800 to 2,000 feet, are more or less timbered with oak and pine, and their higher portions yield all kinds of minerals and stone—gold, silver, copper, iron, platinum, quicksilver, lead, marble, sandstone, limestone, coal, onyx, etc.—affording also opportunities for lovely homes to the small farmer, fruit-grower, stock-raiser, poultryman, and gardener. Water is abundant and of excellent quality, coming from springs and creeks. The climate is pleasant; not extremely hot in summer nor very cold in winter. The valleys are fertile, and capable of producing all things grown in the temperate or semi-tropical regions. An industry that promises to develop in the future is the culture of the apple. At certain altitudes, crisp and luscious apples are produced, and the quantity and quality can not be surpassed.

Shasta has passed the experimental stage. Its orchards are a success, producing heavy crops and of the best quality. The prune, peach, pear, plum, apple, apricot, almond, fig, lemon, orange, and olive thrive.

Large bearing orchards are scattered over the county, but the continuous ones are along the river from Cottonwood to and above Anderson; in Happy Valley, 12 miles southwest of Redding; in Churn Creek bottom, 6 miles southeast of Redding; on Stillwater, 6 miles east, and about Millville. Grapes of wine, table, and raisin varieties have proven a success in the valley portions, and many gallons of wine are made and shipped to different parts of the country; so with raisins. Wheat, grass, and alfalfa are grown successfully. The markets are the best, as there is home consumption for everything produced except fruit, and hundreds of carloads in addition to the products raised here are shipped in annually, consisting mostly of grain, hay, butter, eggs, and vegetables. The producer receives for his products the prices paid at Marysville, Sacramento, and other shipping points, freight and commission added from there here. The homeseeker will find land adapted to grain-growing, hay-making, poultry-raising, or gardening at less prices than in the older settled portions of the State, ranging from \$25 to \$100 per acre for good land, according to location.

Stock-raising is an important factor. The mild winters in the lower altitude obviate the necessity of feeding, while the summer ranges in the mountains make it possible for the stock-raiser to keep his herd upon green feed the greater portion of the year.

The sawmills are also an important consideration, and annually distribute thousands of dollars for labor. The Terry Lumber Company's mills, on the mountains above Montgomery Creek, are the largest in the county. They are connected with Bella Vista by flume, and there have planing mills, yards and dryhouses, and a railway to the main line at Anderson. The wood camp is in the big bend of the Pitt, and has been sending from 50,000 to 80,000 cords of wood annually down the Pitt to the smelters. They also operate a sawmill, and cut from 12,000,000 to 15,000,000 feet of lumber each year. In the Shingletown country there are seven large sawmills, and there have been graded about twenty-five miles of road for traction-engine work. Over this road, with two engines, they transport their lumber to the railroad. At or near Whitmore there are sawmills which turn out from 20,000 to 30,000 feet of lumber per day. There are three large flouring-mills.

The resorts are numerous and easy of access. Near Castella, on the railroad, there are three, where during the hot season are people from all parts of the coast, camping out around the soda spring, enjoying the cool shade of the lofty pines, and fishing and hunting. In the Big Bend country are the hot springs, and around them are congregated the rheumatic, the sick from most any disease, and many who go for pleasure. The Burney Falls are a great attraction to the tourist, and Clover Creek Falls are beautiful, with the climate invigorating and refreshing.

PRINCIPAL TOWNS.

Redding, the county seat, is one of the most beautifully located places on the Pacific Slope, commanding a view of both the Sierra and Coast ranges, with their lofty, snow-clad peaks, and an equally beautiful view of the Sacramento south and cañon north.

The next town in importance is Keswick, at the smelters of the Iron Mountain Company, six miles from Redding. It has a population of about 2,000.

Shasta, once the county seat, is famous the State over for its former glory.

Anderson, on the California & Oregon Railroad, 12 miles south from Redding, is the chief shipping point for the fruit industry of the county. The population is 800, and the buildings, as a rule, are neat. The country surrounding the town is largely valley land, and thousands of acres of bearing orchards are tributary to it.

MINERAL RESOURCES.

From a modest yield of \$623,000 in 1896, the value of the mineral product increased to over \$8,000,000 per annum. When we take into consideration that but one other county is credited with a production of \$2,000,000 per year, and that no metal-mining county reaches even that figure, the preponderance of Shasta is at once apparent, and the county is classed with such districts as Butte, Montana, or Cripple Creek, Colorado. Nor is such classification far-fetched.

While Shasta's preëminence in mineral production is largely due to the development in copper, her output in the more precious metals is very large, at the present exceeding a million dollars a year in both gold and silver. And the production of these metals as a by-product of the copper sulphide ores will, with the extension of the industry, exceed the present output many times.

With her production of over \$8,000,000 a year, it is reasonable to assume that within ten years' time Shasta County alone will produce as much in value as is credited to the entire State at present.

GENERAL STATISTICS.

Area, 4,050 square miles, or 2,592,000 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	1,320,578
Value of country real estate	\$5,411,424
Of improvements thereon	1,596,275
Of city and town lots	545,350
Of improvements thereon	939,400
Of personal property	1,733,694
Total value of all property	11,953,212

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle—Beef	228	\$5,615	Swine	6,622	\$15,500
Stock	15,375	230,205	Colts	544	5,220
Cows—Graded	1,258	25,885	Mules	397	9,860
Common	1,528	32,690	Sheep	18,191	36,395
Calves	4,673	24,615	Lambs	128	122
Oxen	5	100	Goats	9,979	15,180
Horses—Thoroughbred	4	400	Poultry (dozen)	1,377	3,504
Standard-bred	74	4,490	Hay	—	955
American	1,990	59,260	Wool	—	30
Common	1,975	38,620	Lumber	—	23,950

Number of acres sown for crop of 1904:

Wheat	2,500
Oats	200
Barley	1,000
Corn	100
Hay	7,000

Acres of bearing grape vines growing in spring of 1904:

Table	100
Raisin	250
Wine	650

Number of bearing fruit trees growing in spring of 1904:

Apple	15,000	Prune (French)	70,000
Apricot	500	Prune (other kinds)	6,500
Cherry	500	Lemon	250
Fig	1,000	Orange	1,000
Olive	12,000	Almond	2,000
Peach	60,000	Walnut	250
Pear	10,000		

Value of grain assessed in storage:

Wheat	\$940
Barley	1,945

School statistics:

Total number of census children, 1904	4,156
Number of teachers employed	127
Number of school houses	104
Number of school districts	104
Amount expended for public school purposes	\$71,952 31

SIERRA COUNTY.

Sierra County has an area practically all mountainous. The altitude ranges from 2,000 to 8,600 feet, the highest elevation being that of the Sierra Buttes; but the bulk has an elevation of from 4,000 to 5,000 feet.

The main ridge of the Sierra Nevadas crosses the eastern part from south to north. Several spurs traverse the county from east to west, forming the watersheds of the four principal streams which make the drainage system of the western part. These streams consist of the Middle Yuba River on the south, with Wolf Creek, Kanaka Creek, and Oregon Creek as its principal tributaries; the North Yuba near the center, with the North Fork, South Fork, Middle Fork, and East Branch joining it near Downieville; and Cañon Creek and Slate Creek on the north; and in the eastern end the many streams that form the headwaters of the Feather and Truckee rivers. In the northern portion there are Bear, Spencer, Gold, Gray, Hawley, Long, Packer, Volcano, Young America, Upper Salmon, Lower Salmon, Upper Sardine, and Lower Sardine lakes, and in the southeastern portion are Webber, English, Eureka, Meadow, and Independence lakes. Of the peculiar topographical features are the expansive valleys and lakes lying among the loftiest peaks of the Sierras. The lakes vary from one eighth of a mile to three or four miles in length, most of them circular, and, considering their small size, remarkable for their depth. The important body of agricultural land is Sierra Valley. It extends over the boundary line into Plumas County, and is the largest and the most elevated of the valleys of the Sierras, being 4,750 feet above sea-level. It is 30 miles in length and 10 in width. This valley is particularly adapted to stock-raising and dairy purposes, and a fine quality of timothy and alfalfa hay is raised. There are several creameries in the valley, and a superior quality of butter is made, of which most is shipped to the outside. Considerable beef cattle are fattened for San Francisco and other markets; besides large shipments of sheep. The soil is a deep, black loam, largely admixed with rich vegetable mold, the result of ages of forest growth.

MINING.

Since 1849 the principal industry has been gold mining. One hundred and ninety millions of dollars have been taken from its rivers, gravel deposits, and quartz veins.

TIMBER.

The greater portion is practically covered with a virgin belt of soft timber. Last year the Loyalton Lumber Company cut and manufactured over 13,000,000 feet of lumber; other smaller mills cut several million feet, and the Sierra Nevada Wood and Lumber Company cut 30,000,000 feet. The Verdi Lumber Company owns timber lands, and output a large amount of lumber. The Floriston Paper Mill Company owns timber lands, and use a large amount of Sierra County timber. There was probably 60,000,000 feet of timber cut in 1904.

GENERAL STATISTICS.

Population, according to census of 1900, was 4,017.

Average temperature, winter 47°, summer 72°; summer nights pleasantly cool.

Annual rainfall, about 60 inches.

Lands: 100,000 acres tillable; over 500,000 acres of timber land, uncut; about 30,000 acres of timber land, denuded; 1,000 square miles of grazing land. No waste land.

Hay, 30,000 acres; oats, 2,000; barley, 5,000; wheat, 500; rye, 500.

Price of land, from \$5 up.

Character of agricultural soil: black loam, very rich.

The principal towns and their population are: Downieville, 500; Forest City, 400; Sierraville, 250; Loyalton, 500; Sierra City, 400.

Natural products: white, yellow, and sugar pine, fir, spruce, and cedar, live stock, fruit, berries, and garden truck.

Manufactured products: lumber, boxes, sashes, doors, etc., creamery butter.

Minerals: gold, iron, copper, asbestos, and lime.

Irrigation and power facilities are unlimited.

Transportation facilities: Boca & Loyalton Railroad, Central Pacific Railway, Nevada-California-Oregon Railway, and Hobart-Mills Railroad. Communication facilities: Sunset Telephone Company, 56 boxes; Western Union Telegraph Company, and Sierra Valley Telegraph Company.

Educational facilities: 23 first-class common and grammar schools.

Health resorts: Campbell's Hot Springs, Webber, Independence, and Gold lakes.

Hunting and fishing abundant—trout, mountain quail, grouse, duck, snipe, deer, and bear.

Area, 910 square miles, or 582,400 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	315,162
Value of country real estate	\$1,077,660
Of improvements thereon	218,090
Of city and town lots	57,185
Of improvements thereon	231,780
Of personal property	195,360
Total value of all property	1,974,437

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle	1,239	\$19,130	Colts	43	\$780
Cows	734	18,375	Mules	25	570
Calves	153	1,555	Goats	60	60
Oxen	8	200	Hay		1,485
Horses	489	16,190	Lumber		18,360

Number of acres sown for crop of 1904:

Wheat	450	Barley	3,000
Oats	1,000	Hay	3,500

Number of bearing fruit trees growing in spring of 1904:

Apple	7,100	Peach	400
Cherry	2,000	Prune	15

School statistics:

Total number of census children, 1904	822
Number of teachers employed	24
Number of school houses	20
Number of school districts	20
Amount expended for public school purposes	\$28,601 02

SISKIYOU COUNTY.

BY HON. J. L. COYLE, OF HORNERBROOK.

Siskiyou is one of the northern counties. Its north line joins Oregon for 80 miles. Of its area, 1,000 square miles are valley, the remainder mountainous; however, among the mountains are hundreds of upland farms and stock ranches, well wooded and watered. It contains a large area of farming, mining, desert, swamp, and timber lands. The so-called desert lands are fertile when water can be applied, and for this object the last Legislature ceded to the Federal Government all the lake lands along the boundary of the county and Oregon, where hundreds of thousands of acres will soon be reclaimed, by lowering the level of the lakes, using the water for irrigating the arid districts, and draining the swamp lands. This land will be open to homestead entry, and will make homes for thousands of settlers.

MINING.

The mining section comprises the west half, and produces nearly a million in gold annually. There are deposits of iron ore, marble equal to the best, and sandstone in vast quantities that, owing to the lack of lime, is regarded the best on the coast. In Scott Valley are large deposits of limestone, and of granite that takes a polish as smooth as glass.

MISCELLANEOUS INDUSTRIES.

It has been demonstrated that sugar-beets grow to perfection in Scott and Shasta valleys. The agricultural district lies chiefly in the central and eastern parts of the county. Timber is everywhere. There are thousands of sections that will cut from ten to twenty million feet of yellow and sugar pine, from trees that will produce logs from five to eight feet clear. Besides there is much red fir and cedar.

TOPOGRAPHY.

The Sierra Nevadas and Coast Range meet here, forming the head of the Sacramento Valley. The altitude ranges from 2,000 feet in the valley to 14,000 on the mountain peaks. There is a climate in places where snow seldom falls, and regions of perpetual snow. Such conditions make it one of the most scenic of the counties.

Many of the waterfalls have been harnessed for electrical power. The notable one is the plant at Fall Creek, where the Siskiyou Light and Power Company has expended \$400,000 on the third largest electric plant in California, and stretched aluminum wires to all parts of the county, supplying cheap and abundant power.

The principal river is the Klamath, a swift-flowing stream which drains almost the entire county, and flows into the Pacific Ocean at the border line between Humboldt and Del Norte. This stream is not navigable. It is a natural dumping-ground for the placer mines, its swift current carrying the tailings out to the ocean. Placer mining has been carried on along its watershed for more than fifty years, and yet nowhere is there any indication of the channel filling up.

PRINCIPAL TOWNS.

The Southern Pacific Railroad passes through the county from north to south, entering at Dunsmuir, where are located its roundhouse and machine shops. Dunsmuir has a bank, fine residences, and splendid hotels. It is an attractive summer resort, having fine soda springs and convenient camping grounds. Sisson is a popular summer resort, as also is the Shovel Creek Hot Springs and mud baths, at Beswick. Sisson is on the main line of the Southern Pacific Railroad, while Beswick is reached over the Klamath Lake Railroad. This beautiful scenic railway runs along the banks of the Klamath River across the State line into the sugar pine forests of Oregon and furnishes the only outlet, by rail, for the people and freight of Klamath Falls and Eastern Oregon. Hornbrook, the most northerly town in California, is 8 miles from the State line. It is located in a fertile valley, near the Klamath River, surrounded by mountains, which contain valuable placer and quartz mines.

Yreka, the county seat, is the principal town. Its population is about 1,500. The courthouse and jail are splendid buildings. Two electric plants furnish light and power. The city owns its water system, and it is equal to any in the State, the water being filtered through banks of gravel.

PRINCIPAL INDUSTRIES.

The electric light plants will be the means of opening a number of rich gravel mines lying along the low creeks, too deep for hydraulicking, and too wet for drifting. With plenty of cheap and convenient power, dredges are being built to work this ground. A dredge company operating almost within the city limits of Yreka has contracted for 200 horsepower from the Yreka Light and Power Company.

There are three large lumber mills at McCloud, with 18 miles of railroad from the main line at Upton. The Weed Lumber Company is another large concern. It has 30 miles or more of railroad into the timber region, and a large crew is extending the road. Lumbering is the principal industry, with mining and live stock a close second and third.

The population of the county is 17,000.

The mountain districts furnish splendid range nine months in the year for thousands of cattle. New gold mines are being discovered, and the old ones continue good with depth. The timber will last for a hundred years; lime, building stone, and marble quarries are being opened; beet-sugar factories have been established; railroads have been built; swamp lands have been drained, arid plains irrigated, and pasture lands have been converted into hop fields. All this, added to our present prosperity, our temperate climate, and natural advantages, promises for Siskiyou County a bright future.

GENERAL STATISTICS.

Area, 6,078 square miles, or 3,889,920 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	1,684,735
Value of country real estate	\$6,590,801
Of improvements thereon	1,120,430
Of city and town lots	247,600
Of improvements thereon	662,730
Of personal property	1,573,341
Total value of all property	12,051,359

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle—Beef	972	\$24,300	Calves	5,955	\$59,550
Stock	22,577	338,655	Swine	3,078	7,695
Cows—Thoroughbred ..	10	500	Colts	620	6,200
American	100	2,500	Mules	343	10,290
Graded	3,618	72,360	Sheep	12,190	24,380
Horses—Thoroughbred ..	10	1,000	Goats	150	225
Standard-bred	2,000	80,000	Poultry (dozen)	700	1,400
American	4,658	102,475	Hay	—	3,000
Common	500	5,000	Lumber	—	110,000

School statistics:

Total number of census children, 1904	3,835
Number of teachers employed	108
Number of school houses	86
Number of school districts	86
Amount expended for public school purposes	\$64,324 84

SOLANO COUNTY.

Solano County is midway between the northern and southern extremities of the State. It is not exactly square, but about 40 miles from north to south, and averages almost as much east and west.

TOPOGRAPHY.

Swamp lands border on the Sacramento River and on Suisun and San Pablo bays. They are overflowed a few inches in depth at ordinary high tides. In the southeastern portion are the Montezuma Hills, rising from 50 to 300 feet above tide water, and intersected by narrow ravines or hollows. Townsend Hills are in the southwestern portion. Occupying about twelve sections of land are the Potrero Hills; and in Suisun township, Robinson Island rises out of the tules, and contains about a quarter section. A large portion of the county—about two thirds—is valley, the remainder being foothills. A spur of rolling hills extends from Vacaville north to Putah Creek, averaging 3 miles in width, and the slopes and smaller valleys are noted for their early production of fruit and vegetables. On the west of these hills, and parallel to them, lies Pleasant Valley. The Vaca Mountains reach their highest elevation of 2,000 feet in Blue Peak.

SOIL.

The soil varies from red gravel to black sandy loam; from barren patches of alkali to rich alluvium; and all classes of soil may be found. That of the swamp and overflowed lands is largely composed of decayed vegetable matter, admixed with sedimentary deposits brought down from the uplands by streams. In the trough of Vaca Valley the soil varies from a sandy to a clayey loam, and sometimes to adobe. Throughout the hilly land to the east and northeast of Ulattis Creek it varies from sandy to clayey, according to the character of the parent formation. Experience has proved that the heavier soils are the best for pears, and the more sandy for peaches and apricots. In wells dug in this district, the surface soil varies from 1 to 10 feet in depth, beneath which sandstone, interstratified with shale, exists to a depth of about 200 feet.

HORTICULTURE.

Solano ranks among the leading horticultural counties, and during the past ten years has made wonderful strides. In climate and soil Solano is eminently adapted to horticultural pursuits, and the earliness and superiority of her fruit products have given her a national reputation. In Vaca Valley fruit and vegetables ripen and find their way to market in the early season. This valley is 12 miles long and 2 wide, and owes its advantages to elevation, location, and surroundings—

the encircling hills protecting it from chilling winds, and the slopes giving to it the full benefit of the spring sunshine, while the deep, rich, fertile soil gives all the required constituents for plant life. Of the 20,000 acres in fruit in this valley, the bulk is devoted to peaches, apricots, and grapes. The pear, cherry, and prune are also among the favorites, while oranges do well. The income of the valley from this source annually amounts in round numbers to \$1,000,000. Fruit-trains leave daily during the season for the East. The earliness with which fruits ripen in the Vaca and Pleasant valleys is attested by the fact that cherries are shipped regularly by the first of April, and apricots early in May, with all others proportionately. Vegetables are grown in large quantities, and find a ready sale in the San Francisco market because of their quick maturity. The advantage thus derived is certainly great, and the high prices received by the fruit-growers attest the esteem in which their products are held.

The chief fruit sections are Suisun, Vacaville, and Laguna, and the principal varieties of fruits grown are apricots, peaches, pears, plums, prunes, and table grapes. A large proportion of the crop is shipped green for table use. In addition to that exported, large quantities are canned and dried.

LIVE STOCK AND DAIRYING.

The live stock and dairying interests are extensive and profitable.

Poultry interests are quite large and increasing every year, and a profitable field is open to this industry.

VARIETY OF PRODUCTS.

The following special article is from "The Bee Annual" of 1902:

"Some years ago, in a contest to determine which county of Northern and Central California enjoyed supremacy in the variety of its products, the award of a golden cup worth \$5,000, offered at the Midwinter Fair to the most representative county, was made to Solano. It lies between San Francisco and Sacramento, on the line of the Southern Pacific. To the traveler it is best known by its miles of green tule lands, spotted by herds of cattle, if it be spring; and the home of thousands of wild ducks and geese, if it be the late fall or winter. But when the course of the Sacramento is followed after Suisun Bay has been traversed, it will be found that contiguous to the tule area devoted to cattle-raising and the paradise of the hunter of geese or ducks of every variety, including the highly esteemed canvasback, there is an upland which, as a wheat area, is in no sense inferior to any in the State, but which has one advantage denied to many other localities by reason of its contiguity to cheap lines of communication with the warehouses lining the Straits of Carquinez.

"The tule land itself is but the richest soil in process of slow formation, and throughout its broad area, particularly along its border, may be found some of the best dairying sections of the State. But in the wheat ranches of the Montezuma Hills may be found a part of the 45,000 acres which go to make up eastern Solano, and which are about evenly divided into lowland and upland. Here the yield is large, and the production certain. Land is low in price, compared with its productive capacity, and offers the certainty of an annual production of

56 bushels of wheat to the acre, 75 bushels of barley, a staple crop of 35 bushels of beans, and potatoes running from 75 to 200 sacks. All of this section adjacent to the river has a freight rate of 70 cents a ton.

"Beginning at Carquinez Straits, the voyager will see evidences of the fisheries which add to the wealth of the county. As the train leaves the straits by Army Point, back of which is situated the Benicia United States Arsenal and a four-company post, the triangular sails of the fishing fleet may be observed and their course followed until the county boundary is traversed. Salmon canneries dot the bay, and swell the wealth drawn from the soil. The growing of grain is being supplemented by the successful cultivation of hemp and flax, while fruits, particularly grapes, do well. The soil is rich and practically inexhaustible. A good deal of it is adobe, which can be cropped with no apparent lessening of fertility.

"The center of this region of fertility is Rio Vista, an enterprising town of about a thousand inhabitants. It has a large trade with the adjacent islands, and is backed by a rich area of profitably farmed land. The town is growing and thriving. It has good schools, and provides for the higher education of the young by St. Gertrude's Academy, where both sexes secure a thorough and beneficial training.

"To the west from the line of the Southern Pacific lie Green Valley and the portion of Suisun township devoted to fruit. Green Valley is an agricultural section, which was among the first to attract settlers. It has been devoted to vineyards for many years. Portions have been planted successfully to sugar-beets. Cordelia is the metropolis of Green Valley township, and is supported by extensive quarries, where basalt blocks for neighboring cities are fashioned. It has several wineries and enjoys an excellent reputation for their products; it has also a large acreage in fruit, although usually not of the early varieties.

"Solano County is unfortunate in that its railroad lines traverse in great part the most uninviting portion of its territory. Looking toward the hills which divide Suisun township from Napa County, there is hardly a suggestion of the area devoted to fruit or the matchless character of its orchards. Large fruit-houses are seen, however, which are engaged in the shipment of green fruits, and the handling of the dried products of the ranch by the hundreds of tons. Necessarily all of these great packing and exporting houses employ a large number of men and women to handle the fruit in the various stages of its preparation for the East, or for Europe, where much of it is shipped.

"But to appreciate the capacity of Suisun Valley, a visit should be made to this notable section. It does not boast of its early fruits, but it has one of the largest orchards in California, and through every acre of its fruit trees it gives evidence of the careful character of husbandry practiced in the locality in the trimness of its orchards, and its generally attractive appearance. From this portion of the county there are shipped nearly 500 carloads of fruit, comprising cherries and other varieties, but composed in the largest degree of pears, for which the valley is particularly well known. Land in Suisun Valley is high when purchasable, but it is low in proportion to income returned, and will pay dividends on any price at which it has ever yet been quoted.

"Suisun is the center of this section, and also for a large portion which extends east through Denverton township and meets the portion comprised in eastern Solano. It is devoted largely to grain-growing and

cattle-raising and is also used extensively for sheeppasturage, which have been profitable and have been the means of building up several large fortunes for those engaged therein. It has the advantage of cheap communication with San Francisco by means of Suisun Slough, which assures a low freight rate without any appeal to the Board of Railroad Commissioners. The enterprising people of Suisun have organized a company, and will construct a boat to do a freight business between that point and the city, at rates with which the railroad will not compete. Suisun is the point from which freight is scattered throughout the entire northern part of Solano County, and does a business vastly disproportionate to its size. Teams haul freight daily in competition with the railroad as far as Vacaville, 10 miles to the north. The county seat, which is located at Fairfield, just north of Suisun, and separated from it diagonally by the railroad, does not contain a courthouse which is an architectural attraction. But it does, 'tis enough, 'twill serve,' while the county owes no debt, and taxation is limited by reason and a proper care of roads and highways on lines of permanence.

"In the center of the county, stretching to the river lands on the east, is a low country devoted to sheep, cattle, and barley. Frequently during the winter it is under water. But farming is profitable in Denverton and throughout Main Prairie townships, and they are the resorts of hundreds of pleasure-seekers who find their bags of game only limited by the capacity of an ox team. In the northeast corner of the county lies Tremont township. To the south and east it is devoted to grain and cattle. Along the north boundary of the county in this township may be found some of the best lands devoted to grain farming or fruit. In fact, lying along the south bank of Putah Creek, which forms the division line of the county on the north, is a section of land which for fertility can not be surpassed. It is early, too, and is being rapidly cut up into orchards which will be probable sources of profit to proprietors.

"The area devoted to fruit for a considerable period begins somewhere east of the line of the Vaca Valley and Clear Lake branch of the Southern Pacific, and extends westward to the mouth of Putah Creek Cañon, and south through Vacaville township, and includes the western portion of Elmira. But what has been done in Vacaville township in the line of transformation of a wheat section to fruit-growing, is being repeated successfully in Silveyville township. There are no high-priced lands there, but there are no better lands in the State. Like a large portion of Vacaville township, it was a part of the Vaca and Peña grant of 44,000 acres made in 1844, and was doubtless selected on account of its surpassing fertility.

"At the easterly end this strip along the creek was devoted to raising grapes long ago, and its vineyards are no less productive than in the past. Every foot of this section is good land, and is capable of supporting a population of thousands. It is good territory for grain, of course. Its demonstrated value for fruits is equally certain, while such acreage as has been planted in sugar-beets shows a product unusually high in percentage of saccharine matter.

"Sweeping south from the creek there is a gentle slope to the east, but no change in the fertility of the soil. Silveyville township is rich by nature's gifts, and by the accumulations of her people. It is not every locality which can boast millionaires whose lives have been devoted to wheat-growing, but they can be found in there. Recently a creamery

was built at Dixon, the center of the township's population. It is a source of profit, and is awakening the minds of the people to the value of a more intensive farming and the diminution of the average ranch area. The creamery in Dixon is telling the old story of the little farm well tilled, and is certain to be the pioneer of numerous similar, profitable enterprises. Dixon is a town of wealth and conservatism. But there is a spirit of enterprise pervading its people, and the changes which are promised in that favored locality will be markedly beneficial, both as to an increase of profits and of population.

"All of northern Solano can be irrigated; little of it is. The waters of Putah Creek are practically unutilized. Away to the north is Clear Lake, with 52 square miles of water, 10 feet deep, only waiting the application of capital to one of the most feasible schemes of irrigation within the knowledge of those who have given matters of this kind consideration. But while the flood waters of the mountains run unchecked to the sea, the process of wresting the farm from the ranch is going on. Pumping plants are being installed on ranches contiguous to Dixon, and more money is being made off tracts of limited area than was secured from a broad expanse of acres. The town has started upon a new career, in which she invites the people of the East to participate. There they will find all of the conditions demanded by a consideration of an avocation where health is assured, and rich rewards await industry.

"Between Dixon and Vacaville lies Elmira. It is a small town, but the center of a broad expanse of acreage, devoted to cattle-growing, wheat-raising, and diversified industry. There are a good many in this section who surpass the profits of the wheat ranch by the income secured by the housewife in attending to the needs of poultry, or the dairy, as a means of supplementing income. Its climate is delightful. A little warmer than Suisun, which is a modified temperature of the purely bay area, and a little less warm than Dixon, in Silveyville township to the north, or Vacaville to the west, any part of Elmira will be found profitable in any branch of agriculture.

"Vacaville is pretty well known. Its fame seems to have spread abroad. Walter T. Swingle, of the United States Agricultural Department, on returning from Africa, in connection with the Government importation of the date palms to be planted along the Colorado River, learned at Paris that in Vacaville the date palm flourished, and visited the place for the purpose of its examination. Along the south bank of Putah Creek, and in a section tributary to Winters, the shipping point just across the creek, is the old Wolfskill homestead. Here some forty years ago the proprietor of the Wolfskill grant planted the seeds of dates bought for his children. In a frostless area they grew unchecked, and near the house of Colonel Sam Taylor this purely tropical product which demands that it plant its feet in the fountain, while its top revels in the furnace of a Sahara sun—can be found annually maturing its fruit. Date palms are not infrequent in California, but it appears that, unless the Government experiments along the Colorado are a success, it is the only producing date tree in the State. In citrus culture the same tropical character is found. In Vacaville and in Silveyville townships there are citrus groves aggregating forty acres in extent. That more oranges have not been planted is due to the fact that deciduous fruit-growing has been found sufficiently profitable to suit the most exacting. Oranges may be grown in these sections in any quantity.

and placed in the San Francisco or Eastern markets ahead of the products of Los Angeles or Riverside. The quality of earliness is not confined to deciduous fruits, but embraces the citrus varieties as well. The county took a premium for oranges at the Midwinter Fair, held in 1894, and can match from its groves the best product of any part of California.

"No stronger tribute could be offered to the tropical character of the northern portion of Solano. It might, however, be supplemented by the shipment of cherries from Vacaville on March 31st during two seasons, and an annual and certain production of the earliest cherries grown in California, as well as the first apricots, peaches, and other varieties. It is equally early in the production of vegetables, and holds the San Francisco market with its early products for weeks, to the exclusion of all other localities. It is a large shipper of green and dried fruits, and in 1901 shipped 821 carloads of green fruit, and enough dried to make the total 950 carloads out of Vacaville during the season. Out of the 1,400 carloads of fruit shipped from Solano County last year, six tenths were from Vacaville, three tenths from Suisun, and the other tenth from the fertile strip along Putah Creek.

"In manufacturing Solano County is prominent with the location of the navy yard at Mare Island, opposite Vallejo. In Benicia, however, in addition to the Government arsenal, there is an extensive manufactory of agricultural implements, which ships its products to every portion of the world, and furnishes employment for a large number of hands; also extensive tanneries which are continually being enlarged, as they find an ever-widening demand for their products. The Bay Counties power line, which traverses Solano County transversely from the northeast to the southwest, furnishes Dixon, Elmira, Vacaville, Suisun, Fairfield, Cordelia, Benicia, and Vallejo a potentiality that surpasses Holyoke or Fall River as manufacturing centers. It is being taken advantage of north of Suisun by an extensive plant for making cement. A company is expending \$250,000 in improvements, which promises to add much to the wealth of Solano County. Benicia is a former State capital, as was Vallejo, has a population of several thousand, a climate that is cool and exhilarating, and is an attractive residence location tributary to San Francisco.

"Vallejo is the metropolis of the county. It is a money city. Every month in the year \$100,000 in gold coin comes in for circulation among its people. It is a progressive city. Its people are up and doing. They have abundant faith in public utilities, and they practice it as well. The spirit of self-reliance predominates. It is coming to be a city of homes. Located on a magnificent waterway, and built on hills that lend grandeur to the view; with a climate that is balmy with the rigor of sea air, equable in its character, and practically free from fogs, Vallejo is an ideal residence city. There is an air of stability in its physical make-up. Ever since the Mare Island Navy Yard, its chief dependence, employing from 1,500 to 2,000 men, was taken from a political and placed upon a civil-service basis, thus insuring retention of employes regardless of changes in National administrations, Vallejo has been advancing. One good thing has led to another as the result of this policy, and not the least meritorious is the confidence it gives the people to engage in business for themselves. As we have already stated, Vallejo is a firm believer in public utilities. It owns and operates its own water works, that yield

a revenue of \$36,000 annually, at an operating cost of less than \$5,000. The system is a gravitation one, the water being brought to the city from the mountains, 15 miles distant in a direct line. No city in the State has better results or better water, and the works have been owned by the city since 1894. In the meantime, the city has constructed a most perfect sewer system, put down substantial sidewalks, has a mile of bituminized streets, with more to follow, and has many hundreds of new and modern cottages that make for attractiveness. It is, in fact, a city of industry and enterprise. Its latest move is to secure the construction of electric railroads, that are to connect Benicia, in this county, and Napa and St. Helena, in Napa County. Within the year just passed five franchises have been secured, at the cost of considerable labor and money, and capital is under a written contract to construct the road. A few miles north of Vallejo a corporation has been formed to develop a cement deposit that is superior in quality to the famous Portland, and endless in quantity. The company is capitalized for \$2,000,000, and many thousands of dollars are already invested in the enterprise. Three miles northeast of the town the old St. John quicksilver mine is being reopened at a cost of thousands of dollars. In the early 70's this mine yielded \$500,000, and was closed down in the face of high-grade ore because of over-production and consequent low price of quicksilver. The population of Vallejo now approximates 10,000. The great increase has made necessary additional school accommodations, and new buildings are to be constructed. At the city election, in March last, its people voted by ten to one in favor of the issuance of \$90,000 in bonds, to be used in enlarging the delivery capacity of its water-works system, the rapid growth in the number of consumers—from 1,100, in 1894, to 2,000, in 1901—having made this step an absolute necessity. It enjoys the advantages of a splendid high school, and a magnificent corps of teachers is employed. It has the free postal delivery system; a splendid public library; a well-organized fire department; owns and controls a public wharf, which is not only an ornament, but a source of revenue to the city; has day and night electric service; has a women's improvement club of 200 active members; has forty-four fraternal orders and societies, and has a great future. It is a city closely in touch with San Francisco: three steamer lines engaged in freight traffic, one of them making three round trips daily, built like a yacht, and fast as a torpedo-boat, doing a splendid passenger service, as well as that done via railroad. In addition to these evidences of a progressive city, it has a flouring-mill and warehouse, tannery, salmon cannery, planing-mills, etc., giving employment to hundreds of hands. The opportunities for the profitable investment of capital are not excelled by any other place. The conditions are ripe for a modern opera-house, an up-to-date hotel, and business blocks as well. In some respects the city is lacking in these things, and the capital first on the ground to take advantage of them will profit. In the last year an active Chamber of Commerce has made the subject of ship-building in navy yards a material issue, and 10,000 labor councils have petitioned Congress to utilize its navy yards to the utmost as public utilities. The large plant at Mare Island is being vastly improved, and is to-day equipped with the finest machinery for the construction of men-of-war. A new dock, larger than the present one, is being built, to cost \$1,250,000. The future of Vallejo, as a business and as a residence place, is hopeful."

GENERAL STATISTICS.

Area, 911 square miles, or 583,040 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	519,960
Value of country real estate	\$9,901,107
Of improvements thereon	1,774,165
Of city and town lots	1,186,807
Of improvements thereon	2,544,316
Of personal property	2,254,762
Total value of all property	18,855,077

Value of live stock, etc.:

Cattle—Beef	\$16,750	Colts	\$13,000
Stock	117,150	Mules	65,000
Thoroughbred	1,600	Sheep—Graded	7,500
Cows	195,655	Common	46,700
Calves	15,150	Lambs	2,000
Swine	5,550	Poultry	3,850
Horses—Standard-bred	4,950	Hay	2,850
American	16,500	Lumber	47,250
Common	230,750		

Number of acres sown for crop of 1904:

Wheat	125,340
Oats	91,000
Barley	51,960
Corn	640
Hay	29,160

Acres of grape vines growing in spring of 1904:

	Bearing.	Non-Bearing.
Table	550	—
Wine	1,080	565

Number of bearing fruit trees growing in spring of 1904:

Apple	2,265	Prune (French)	281,460
Apricot	33,155	Prune (other kinds)	105,630
Cherry	36,740	Lemon	2,130
Fig	5,430	Orange	3,440
Olive	3,050	Almond	100,240
Peach	322,570	Walnut	3,760
Pear	218,550		

Value of grain assessed in storage:

Wheat	\$10,670
Oats	500
Barley	5,750
Corn	450

School statistics:

Total number of census children, 1904	4,919
Number of teachers employed	133
Number of school houses	65
Number of school districts	54
Amount expended for public school purposes	\$104,681 24

SONOMA COUNTY.

BY A. S. LUCE,

Secretary of the Sonoma County Board of Trade.

Sonoma County is bounded on the west by the Pacific Ocean, for more than 65 miles that boundary conforming to the irregularities of the shore, while on San Pablo Bay it has a frontage of 20 miles.

There is no sameness in the surface of the county. Variety is a leading characteristic. Valleys, and hills, and mountains appear to have been planned and distributed to give the best effect. The great central valley extends the entire length of the county from south to north, and having a varying width of from 6 to 15 miles, commands attention by its area and remarkable fertility. The Coast Range of hills breaks the monotony of the landscape in that direction, while to the southeast Sonoma Mountain rises to the height of 2,400 feet, with Bennett Peak and Mounts Taylor and Hood farther north. Away to the northeast Geyser Peak has an elevation of 3,740 feet, and from its greater height of 4,343 feet St. Helena looks down upon the whole of Sonoma County. These hills and mountains are not for ornament; high up on their fertile slopes, even upon their summits, are numbers of the finest homesteads. The area on which rough stone interferes with farming operations is small. Out of the area of land in the county at least 200,000 acres are valley land, the richest soil known, being a black loam; 200,000 acres are rolling or higher tableland, of an exceedingly rich alluvial brown soil, with considerable sand. This is the best fruit land. We may class 200,000 acres as foothill lands, adapted to many kinds of agricultural and horticultural products and pasturage. At least 100,000 acres of mountain land are adapted to grazing, and about 80,000 are covered with redwood timber of a magnificent growth.

LOCATION.

The location of Sonoma County is a matter to which we call particular attention. Distances are reckoned from the county seat, Santa Rosa, which is centrally situated. It is 48 miles north of San Francisco; 68 miles due west of Sacramento, the capital of the State; 400 miles northwest of Los Angeles; 300 miles south of the northern boundary of the State, and comes within 50 miles of being the farthest western point on the coast of the United States, except Alaska. The southern boundary of the county fronts on San Pablo Bay, an arm of San Francisco Bay, about 30 miles north of San Francisco. It is 350 miles farther west than San Diego, and 280 miles farther west than Los Angeles. On the west it has a long coast line, and several small but valuable harbors, bays, and beaches of its own.

VALLEYS AND WATERCOURSES.

Sonoma Valley is about 20 miles in length, with an average width of 8 miles. It lies parallel to Petaluma Valley, from which it is separated by a range of mountains.

The streams and watercourses of Sonoma County are numerous, and can be utilized for irrigation. On the coast frontage streams of greater or less size flow down from the adjacent hills, at short intervals, to the sea. Russian River, the largest stream, enters on the north, flows in a southeasterly direction for 20 miles, turns Fitch Mountain, and finds its way to the lowest depression in the Santa Rosa basin, from which it breaks through a gap in the Coast Range to the Pacific Ocean. This river gathers the waters from three fifths of the area of the county. Its largest tributary on the northeast is Dry Creek, flowing out of the Coast Range through a splendidly fertile valley 20 miles long and 2 or 3 miles wide, running parallel with and merging into the central valley at the point where Dry Creek delivers its waters to Russian River. From the northeast the largest tributaries of Russian River are Sulphur Creek, upon which the celebrated Geyser Springs are, and McDonald, Marcoma, Redwood, Wines and Brooks creeks, which flow through and out of St. Helena Valley. From the mountains on the east, Mark West and Santa Rosa creeks come down to the plain, and flow for 10 miles across it, parallel with each other and 4 miles apart. They empty into the laguna or lake of Santa Rosa, which overflows at high water into Russian River. Copeland Creek comes into the valley from the south, flows northerly, and also empties into Santa Rosa Laguna. The Gualala River flows through the southwest Coast ranges to the Pacific Ocean. Austin Creek and many other tributaries find their way from this direction to the Gualala and Russian rivers.

POULTRY INDUSTRY.

Sonoma County, together with her great wine, fruit, dairy, stock, and other large industries, produces as much poultry and eggs as all the balance of the State put together. The annual output is upward of \$2,000,000 in value. The advantages of the poultry and egg industry are its nearness to a reliable market, quick cash returns, and length of season. The vicinity of Petaluma is largely devoted to this industry possibly one half of the poultry and eggs shipped from the county are from there. From this point 3,493,321 dozen eggs and 33,286 dozen chickens were shipped last year, as high as 29,232 dozen eggs and 686 dozen chickens being shipped in one day. On an acre of ground can be raised and kept successfully 400 chickens, laying hens, the year round. These chickens, with ordinary care and attention, such as an intelligent and industrious man would give to any business to succeed in, will net the owner from \$1 to \$1.25 a hen clear profit a year, over and above the cost of feed, which is all purchased and paid for, except such as vegetables, kale, and feed raised in the garden. It is difficult to imagine what else a man can raise on land to net \$400 or more an acre, with a sure and steady market for his product.

To convey an idea of the profits in the business we quote the following from the Petaluma "Land Journal": "One man near town has 2 acres, keeps 800 hens, and makes \$1.25 per hen, clear of expenses. Another, with 20 acres, has banked in three years \$3,000, clear of all

expenses and living. A few make as high as \$1.50 to \$2 per hen, and there is no danger of collapse in prices. As proof, note the hundreds of carloads of poultry and eggs imported from the East each year by the commission houses of San Francisco."

These are a few instances among many. With a few acres well stocked with chickens a family can make a good, independent living. The poultry business is like the banking business—cash on the spot; and there is no surer road to success than along the chicken route in Sonoma County.

STOCK AND PASTURES.

Cattle are raised on a large scale, principally for dairying purposes, and the very best breeds are represented. Our grazing land is unsurpassed. From December 1st to July 1st the pastures are green, being thickly carpeted with the native grasses, alfalfaria, white clover, bur clover, wild oats, bunch grass, and many other kinds. Stock will thrive on such ranges the year round without extra feed. In the valley lands it requires about 5 acres per cow per year for dairying purposes; in the hill lands from 10 to 15 acres per cow. In the northern part of the county sheep-raising forms an important industry. Much of the coast region is devoted to pasturage purposes.

DAIRYING.

The milch cows are of a choice, selected breed. Owing to this forward breeding, and the further fact that the nutritious grasses that grow in the dairy districts make exceptionally fine feeding ground, the annual product per cow is, on an average, 50 to 100 per cent higher in this and adjoining coast counties than in almost any other part of the State. The dairies number from 40 to 250 cows each, the average number being 100 to 200. Petaluma, Santa Rosa, Bodega, and Valley Ford are the chief places from which dairy produce is shipped. From these points, by rail and water, large shipments are made weekly to San Francisco and other large markets. For 65 miles the western boundary is washed by the waters of the Pacific. The moisture that rises from the ocean is absorbed by the ground, and from this fact the pastures are kept green nearly the year round, making this section the ideal spot for the dairyman and stock-raiser. The total expense in the actual manufacture of butter is three fourths of a cent per pound. The breeds of milch cows represented are mostly Jerseys, Holsteins, and Ayrshires, with some strains of Durhams, and fine American breeds. All milk used at the creameries is bought and sold by weight. The average test shows about 4 per cent, or 4 pounds of cream or butter-fat to 100 pounds of milk. In well-managed dairies the yield of butter per cow per annum is from 150 to 200 pounds.

The value of the growth of stock cattle is \$10 per head per year, until the limit is reached, and this without other feed than that obtained by grazing upon lands valued at from \$10 to \$40 per acre.

HOPS.

In the production of this article Sonoma County leads the world. There is no other country that can produce the quality equal to a choice Sonoma. Nearly all other hop-raising sections, outside of a few counties in this State, are subject to crop failures, caused chiefly by vermin,

mold, honey-dew, rust, red spider, or severe storms. Such calamities are unheard of in this county. Vermin are the most dangerous enemy to a hop-grower. A crop may be in splendid condition until the time of harvesting, when this pest may sweep over the section and destroy the crop. These insects have had forty years in which to make their appearance in Sonoma County. They can not exist there, as they require a warm, muggy atmosphere. During the hop harvest the growers are favored with bright, sunshiny days. The very best quality of soil—and there is plenty of it—together with an excellent climate, is required for a successful culture of hops. In New York state hops grow on elevated land, while in Sonoma County the rich, sandy loam of the river and creek bottoms is employed. In the East and Europe the land has been worked out, and for this reason an enormous expense is incurred by the constant use of fertilizers. The Sonoma grower never has to resort to this. The richness of the soil, together with the adaptable climate, assures an average crop of about 1,800 pounds of dried hops to the acre. This enormous yield makes it possible to place the product in the Eastern and European markets for less than the cost of growing the hops there; the average yield there being in the neighborhood of 1,200 pounds to the acre.

In laying out a hopyard two systems are used, the pole and the trellis. In the former the vines are set about 8 feet apart, and trained on poles 9 feet in height. The cost in addition to the value of the land varies from \$35 to \$50 per acre, according to conditions. This includes everything—roots, poles, and labor. In the trellis system the vines are set about 7 feet apart, and trained on a trellis work of poles and wires, from 16 to 18 feet above the ground. The total cost of this system per acre is from \$60 to \$75, and when once installed is permanent, there being no further expense. In this county the planting is done from the first of January to the first of April. The crop is harvested from the 25th of August to the 25th of September.

There is no place where hop culture is carried on that can produce from the first year's planting the amount of the dried product per acre that can be raised in Sonoma County. The largest yield up to that time ever raised in this county was produced in 1899, the amount being 18,000 bales. At an average of 190 pounds to the bale, this would make a total of 3,420,000 pounds. In 1900 the yield fell to 8,000 bales; in 1901 it increased to 15,000 bales; 1902, 17,222 bales; 1903, 14,661 bales; 1904, 19,300 bales. The average cost of placing hops on the market is 8 cents. The average price obtained by the grower for the past three years was 22 cents, making a profit of 14 cents per pound.

The hop industry in Sonoma County is assuming greater proportions; other sections are gradually decreasing their acreage, while Sonoma is gradually increasing hers. Most of the hops are shipped to Eastern and European markets, but there is a growing demand for our product in Australia, New Zealand, and the Orient. The adaptability of this county in producing the quantity and quality has for its proof placed the growers on a better financial footing than those in any other hop-raising section of the world.

HAY AND GRAIN.

This county produces large quantities of wheat, oat, barley, and alfalfa hay, which runs all the way from 2 to 5 tons per acre. It costs from 90 cents to \$1 per ton for baling. Good hay can be raised wher-

ever one can plow. It is harvested in May and June. Hay brings from \$9 to \$12 per ton. The acreage of hay in 1904 was 37,460, and the yield upward of 100,000 tons.

The soil is particularly adapted to oats, which many consider the most profitable of our grain crops. However, wheat, barley, and corn are extensively cultivated in every locality at a splendid profit. All grain is harvested in June and July. Corn is grown mostly on river bottom land, and yields on an average 65 bushels to the acre.

FRUIT-GROWING.

One of the chief industries is fruit-growing. Last season there were in cultivation 45,000 acres planted to fruit trees and vines, and the increase up to the present amounts to about 10 per cent. The total number of fruit trees of all kinds in 1904 was 1,567,215. This estimate is made from the Assessor's figures, and 10 per cent should be added to cover numerous small holdings in less than acre lots. The estimated value of a fruit tree from the time it is planted to the time it comes into bearing is \$1 per year. The first cost of a tree for setting out is from 10 to 15 cents. The right season for planting is during February and March. While many fruit-driers are operated, many authorities prefer the sun-drying process, which involves no expense and can always be relied upon. The sun-dried product is of superior quality and flavor, and will bring a correspondingly higher price.

The peach is a great favorite, as the trees commence to bear the second year after planting. The soil best suited to them is a sandy loam, and they may be cultivated with equal success either on the hill-sides or in the valleys. They are set 20 feet apart, 108 to the acre. After the trees get into bearing the income will depend principally upon the care bestowed upon them. Peaches of standard size for the market are those that will fill a 2-inch hole. If larger they are called "extras," and if smaller, "seconds." The latter are mostly used for drying. The fruit is harvested in July, August, and September. All varieties of the peach thrive. The area in cultivation is now about 3,000 acres.

Prunes should have the best quality of soil, for the tree is a heavy bearer and of comparatively short life—about twenty-five years. The trees are set 20 feet apart, 108 trees to the acre, and they come into bearing after five or six years. The crop is picked in October. Last year there were about 6,000 acres in bearing trees. With 100 trees to the acre, we have 600,000 as the approximate number. The yield last season, expressed in the quantity of the dried product shipped, was 400 carloads, of an average value of \$750 per car of 15 tons each, or a total value of \$300,000.

Pears are planted about 20 feet apart in a clay subsoil, and bear after five or six years. Harvesting takes place in September, October, and November. The acreage in pears last year was 1,000. Four of the largest pear orchards in the county have a combined total of 10,300 trees.

Cherries begin to bear within five to seven years after planting. They are set 20 feet apart, and do best in a clay subsoil. The fruit ripens in May and June. There are 600 acres now in cultivation.

The land best adapted to apples is that having a clay subsoil. The

trees are set 25 feet apart, or 76 trees to the acre, and bear within five to six years after planting. The fruit is harvested in October, November, and December. At present there are over 3,000 acres devoted to apple culture. The finest apple land is along the northern coast, and sells at from \$10 to \$20 per acre. The price paid for apples averages somewhere around \$10 per ton, although this is often exceeded in the special varieties. The average yield is in the neighborhood of 8 to 10 tons per acre.

The growing of citrus fruits, though comparatively a recent industry, has gained a strong foothold, and present indications point to a steady increase in acreage. It was first demonstrated that the orange could be successfully grown here by General M. G. Vallejo and Nicholas Carriger about thirty years ago, but it has only been within the past six or seven years that the fact has become generally recognized. There are now about 10,000 orange and 1,000 lemon trees in the county. Though mostly young, they are thrifty bearers, and the crop increases each succeeding year. The most popular varieties of oranges are Mediterranean Sweet and Washington Navel. The best three sizes are those going 126, 150, and 176 to the box, and the prices range from \$1.50 to \$2.50, according to size. The orange season begins early in December, and lasts until June. The lemon thrives as well as the orange. From the time the tree comes into bearing ripe fruit may be picked every month in the year. It is in blossom continuously. The best sizes of lemons run about 300 to the box. Prices range from \$2.25 to \$3.50. Both orange and lemon trees are set 20 feet apart, or 108 to the acre. They come into bearing after five or six years.

While the olive requires a good, well-drained soil, there are many orchards that are planted around the rocky foothills where nothing else can be grown. They are set from 20 to 32 feet apart, and come into bearing after five or six years. There were 1,200 acres in cultivation last year. Olive culture is making rapid strides. The first grove of about 90 trees was planted in 1870, and from the crop was produced the first olive oil in the county. It was awarded a gold medal at the Paris Exposition, and received first premium at the World's Fair in Chicago, 1893. This county has about 120,000 olive trees of the very best varieties for oil and pickling. The oil produced has established an excellent reputation, and is usually sold ahead of its production. Olive oil costs \$2 per gallon to manufacture, and sells at from \$3.50 to \$5. Though slow in coming into bearing, the olive tree is a paying and lasting investment. It has a life of thousands of years, and even history does not enable us to determine it accurately, but it is an absolute fact that olive trees mentioned in the Bible are living and bearing fruit at the present time, notably those in the Garden of Gethsemane in Jerusalem.

NUTS AND BERRIES.

Sonoma County is the true home of the English walnut; and there are few places in the world where it can be more successfully cultivated. What it needs is a suitable climate, for experience has demonstrated that the quality of the soil is of little consequence, provided only that it is deep, for the trees have a very long root. They also have widely spreading branches, and must be set 50 feet apart. This will permit of only 16 to the acre, but they are very prolific, and the large returns

fully justify the space covered. It is only recently that the walnut has attracted the attention of growers in this county, but now that its possibilities as a money-maker are becoming more widely known the acreage devoted to its cultivation is rapidly increasing and it promises to become one of our great industries. At present there are 500 acres in cultivation. Trees for planting cost usually about 15 cents, and they bear after six or seven years.

Sonoma is the greatest blackberry county. Last year there were 700 acres in bearing vines, which produced 1,400 tons, or 140 carloads, of first-grade fruit. The blackberry season begins in the latter part of June, and runs into September. Raspberries are harvested in May, June, July, and August.

There are now 50 acres of Lucretia dewberries. Last year a part of the crop was shipped to Montana, and brought 15 cents per pound. The season is from about the 10th of June to the 10th of July.

Gooseberries are a valuable product, and here are raised the largest and finest varieties. They often sell as high as \$70 per ton. Their season is in May and June.

Many strawberries are not shipped, most of the supply being used for home consumption, but those raised are of the very best quality. Some varieties are ready for market as early as February. The season extends into November. The raising of strawberries for the market forms an important and profitable industry.

VEGETABLES AND MELONS.

Sonoma grows vegetables throughout the year, and often raises from two to three crops annually.

Potatoes are a staple product. They are grown in almost every section, attain large size, and are of the finest quality.

Asparagus is particularly adapted to the soil and climate. It brings from \$1.50 to \$2.25 per box containing from 40 to 50 pounds. There are great possibilities for an increased acreage in this vegetable. An average crop is from 80 to 100 boxes per acre, and the profits vary from \$100 to \$300 per acre.

Tomatoes are produced in great quantities for canning. String beans are also grown extensively for this purpose.

Rhubarb brought 75 cents to \$1 per box of 40 pounds this spring. A greatly increased acreage of this plant may be looked for in the future.

There were more than 150 acres bearing watermelons last year; they were of large size and fine flavor, and worth \$100 per carload. In the San Francisco market they sold as high as \$4.50 per dozen.

GRAPES AND WINES.

Sonoma is the largest and most important grape- and wine-producing county in the State. Her wines are justly famed throughout the world, and took first premium at the Genoa Exposition in Italy in 1892. A gold medal was awarded at the World's Fair in Chicago in 1893, and also at the Midwinter Fair in San Francisco in 1894; and the grand prize, the highest award, was given her wines at the St. Louis World's Exposition last year by a jury composed of twenty-one members, most of whom were French and German experts. In order to accommodate the enormous yield of its own section alone, one wine company has

erected a wine tank with a capacity of half a million gallons, the largest in the world.

The total area covered by vineyards amounts to 25,000 acres. At \$200 per acre (average value of the vineyard in full bearing) this represents a value of \$5,000,000. With an average of 680 vines to the acre, we have the total of 17,000,000 grape vines. The cost of producing a ton of grapes is estimated to be \$8. The grape-grower receives from \$10 to \$20 per ton. Wine grapes yield from 140 to 150 gallons per ton. The price of wine, one year old, ranges from 10 to 20 cents per gallon. Last year there were produced over 15,000,000 gallons, equivalent to 100,000 tons of grapes. The yield of grapes therefore was almost three tons, and of wine more than 400 gallons, per acre. At an average price of 15 cents per gallon for one-year-old wine, the value of the wine product of an acre of grapes is \$60. The value of all the wine produced in the county last year was about \$1,500,000, and the average annual product for the past ten years was about 7,000,000 gallons. In addition to wine grapes, there are many choice table and raisin varieties grown. Good grape land, unimproved, can be purchased at from \$15 to \$100 per acre, according to location.

TOBACCO.

Tobacco-growing has made a fair start, and is one of the coming industries. The plant will thrive in almost every section, and is now quite extensively grown and manufactured in many localities, and the quality is excellent. David Hetzel has raised tobacco for many years near Guerneville. Through a friend a few hands of his tobacco found their way to the St. Louis Exposition, and although the sample was not large enough to be called an exhibit, it attracted the attention of the judges so favorably that they awarded it a silver medal, making the further statement that had there been the required amount they would have awarded it the gold medal.

LUMBER.

The amount of lumber manufactured by the eighteen sawmills during 1904 was over 17,000,000 feet. A large amount of shingles, pickets, and shakes is made in the county.

The handling of lumber and other forest products gives direct employment to a large number of men. A considerable business is done in wood and other split timber, between 20,000 and 30,000 cords of stovewood alone being cut annually. A big business is also done in the handling of tanbark, etc.

The prices of Sonoma County pine and redwood lumber are as follows: Clear, or surfaced lumber, \$15 to \$18 per thousand feet; rough lumber, from \$9 to \$11; shingles, 40 cents per bunch; split pickets for fences, \$17 per thousand. The average cost of a redwood fence is about \$1 per rod.

TEA-RAISING.

John Schindler is experimenting with tea-raising on his ranch near Melitta, east of Santa Rosa. He has several hundred tea plants in his garden, and thinks he will be able to place his tea on the market in a year or so. At first he grew his plants in pots, but now he has them in the ground.

MISCELLANEOUS ITEMS.

Labor commands better prices, especially competent and experienced farm hands, than in the East or in any part of Europe.

Sonoma County has a large number of mineral springs. The seltzer water from one of these is considered the finest in the United States.

There are six incorporated cities in the county: Santa Rosa, Sonoma, Petaluma, Healdsburg, Cloverdale, and Sebastopol.

Russian River is Sonoma's great waterway, and the larger portion of the county is drained by it and its tributaries.

The Japan current gives us unfailing rains, and regulates the temperature both summer and winter.

The total expenditure on county roads in 1904 was \$113,906.84. The number of miles covered by this sum was 1,185.

Of the amount collected in taxes, 36 cents on each \$100 are spent upon the roads. Compared with the East, our roads are more solid and permanent. This is due to the absence of excessive frosts, which crack and break up the hardest ground, of whatever material it is composed.

The many and varied health-giving mineral waters, fishing and hunting locations, and summer resorts, make this county a paradise for the pleasure-seeker. Thousands of visitors spend the summer living in tents pitched along the many beautiful streams and in the numerous picturesque spots.

PRICES OF LANDS.

Land values vary according to quality, location, and what the land is wanted for. The rich river bottom land, with no crop, ranges from \$200 to \$300 per acre; valley fruit land, not planted to fruit, from \$75 to \$125; bench and hill lands suitable for hay, grain, or fruit, from \$25 to \$100—this includes vineyard lands; stock ranges, from \$5 to \$25, which includes timber land. These prices may seem to some people rather high, but when one considers what the land produces, the favorable conditions of the climate, and that such a thing as a total failure of crops has never been known, they can not be considered exorbitant. We have in mind a place of ten acres, for which the owner paid \$200 per acre for the bare land. Setting to fruit and improving cost him \$1,500—making a total cost of \$3,500. The present annual net income from the place is \$1,000—or equal to 10 per cent on an investment of \$10,000.

GENERAL STATISTICS.

Area, 1,540 square miles, or 985,600 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	874,574
Value of county real estate	\$13,689,220
Of improvements thereon	3,833,850
Of city and town lots	3,535,550
Of improvements thereon	3,544,890
Of personal property	3,646,060
Total value of all property	30,713,665

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle—Beef	580	\$17,400	Colts	1,840	\$27,600
Stock	10,210	204,200	Mules	470	11,700
Thoroughbred	500	25,000	Sheep—Graded	1,530	5,600
Cows—American	20,640	412,800	Common	25,450	50,900
Common	520	7,800	Lambs	2,400	1,200
Calves	5,620	56,200	Goats—Angora	820	1,640
Oxen	50	750	Common	1,200	1,800
Swine	2,750	8,250	Poultry (dozen)	9,150	27,450
Horses—Thoroughbred	50	7,500	Hay		1,900
Standard-bred	45	4,500	Wool		385
American	7,350	294,000	Lumber		10,000
Common	5,150	128,750			

Number of acres sown for crop of 1904:

Wheat	3,050
Oats	6,190
Barley	1,780
Corn	950
Hay	37,460

Acres of grape vines growing in spring of 1904:

	Bearing.	Non-Bearing.
Table	450	150
Wine	16,850	1,170

Number of fruit trees growing in spring of 1904:

	Bearing.	Non-Bearing.		Bearing.	Non-Bearing.
Apple	210,470	72,470	Prune (French)	480,670	110,260
Apricot	18,990	2,530	Prune (other kinds)	44,590	5,290
Cherry	42,620	18,840	Lemon	740	250
Fig	3,970	1,350	Orange	8,710	2,010
Olive	59,270	44,990	Almond	7,020	3,015
Peach	256,710	8,850	Walnut	4,040	1,380
Pear	76,240	23,970			

School statistics:

Total number of census children, 1904	10,153
Number of teachers employed	240
Number of school houses	153
Number of school districts	138
Amount expended for public school purposes	\$172,494 75

STANISLAUS COUNTY.

Stanislaus County is one of the San Joaquin Valley group. It extends across the entire width of the valley, reaching from the summit of the Coast Range on the west well into the foothills of the Sierra Nevadas on the east.

The San Joaquin River, a navigable stream for eight months in the year, flows across the county some miles west of the estimated geographical center. From that stream diverge two tributaries, the Stanislaus and Tuolumne, both leading eastward to the Sierras, and both navigable for from three to six months in the year. There are also several other streams of more or less importance.

The greater part of the county is an almost level plain, stretching away until it merges into the foothill and mountain region on the east and west.

The rainfall is under the general average of the State, the precipitation at Modesto being about $9\frac{1}{2}$ inches.

SOIL.

On the eastern side of the county the soil is of a sandy nature, merging into loam as the foothills are approached. That prevailing on the west side is a rich loam of indefinite depth, and which under water is wonderfully fertile. The San Joaquin River divides the county a little west of its center line, and this is bordered by a belt of bottom land from 1 to 2 miles in width. The lands immediately adjoining this on the east side, for a width of from 1 to 5 miles, are principally adobe. The low lands adjoining the Tuolumne River are very sandy, while those along the Stanislaus are a dark, firm loam. In the central part the soil is of a sandy character, especially to the south of the Tuolumne River, changing northward and westward to grayish and blackish loams. Some alkali patches are found in the lower lands, but they are not extensive.

IRRIGATION FACILITIES.

Two hundred and sixty thousand acres of the central portion of the county, lying between the Stanislaus and San Joaquin rivers and bisected by the Tuolumne River, will within a few years comprise one of the garden spots of California. There are extensive systems that irrigate thousands of acres. These irrigation systems are comprised in the Turlock and Modesto irrigation districts; the former, embracing 176,000 acres, lying between the Tuolumne and San Joaquin rivers, and the latter, 82,000 acres, lying between the Stanislaus and the Tuolumne rivers. The Tuolumne River is the source of supply for both districts. This stream has a watershed second only to that of one other river of the State, carries a vast volume of water and is never-failing, being fed by the perennial snows of the Sierras. The water is

taken out of the stream, on either side, by means of a concrete dam constructed jointly by the districts at a cost of \$550,000. It is located just above the mining town of La Grange, well in the hills of the Sierras, 32 miles distant from the centers of the districts, and constitutes one of the greatest and most spectacular structures of the kind in the world. It is 327 feet in length, 97 feet through at the base, 12 feet through at the crest, and 127 feet in height, arching up-stream. The Turlock District canal system comprises 22 miles of main canal, 74 feet in width at the bottom, and designed to carry a maximum depth of 8 feet of water; two main laterals, aggregating 35 miles, 40 feet in width on the bottom; and six sub-laterals, aggregating 80 miles in length, ranging from 18 to 30 feet in width, floor measurement. The main canal of the Modesto District system is 60 feet in width on the bottom, and will supply 90 miles of laterals ranging from 18 to 40 feet in width.

FRUIT CULTURE.

Stanislaus produces oranges—fine, luscious Navels—in marketable quantities about Knight's Ferry, Oakdale, Modesto, and Hickman. Her olives go on the market, green and pickled, and in the shape of oil. Her Bartlett pears, prunes, apricots, grapes, and wines are known and appreciated abroad, and peaches add to the fame of her climate and soil. Nuts do well.

The horticultural interests have received comparatively little attention, wheat-growing being the general industry—her product for 1904 being no less than 110,000 tons; but now that irrigation is available the production of fruit is rapidly assuming great proportions. On the bench lands along the rivers are some fine orchards and small vineyards; and here and there on the uplands, particularly about Knight's Ferry and La Grange, where irrigation has been available to a limited extent, and in instances on the plains where pumping has been resorted to, fruit and grapes grow to perfection.

The sandy loam soil, of which a large portion of the area of the county is comprised, affords every advantage for intensive farming. Garden products are produced in abundance. Oranges, lemons, nuts, peaches, apricots, prunes, pears, nectarines, figs, olives, and table and wine grapes yield in gratifying quality and quantity; while alfalfa fields yield five crops of $1\frac{1}{2}$ tons to the acre annually, and afford pasturage after the curing season.

Dairying is a growing and very prominent industry, because of the favorable conditions and excellent profits. There is a model creamery at Modesto, and skimming stations in all tributary localities. Stanislaus County produces about 1,000,000 pounds of butter annually. In addition to the butter product, her dairy interests are represented by large quantities of cream and cheese.

The famed Atwater sweet potato district adjoins the Turlock district, but the Turlock sweet potatoes are in as keen demand and bring as good prices as the Atwater product, and the yield is none the less heavy.

There are over 10,000 acres in alfalfa on the West Side, stretching from Crow's Landing south to Newman, under a branch of the San Joaquin and King's River Canal, and the dairy industry in all its branches flourishes exceedingly, maintaining several creameries, a

score of private separating plants, and a number of cheese-making institutions. Land in alfalfa rents for as high as \$10 per acre per annum, the lessee paying the water rate. On the East Side, about Oakdale, there is a large percentage of the orchards and gardens; and alfalfa is receiving considerable attention, the Oakdale Irrigation Company's system affording water for irrigation, the water being derived from the Stanislaus River through the medium of the Stanislaus and San Joaquin Canal Company's system.

LIVE STOCK.

There are large bands of cattle and sheep, most of them being driven to the mountains of Tuolumne and Alpine counties for summer range. Much attention is paid to breeding fine horses, and excellent grades are the result.

PRINCIPAL TOWNS.

Stanislaus County has a population of about 10,000.

Modesto, the county seat, has first-class county buildings, substantial business blocks, good hotels, schools, and churches.

Oakdale, on the Stanislaus River, 14 miles northeast of Modesto, is the center of a large fruit and grain region.

Knight's Ferry, in the foothills, has fine orange groves, vineyards, a winery, and flouring-mills.

Other towns are Waterford, Montpelier, La Grange, Ceres, Turlock, Grayson, and Newman—all produce- and grain-shipping places with large warehouses.

LAND VALUES.

Farming lands range from \$25 to \$50 an acre, according to quality and location. The best bottom fruit lands can not be bought for less than \$75 and \$100 an acre near the central shipping points. Remote from the towns lands are much cheaper.

GENERAL STATISTICS.

Area, 1,486 square miles, or 951,040 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed.....	951,040
Value of country real estate.....	\$8,507,420
Of improvements thereon.....	758,455
Of city and town lots.....	595,650
Of improvements thereon.....	761,690
Of personal property.....	1,980,050
Total value of all property.....	14,376,711

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle—Beef.....	157	\$3,925	Mules.....	4,842	\$168,950
Stock.....	16,892	261,500	Sheep—Graded.....	20	75
Cows.....	6,779	169,250	Common.....	46,831	94,685
Calves.....	8,537	59,210	Lambs.....	19,746	10,880
Swine.....	8,360	20,990	Goats.....	92	240
Horses—Standard-bred.....	30	2,590	Poultry (dozen).....	1,901	5,080
American.....	1,761	51,725	Hay.....		4,050
Common.....	4,113	92,225	Lumber.....		31,200
Colts.....	1,933	32,340			

Number of acres sown for crop of 1904:

Wheat.....	230,100
Oats.....	7,900
Barley.....	73,320
Hay.....	29,260

Acres of bearing grape vines growing in spring of 1904:

Table.....	55
Raisin.....	200
Wine.....	220

Number of fruit trees growing in spring of 1904:

	Bearing.	Non-Bearing.		Bearing.	Non-Bearing.
Apple.....	5,000	700	Pear.....	4,060	320
Apricot.....	16,600	500	Prune (French).....	11,560	2,880
Cherry.....	80	120	Lemon.....	65	15
Fig.....	4,000	6,000	Orange.....	8,960	2,240
Olive.....	9,600	400	Almond.....	7,600	1,600
Peach.....	20,800	16,000	Walnut.....	320	240

Value of grain assessed in storage:

Wheat.....	\$225,780
Oats.....	1,320
Barley.....	46,920
Corn.....	135

School statistics:

Total number of census children, 1904.....	2,819
Number of teachers employed.....	80
Number of school houses.....	53
Number of school districts.....	54
Amount expended for public school purposes.....	\$50,165 90

SUTTER COUNTY.

Sutter is the only county situated entirely in the great central valley of the State. No part of it extends to the foothills of either the Sierra Nevada or Coast Range mountains. As nearly all the county lies between the Sacramento and Feather rivers, the soil is mostly alluvial or delta land. The Sacramento River forms the entire western boundary, and is navigable throughout this entire distance of over 40 miles. The Feather River is on the east side, except in the southern part, where the county extends across the river, about 100 square miles being on that side. The southern boundary is only 12 miles from the State capital. In size Sutter County is among the smallest in the State, there being but five smaller. In population it ranks forty-sixth, and in assessed valuation is thirty-ninth.

TOPOGRAPHY.

About 300,000 acres of the total are tillable and have been cropped for more than fifty years. About 100,000 acres are subject to annual inundation and covered by a rank growth of tules, which is, however, very valuable from July to January for pasture; hundreds of cattle and thousands of sheep are annually pastured and fattened thereon.

The Sutter Buttes are in the northwestern corner. This peculiar mountain formation lies about in the center of the Sacramento Valley. The peaks rise to a height of nearly 2,000 feet, while the whole extent of these mountains only covers about 40 square miles. The plains surround them on all sides, the level alluvial lands running up to the foot of the mountains, where the character of the soil changes from a sandy or clayey loam to a gravelly one. Many small fertile valleys extend well into these hills, which, while not tillable, furnish excellent pasturage throughout the winter and spring.

Beginning on the southern side of the Buttes, and extending to the junction of the Feather and Sacramento rivers, is the Sutter tule basin. During the winter the water of Butte Creek, joined to the overflow from the Sacramento River, pours into this basin until it is filled to a depth of from 2 to 15 feet. In the spring and summer a dense mass of tules, a soft reedy growth, springs up, frequently to a height of 12 or 15 feet. In the fall and winter this dies down and is covered with sediment brought down by the next high water. This going on for ages has formed a soil of marvelous fertility. The area of this basin is about 125,000 acres. Several small sections of this land have been reclaimed by building levees, but the greater part is in its natural condition. During recent years, the growing of late crops of beans and potatoes on this class of land has been very profitable, and each year sees the area of such planting extended. Improvements now being made to the Sacramento River by the State and National governments will render this land still more valuable.

The arable land is mostly a sandy loam, with a heavy clay subsoil, which resists drought. A strip of adobe extends from the tules to the northern side near the Buttes. The soil east of the Feather River is mostly red.

HISTORY.

General John A. Sutter, after whom the county was named, made the first settlement in 1841, on the west bank of the Feather River, about seven miles south of Yuba City. The Mexican government had granted him a tract of land comprising, according to the description in the grant, about four fifths of the present county. He established a rancho, planted trees and vines, and watched his herds of horses and cattle roaming at will over the plains. When California was made a State his grant was only confirmed for some 10,000 acres.

With the discovery of gold came an influx of American settlers, who rapidly acquired title to the unoccupied lands. At first the settlers did not think that the dry plains would produce crops without irrigation, and farming was confined to the bottom lands next the river. When Horace Greeley, in a speech delivered at Marysville in 1859, declared that those plains would produce grain without irrigation, people thought it idle talk, but within ten years thousands of tons were being harvested each season.

IRRIGATION—ELECTRIC POWER.

Irrigation has not been extensively utilized. In lieu thereof the most thorough cultivation has been the means used to secure the abundant crops which have made the county famous for productiveness. If, however, irrigation is found to be desirable, and an improvement upon the present mode, no other section can procure an unlimited supply of water for that purpose so cheaply and conveniently as can Sutter County. With the Sacramento River running the entire length of its western boundary, and the Feather and Bear rivers cutting through its length from north to south, and each taking rise in the adjacent mountains, and being all torrential streams above the valley, it is easily practicable to flood any portion of the county, except the Sutter Buttes, at all times and seasons at a small outlay, by diverting the waters of those streams at the lower foothills, which, in no instance would be more than ten miles distant from the land sought to be irrigated. A large canal for that purpose is being constructed to tap the Feather River at a point near Oroville, in Butte County, and will enter the county at its northern boundary. Another and most inexpensive mode of general irrigation can be had from large wells with power from the Bay Counties Electric Power Company, located less than forty-five miles easterly from the county line, it being—with one exception—the largest and most extensive plant in the United States. It has harnessed the hitherto uncontrolled and torrential stream, and is running street cars in Oakland, and machinery as far south as San José, and at all intermediate points. Its main line crosses the county, while its branches convey light and power throughout the fruit district. Every home can avail itself of telephone communication.

The average rainfall for the past fifteen years has been 19.65 inches, while the water level throughout is less than fifteen feet from the surface. A drought or crop failure is unknown. Dry seasons, as a rule, produce the best grain crops, as was evidenced in 1898—a dry year. The average of the summer-fallow grain was the best for several years.

TRANSPORTATION FACILITIES.

The means of transportation are ample and almost phenomenal. The Southern Pacific Company has one main trunk line and one branch line which traverse the county longitudinally. They are the California and Oregon and the branch line from Sacramento to Oroville. These lines furnish eight daily mails, and passenger and freight service equal to many of the great Eastern railroad centers.

FRUITS—CEREALS—HOPS.

Fruit-growing as a commercial proposition was commenced nearly forty years ago by George Briggs, just below the town of Yuba City. He had there an orchard of about 300 acres, much of which has since been destroyed by debris from the mountain mines. The pioneer in grape culture was Dr. Chandler, who planted the first muscatel vineyard of 40 acres, five miles southwest of Yuba City.

Sutter County is naturally the home of the peach. In no place in the United States can that fruit be grown in greater profusion, or to greater perfection; and this is particularly true as to the high-grade canning clings. The great bulk of high-grade extra fancy cling peaches canned in this State are from the orchards of this portion of the Sacramento Valley. The Phillips Cling, the Tuscan, the different Orange Clings, the Sellers and Levi Clings, and many other varieties are shipped annually from here all over the State for canning, almost to Siskiyou and San Diego.

Nearly all other deciduous fruits find here their native soil. The pear, plum, prune, nectarine, fig, almond, and walnut all do well.

The Thompson Seedless grape is grown nowhere in the United States but in California, and hardly in California except in Sutter County. There are probably 1,500 acres of them in this State, 900 acres of which are in this section. This grape had no known existence in this county until it was propagated by Mr. Thompson about 1870. It was imported from southern Europe, and was there known as the Lady de Coverly. It seems indigenous to Sutter County soil. The raisins produced from this grape are superior in flavor and quality to any other known variety, and the price is highly remunerative. Commercially, the growing of the Thompson Seedless is in its infancy; intending producers can start in abreast with present growers, and be fully equipped with their past experience.

All the grains, hops, small berries, and the entire family of vegetables can be raised here with a profit equal to that in any other section of California. One of the most prolific wheat areas in the world is the Sacramento Valley, and Sutter County is a most creditable component part of that area.

CANNING INDUSTRY.

Among the industrial improvements in Yuba City is an immense dried-fruit packing-house, which employs more than 300 men, women, and children at least five months in the year, in packing, boxing, and making ready for market their output of thousands of tons of dried fruits, nuts, etc. During the year past this establishment packed and shipped to Eastern markets 45,000 ten-pound boxes of dried and cured figs, all grown and cured in the immediate vicinity. There are many smaller packing-houses and drying establishments, and extensive green-

fruit shipping sheds, from which hundreds of carloads of fresh fruit are shipped annually.

The California Fruit Cannery's Association has a large cannery, with a capacity of several hundred thousand cases each year. It gives employment every fruit season to more than 500 persons of both sexes. This association has enlarged its plant, nearly doubling its capacity, thereby making it the largest canning and preserving establishment on the Pacific Coast.

The Sutter Preserving Company has an immense plant for canning and preserving vegetables as well as fruit. It has created a healthy competition both as to employes and raw material, and greatly stimulated the planting of fancy cling peaches.

DIVERSIFIED FARMING.

Experience has demonstrated that the industrious man with a small capital and a family can take twenty acres of orchard and make as much or more out of it than the grain-grower can on a half section. There have been no failures among the small orchardists.

The county has several large creameries, and is especially adapted to the growing of alfalfa. Three crops can be cut annually upon thousands of acres of our best lands, and with liberal irrigation the amount can easily be doubled.

For up-to-date, diversified farming and fruit-raising, thousands of acres of Sutter County lands have no superior, and hardly an equal in the entire country. The soil is of unusual depth and generally a sandy loam. The rainfall is much above the average; shipping facilities are unrivaled, and the markets of the world can be reached with convenience and certainty.

Much attention is being given to the subdivision of heretofore large wheat farms into convenient tracts for homeseekers, and success has attended the effort. Many tracts have been cut up, sold and settled, and now gladden the eye with their orchards, vineyards, berry and vegetable gardens, and comfortable, and often luxurious homes, embellished and embowered with almost every flower and blossoming vine that is indigenous to a semi-tropical clime.

STOCK-GROWING—MINING.

Stock-growing and dairying have always been extensive industries. The Sutter Buttes furnish winter pasturage for large flocks of sheep and bands of cattle, while the tule provides summer feed. Along the Sacramento and Feather rivers are many alfalfa fields. Dairying has received quite an impetus from the establishment of the creameries at Knight's Landing and Vernon, with skimming stations at Tudor and Nicolaus.

Sutter has never produced minerals to any extent, although gold has been found in the Buttes. Indications of oil are abundant. One shaft, sunk more than thirty years ago, has never ceased to furnish a supply of gas. No use has ever been made of it, nor has any attempt been made to search further.

PRINCIPAL TOWNS.

Towns are scattered throughout. The largest is Yuba City, the county seat, with a population of about 1,500. In the north, near Butte County, is Live Oak, a railroad town. Near the Buttes is Sutter, where a high

school is prospering. Meridian, on the Sacramento River, is in the rich river and tule country. Nicolaus is on the Feather River, and Vernon, 10 miles south, at the junction of the Feather and Sacramento. These, with Tudor, Pleasant Grove, Marcuse, Pennington, and West Butte, furnish ample trading facilities.

GENERAL STATISTICS.

Area, 611 square miles, or 391,040 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	374,513
Value of country real estate	\$4,101,691
Of improvements thereon	704,280
Of city and town lots	83,155
Of improvements thereon	162,295
Of personal property	994,276
Total value of all property	6,676,030

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle—Beef	32	\$610	Swine	8,368	\$23,046
Stock	5,236	78,390	Colts	969	20,765
Thoroughbred	2	80	Mules	2,269	113,255
Cows—American	5	150	Sheep	51,213	104,505
Common	2,403	70,545	Lambs	7,988	4,483
Calves	2,591	25,775	Goats	22	50
Horses—Thoroughbred	16	1,535	Poultry (dozen)	2,967	8,680
Standard-bred	140	5,450	Hay	---	55
American	1,993	71,625	Wool	---	80
Common	888	27,490	Lumber	---	7,150

Number of acres sown for crop of 1904:

Wheat	27,680
Oats	7,790
Barley	14,955
Corn	340
Hay	6,225

Acres of grape vines growing in spring of 1904:

	Bearing.	Non-Bearing.
Table	30	---
Raisin	450	420
Wine	470	---

Number of bearing fruit trees growing in spring of 1904:

Apple	5,350	Prune (French)	26,865
Apricot	5,500	Prune (other kinds)	1,655
Cherry	1,500	Lemon	55
Fig	1,420	Orange	735
Olive	1,025	Almond	25,720
Peach	97,845	Walnut	60
Pear	4,520		

Value of grain assessed in storage:

Wheat	\$92,525
Oats	1,160
Barley	17,650
Corn	830

School statistics:

Total number of census children, 1904	1,337
Number of teachers employed	44
Number of school houses	34
Number of school districts	34
Amount expended for public school purposes	\$29,425 24

TEHAMA COUNTY.

By HON. H. S. GANS.

Tehama County occupies the upper or northern portion of the Sacramento Valley. It is 200 miles north of San Francisco, and 120 miles north of Sacramento. Part of its eastern boundary follows the summit of the Sierra Nevada Mountains, and its western boundary lies along the summit of the Coast Range. Its greatest length is 78 miles; its width from north to south, 38 miles. Of its area, speaking roughly, 700,000 acres are agricultural lands, 800,000 grazing, and 500,000 timber. The population was 10,966 by the last Federal census; it has since increased. The tax rate is comparatively low, rarely exceeding \$1.65 on the hundred dollars, and averaging about \$1.60.

Red Bluff, the county seat, has a population of 3,500. It is a clean, modern little city, located upon an elevated plain, with superior drainage, and with the Sacramento River washing the foot of the bluffs at one side. Other towns are Corning, Tehama, Vina, Paskenta, and Kirkwood. At Corning is located the Maywood Colony, with 11,000 acres planted to orchards; and at Vina is situated the famous Stanford ranch and vineyard, with 3,000 acres planted to grapes.

TRANSPORTATION FACILITIES.

The county is easily reached, being on the line of the California and Oregon branch of the Southern Pacific Railroad. Two lines of this road converge at the town of Tehama, 12 miles below Red Bluff; one coming up the valley on the west side and the other on the east side of the Sacramento River. North of Tehama there is but one line of track. The Sacramento River is navigable to Red Bluff, and steamboats from San Francisco and Sacramento make weekly trips up and down during most of the year.

Telegraph and telephone lines follow the railroad, and several private lines are in operation. One electric railway franchise has been applied for.

EDUCATIONAL.

The public school system is complete and excellent. A school is maintained wherever there is need of one. Two high schools, one at Red Bluff and one at Corning, furnish additional facilities for education, and prepare students for admission to the two great universities of the State.

TOPOGRAPHY.

The Sacramento River runs through the county from north to south. From this river there is a rise to the east and west until the summit of the mountain ranges is reached. South of Red Bluff and west of the river lie broad plains; beyond these rolling hills developing into the

foothills of the mountains, and then the mountains themselves, which rise quite abruptly to a height of from 3,000 to 9,000 feet. On the east side of the river low alluvial plains from 7 to 10 miles wide stretch to the edge of a low tableland of lava and other volcanic deposits. This tableland is about 600 or 700 feet high where it begins, and rises gradually until the mountains are reached, some 20 or 30 miles to the eastward, in what is known as the Lassen Peak volcanic ridge, culminating at Mount Lassen, with an elevation of 11,000 feet and covered with snow all the year round. The elevation of Red Bluff is about 307 feet; at Vina, 20 miles south, it is 213 feet. North of Red Bluff the country is hilly. Numerous creeks cut the land into cañons and little valleys, where the low land is suitable for agriculture.

The drainage is simple. Several large creeks empty into the Sacramento River from each side of the valley, and the flow of surface water is toward the river and southward.

SOIL.

In the alluvial land along the river the soil is mainly a dark brown, almost black, sandy loam, rich and deep. The tableland to the east is so rocky as to be of no use except for stock ranges. On the west of the river the loamy lands merge into clayey loam second bottom; farther west is the sandier soil of the plains, gray, brown, and red in color; then the hills with reddish soil and gravelly loam. The creek bottoms have generally a yellowish soil. North of Red Bluff, in the hilly country, it is chiefly reddish clay and gravelly loam.

WATER.

Tehama County is well watered. West of the river numerous green spots on the hillsides indicate where springs can be developed with little trouble. Numerous creeks carry streams from the mountain snows to the river. Wells can be dug anywhere to reach water at a moderate depth. On the east are Battle, Antelope, Mill, Deer, and Pine creeks; on the west are Cottonwood, Elder, Reeds, Red Bank, Thomes, and Stony creeks. Some of these streams from the west sink before reaching the river, and present in summer only an apparently dry bed, but digging a short distance develops a flow of water. Each of these creeks bursts out upon the lower land from a cañon of greater or less depth and extent. In most cases these furnish natural anchorage places for storage dams behind which the surplus water of the winter's storms can be stored and later conducted out over the lower lands by ditches and pipes to irrigate the whole adjacent country. The Federal Government is taking such an interest in this proposition and so many surveys have been made recently in this valley, that it is only a question of time when such works will be constructed and completed. When this is done every acre of land in the valley can be irrigated. There is plenty of water to do this, and the natural conditions are most favorable.

Irrigation is really not necessary, but experience has shown that plenty of water means an increase in product and variety. It is practiced to some extent, but mostly for the cultivation of alfalfa. There is a great deal of unappropriated water available for irrigation and the development of electric power, awaiting only the capital and energy to make it return a large profit.

INDUSTRIES AND RESOURCES.

The principal industries are horticulture, agriculture, stock-raising, and lumbering. There is practically no mining. A large deposit of chrome ore to the west, valuable sulphur springs to the east, some indifferent placer claims to the north, and the story of mining is told. One mine in the western part of the county is being worked and some ore shipped, but the extent, and character, and value of the ledge are unknown.

HORTICULTURE.

The fruit crop sells for about \$1,000,000 annually. It gives employment to a large number of people, who can engage in healthful outdoor work in summer. Several thousand persons are directly or indirectly engaged in some branch of the fruit business.

The following figures give some idea of the extent of this business in Tehama County, and of its standing among the others from a horticultural standpoint. Among the counties, Tehama ranks as follows in fruit production: peaches, second; figs, second; pears, eighth; apricots, eleventh; prunes, twelfth; cherries, fourteenth; apples, eighteenth. The yield of 1904, which was somewhat below the average, was: peaches, 13,109,000 pounds; pears, 1,500,000 pounds; prunes, 5,013,155 pounds; apricots, 11,000,000 pounds; cherries, 41,000 pounds. The prices paid for fruits vary from year to year. The following shows about the average prices paid per pound for dried fruits, and also the time of the year when the same ripens: peaches, 5 to 8 cents, ripen May to November; prunes, 2 to 5 cents, ripen August to October; pears, 6 to 10 cents, ripen July to November; apricots, 8 to 12½ cents, ripen June to November; strawberries, ripen April to December; almonds, 10 to 15 cents, ripen July to September; raspberries, ripen May to October; blackberries, ripen June to September; olives, 60c to \$1.00 per gallon, ripen December. About three fourths of the peaches, prunes, and apricots are dried, and marketed in that form.

Olives are fast coming into favor as a crop and as a food. The tree grows readily and yields abundantly. The fruit brings a good price, and the demand is constant and growing. The fruit is pickled green or ripe. The trees yield at four years. At ten years, they yield from \$3 to \$5 per annum. About seventy trees are planted to the acre. The crop is certain and the cost of harvesting small.

Oranges and lemons do well and bear abundantly. No attempts were made to plant them in quantities until within the past few years. There are in yards all over the county numberless trees that bear profusely. The fruit ripens several weeks earlier than that of Southern California, which gives this section an advantage. Several small orchards have been planted within the last few years, but they have not yet come into bearing. The trees are healthy and vigorous.

Almonds are being grown with more or less success.

Raisin grapes, and indeed all grapes, grow remarkably well. The raisins can be cured in the sun during the long summer days.

Some 3,500 acres of grapes are planted and yielding returns. An immense winery is located on the Stanford ranch in the southern part of the county.

Peaches are the principal fruit. They are shipped green, and are canned and dried. The bulk of the crop is dried.

Prunes are readily cultivated and yield abundantly.

The apricot is the third fruit in importance. All the apricots are dried. The pits are sold for fuel, or for extracting the oil, which is used by druggists and confectioners.

Pears do well. The fruit is nearly all shipped green. Pear blight so far has done no damage. The Bartlett is the favorite.

Figs are attracting more attention since the procurement of blastophaga, the insect which fertilizes the Smyrna fig. A great many of these trees are now being planted, and no doubt this fruit will assume a larger place in the output of the county hereafter. The trees grow to an immense size, bear from three to four crops a year, and are easily grown from slips. California imported last year 13,178,061 pounds of figs, which indicates that there is a large home market to supply.

Apples are grown only in the foothills. The chief apple-producing region of the county is at Manton, 35 miles to the northeast of Red Bluff, where very fine apples are raised. They are a profitable crop, for they come into market when other fruits are out of the way.

Berries and all small fruits do well. They come into market early and sell readily. They are cultivated at the Bend Colony, 9 miles north of Red Bluff, more extensively than in other places.

AGRICULTURE.

In agriculture there has been a gradual change from the growing of wheat to fruit or other grains.

Hay is made from a mixture of wild oats and wheat grown together and cut when just on the point of turning. It is cured on the ground and then stacked. Hay is worth from \$8 to \$12 per ton loose, and from \$10 to \$18 baled. About one ton per acre is produced.

Alfalfa growing where water can be obtained, is the best of all forage crops. It produces from three to five crops per year, and from one to three tons per acre per crop. It is a splendid feed for cattle, hogs, and horses. The roots sink to a depth of 10 or 12 feet and are sure to obtain any moisture that may be in the soil.

About 1,500,000 bushels of grain are produced annually. The average yield is about twenty bushels of wheat per acre, and thirty bushels of oats and barley on first-class land. About 30,000 tons of hay are produced annually.

Experiments are being made looking toward the cultivation of hops and sugar-beets.

STOCK-RAISING.

The stock business is carried on under conditions that differ from those of the Eastern States, and are differing from those of former years here. The owner of cattle, sheep, and goats finds it necessary to own or control two ranges; one in the valley for the winter months, and one in the mountains for the summer season. In former years there was an abundance of unoccupied public land which was freely run over by stockmen with their flocks and herds. But in later years the lines have been drawn more closely. Considerable land has been withdrawn into temporary forest reserves; the number of men engaging in the stock business has greatly increased, and range land has been in greater demand as a consequence. This is not meant to indicate that there are

no openings for persons seeking to engage in the stock business, but that the business can not be carried on in the free and easy way of earlier days. Stock is taken to the mountains about April, and is kept there until September or October.

Sheep-raising is easily the favorite branch of the stock business. This is the principal wool-producing county of Northern California, and indeed of the State. Twice each year the buyers come here, and there is a busy time until the wool is sold. It is sometimes bought before the sheep are sheared. Some 6,000 bales, or 2,000,000 pounds of wool, are produced in the county annually. Lambing occurs in February or March, and often results in an increase of 90 to 100 per cent. Sheepmen own all the way from 1,000 to 100,000 head. The price of wool varies from 12 to 25 cents per pound. The favorite breeds of sheep are Spanish Merinos, French Merinos, Southdowns, and Cotswolds for wool, and Shropshires more particularly for mutton. Sheep are worth from \$2 to \$4 per head; lambs are worth from \$1.50 to \$2.

The cattle business is conducted in much the same general way as the sheep business, except that the animals do not require constant care and herding; there is a further difference, that nearly every farmer has at least a few head of cattle, while but few of them have any sheep. The cattle are driven to the mountain ranges and left. The owner or herders ride around once in a while to see how they are getting along, and that is about all the care they have for months at a time. In fact, they will often travel to the mountain range by themselves when the proper season comes. The favorite breeds of cattle are Holsteins, Herefords, Jerseys, and Durhams. Stock cattle average about \$30 per head in value.

Of late years Angora goats have come into greater favor. They are hardy animals, readily adapting themselves to a mountainous and hilly country which no other animal can occupy. They will eat almost anything, can protect themselves from wild animals, and their wool or mohair is in demand and brings a good price, averaging about 25 cents per pound. Goats are more easily handled than sheep, the difference being that sheep require constant care and attention; goats do not. Goats sell for about \$3 to \$4 per head. They spend about four months each year in the mountains, and the rest of the time in the foothills of the valley.

LUMBERING AND FORESTRY.

There is everywhere plenty of timber of various kinds for fuel, posts, etc., for immediate local use. Oaks are the principal trees of the valley, except along the streams, where willows, cottonwoods, and sycamores abound. Oak wood is the favorite fuel, and sells readily for from \$2 to \$2.50 per tier. The principal timber region is in the mountains, which are largely covered with forests of pines, spruces, cypresses, and firs, with oaks, maples, and others along the streams. The principal timber trees are sugar pine, yellow pine, red fir, and cedar, as it is called. In the Coast Range to the west there is plenty of timber, but the country is very precipitous, and distant from the railroad; and, as the timber is no better than that from the great forests in Oregon that are easily accessible, little lumbering has been done there. But in the Sierras, there is a magnificent belt of timber some 15 by 40 miles, containing a great preponderance of sugar pine, which is one of the finest of timber

trees. These trees attain a height of 200 or 250 feet and a diameter of from 6 to 10 feet. Several sawmills are located in this timber belt and most of the land, if not all, is now owned by private individuals or corporations. The principal company operating in this section is The Sierra Lumber Company, which has its sawmill 35 miles east of Red Bluff. This company cuts about 12,000,000 feet of lumber each season, and transports it to the valley by water through a V-shaped flume. This flume is about 50 miles long. In some places it rests upon the ground; in others it is as much as 100 feet above. The rough lumber floats down to the company's yard at Red Bluff, is piled and seasoned, and later shipped as lumber, or is worked into doors, sash, blinds, boxes, rustic, moldings, etc. Their factory at Red Bluff employs a large number of men and boys.

CONCLUSION.

In closing it may be added that there is a ready market for all of the products mentioned. The wool, lumber, stock, fruit, hay, grain, etc., can all be sold at Red Bluff. Buyers come to bid for the wool and fruit and other products. A market is always available at San Francisco; and in Red Bluff, the county seat, there are local individuals and firms ready and willing to buy all of these products that are offered. There are two large packing-houses for fruit, warehouses for wool and grain, livery stables for hay, a flouring-mill for wheat, over 3,000 inhabitants for the fresh fruit and vegetables, and railroad and river means of transportation.

The large land holdings are being broken into smaller tracts to encourage immigration and settlement. The outlook is most hopeful, and possible investors can do no better than to make full investigation of conditions here before settling elsewhere.

GENERAL STATISTICS.

Area, 3,200 square miles, or 2,048,000 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	1,225,592
Value of country real estate	\$6,249,445
Of improvements thereon	850,640
Of city and town lots	576,855
Of improvements thereon	942,375
Of personal property	2,182,560
Total value of all property	11,986,947

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle—Beef	93	\$2,790	Colts	581	\$10,185
Stock	25,890	453,075	Mules	1,355	64,130
Thoroughbred	233	11,770	Sheep—Graded	1,779	8,895
Cows	1,339	35,595	Common	235,070	470,140
Swine	8,147	24,440	Goats	15,280	26,740
Horses—Thoroughbred	18	2,500	Poultry (dozen)	1,732	4,330
American	967	44,215	Hay .....	...	750
Common	3,182	82,690	Lumber .....	...	40,815

Number of acres sown for crop of 1904:

Wheat	25,865
Oats	1,260
Barley	24,480
Corn	200
Hay	38,110

Acres of bearing grape vines growing in spring of 1904:

Table	200
Raisin	285
Wine	3,015

Number of fruit trees growing in spring of 1904:

	Bearing.	Non-Bearing.		Bearing.	Non-Bearing.
Apple	17,500	1,650	Prune (French)	83,135	7,835
Apricot	63,745	4,710	Prune (other kinds) ..	16,430	4,225
Cherry	3,310	1,670	Lemon	405	280
Fig	10,090	1,245	Orange	4,900	5,480
Olive	18,500	119,760	Almond	62,205	945
Peach	580,850	116,050	Walnut	3,970	500
Pear	45,790	15,260			

Value of grain assessed in storage:

Wheat	\$39,440
Barley	12,660

School statistics:

Total number of census children, 1904	2,818
Number of teachers employed	91
Number of school houses	66
Number of school districts	64
Amount expended for public school purposes	\$65,332 74

TRINITY COUNTY.

Trinity County is oblong in shape, its greatest length running north and south for 90 miles, while its width from east to west at its widest part will not exceed 55 miles. Mountain barriers inclose it on three sides. Upon the north lie the Scott Mountains, upon the east the Shasta, and upon the west the Coast Range. These extend their spurs into all portions, leaving but a small part of its area free from their contact. The entire surface is, in consequence, broken, rugged, and precipitous. To this formation the section is indebted for its abundant moisture, as it is watered by numerous streams, all having their sources in the county, and flowing eventually into the ocean. Trinity River, the largest of these, rises in the north, flows south for about 40 miles, and then turns sharply to the northwest, receiving in its course the waters of many tributaries. The southern part has also many streams, and is a mass of high, rugged mountains.

Weaverville, the county seat, has an altitude of 2,000 feet, and its climate differs little from that of other places similarly located. Owing to the altitude of the county, the atmosphere is dry and pure, and the extremes of heat and cold do not cause so much discomfort as they would in less elevated regions. There is an average rainfall of 46 inches, the smallest precipitation being recorded in 1874-75, when there were 24.72 inches, and the heaviest in 1877-78, when 63.95 were recorded.

AGRICULTURE—HORTICULTURE.

Trinity is essentially a mining county, and but little attention has been paid to agriculture. Hay Fork Valley is about 10 miles long and from 1 to 2 miles wide. Through it run Hay Fork and Salt creeks, and there are numerous springs. Trinity Valley is about 18 or 20 miles long, and from $\frac{1}{2}$ to 2 miles in width; Trinity River passes through it. These are the largest valleys, and outside of them the agricultural land is generally in small patches. Some fruit is grown for home consumption, and apples, pears, and plums do well. Berries of all kinds thrive and yield abundantly.

It is not a fruit-growing county, but along the streams and rivers, in the mining towns, and on stock ranches, are small family orchards, the chief of which are at Weaverville, Junction City, and vicinity.

The apples raised are choice, and other fruits are of excellent flavor, but are only grown in limited quantities for home consumption.

The area of agricultural lands under cultivation is small, the principal products being barley, oats, and wheat. Vegetables are raised for consumption in the towns and mining camps.

GENERAL REVIEW.

The following extracts are from a paper prepared by Judge James W. Bartlett, of the Superior Court, and President of the Trinity County Development Association:

"Nature has been most lavish in her bestowal of natural resources upon this region. A temperate climate, where the thermometer rarely

passes above 100° nor below 10° Fahrenheit; hills stocked with game; streams supplied with trout; mountain sides ribbed with veins of metal-bearing ores; hills, river bars, and benches covered with auriferous gravels; mountain scenery unsurpassed for beauty and grandeur; springs of pure, cold water; streams of heavy grade, with abundance of water for mining, irrigation, domestic, and power purposes; forests of pine and spruce and sugar pine; stock ranges covered with abundant crops of natural grasses; agricultural lands capable, with moderate irrigation, of producing all the varieties of fruit, grass, grain, and berry of temperate climes—such are some of the gifts of nature in this section.

“Here life can be lived in the open air without discomfort for nearly six months out of twelve without fear of the blizzard, the hurricane, the flood, the drought.

“From the quartz veins and gravels has been extracted since 1850 over \$100,000,000 of the \$1,500,000,000 which California has given to the world, and the mines of this region now contribute over \$1,000,000 annually of the yellow metal.

“And yet, after forty-four years of settlement, with all its resources and opportunities, this large section is populated with less than 5,000. Among these residents are many whom the cry of gold drew to California over fifty years ago. By years of toil and without the assistance of the machinery of modern invention, the people of Trinity have constructed several hundred miles of wagon road, cleared the woods, erected homes, established schools and churches, connected by telephone with the outside world and built up a community of good, substantial, law-abiding citizens, which for general prosperity is not excelled. Nearly every family owns its own home. Barely is one of these homes incumbered with lien or mortgage. Bankruptcy and insolvency are almost unknown, and the county jail is nearly always without a tenant. Almost without any county indebtedness, with an assessment roll constantly increasing, with ample home markets and good prices for products, the people know nothing of hard times and look forward only toward still better and improved conditions.

“With all its resources the county has received but few of the capitalists, homeseekers, or tourists who have been attracted from other lands by the climate and opportunities of the Golden State. And yet, Trinity County should receive a goodly share, for its mines, stock ranges, forests, streams, agricultural lands, mineral springs, trout, game, climate, and locations for summer resorts afford good opportunities for investments, homes, and pleasure.

“Its industry first in importance and opportunity is that of gold mining in its various branches—hydraulic, quartz, and dredge. About four miles from Weaverville, on Oregon Mountain, the La Grange Hydraulic Gold Mining Company is conducting the largest and best equipped hydraulic mining operation in the world. Within a mile of Weaverville is the Hupp & McMurphy mine, which for over forty years has never failed to yield a substantial dividend at the end of the mining year. At Trinity Center the well-known Bloss & McClary mines are being worked more vigorously than ever. At Junction City the Heurtevant, the Jacob, the Chapman & Fisher, the Sheridan, the Carr, the Maple Creek, and the Haas mines are being energetically worked, while at Lower Trinity, New River, Steiner's Flat, Democrat Gulch, Hay Fork, Indian Creek, Lewiston, Minersville, Coffee Creek, North

Fork, and various other places are numerous hydraulic mines, all extracting gold in paying quantities from the hills and river bars.

"With all the mines in operation, but a small portion of the auriferous gravel has so far been worked. Lying unequipped and unworked are the large gravel bodies of the Union Hill mines near Douglas City, the Dutton's Creek mine near Weaverville, the Humboldt Placer Company's mines on Buckeye Mountain, the Musser Hill mines near Weaverville, the Hammer & Kahlke mines on Lower Trinity, which are cited only as a few instances of vast deposits awaiting necessary improvements and working to rank with the best hydraulic mines of the State.

"For the comparatively new industry of dredge mining, because of its large river bars and numerous facilities for obtaining electric power, the county offers splendid opportunities. At the McGillivray ranch, Eagan's flat, Sturdivant's ranch, Lowden's ranch, Blakemore's, mouth of Stewart's fork, Bragdon's, and Trinity Center are extensive bodies of land suitable for dredging. That the river bars have the necessary values, and that they can be so worked, have been demonstrated by the Alta Bert Company, above Trinity Center, which for a considerable time has been dredging the bars of the Trinity River.

"In quartz mining the county offers equally as good opportunities as in placer mining. Though quartz mining is an industry which was not prosecuted in Trinity until about 1880, since that time it has been constantly followed, with most profitable results in nearly every section. In the Dorleska, Strode, Fair View, Brown Bear, Lappin, Mason & Thayer, Globe, Enterprise, Yellowstone, Mountain Boomer, and various other mines the county can exhibit profitable quartz properties of high grade, and there are numbers of other mines partially prospected which give every indication of being equally as good when properly equipped and worked. There are numerous bodies of comparatively low-grade ores which would be opened up and worked if the county had communication by rail with outside points. Trinity is an ideal section for mining and milling large ore bodies, on account of the mild climate and abundance of wood and water.

"New locations of both quartz and placer mines are being made, the County Recorder's office showing a record of 331 new locations between March 1 and August 15, 1904.

"The county would afford a splendid opportunity for a prospecting company provided with sufficient means to enable an intelligent, systematic, and careful examination of the mineral districts. The Government has not as yet made any geological examination of this territory.

"Many thousand acres of mineral lands have as yet not been prospected to any extent; in fact, but few of the higher gravel deposits have been tunneled or sunk upon. In its present condition it is reasonably certain that a prospecting company properly financed and equipped would obtain many valuable mines, both placer and quartz, by merely prospecting and locating.

"Besides gold, copper, iron, platinum, quicksilver, coal, iridium, and asbestos have been found at various places; but with the exception of quicksilver, none of these metals has received much attention. The copper prospects show probably large deposits of that metal. The finds of platinum have been frequent, and probably would rouse more

interest if miners generally knew this metal was as valuable as gold and could be saved by similar methods.

"While in the main a mountain country, Trinity has many rich spots of agricultural land which produce the fruits, vegetables, hay, and berries used in the county. The soil, with moderate irrigation, produces splendid crops of alfalfa and red clover, and fits the county for an industry badly needed—that of the dairy and creamery. With a splendid home market for butter, cheese, ham, bacon, and lard, it is strange that this industry has not been vigorously prosecuted, for certainly there are some splendid opportunities at several points.

"Stock-raising has been and always will be a leading business. Fine open ranges and an abundance of water are in every part. Though feeding is sometimes required in the winter, many of the stockmen avoid this by driving their stock to the Sacramento Valley and pasturing there.

"Though covered with magnificent forests of pine, spruce, and sugar pine, no use has yet been made of the timber resources beyond the supplying of home demand. In present conditions not much development of the lumber industry can be looked for until the construction of a railroad into the county.

"Communication by steam or electric railroad with Humboldt Bay and the Sacramento Valley is the greatest necessity required for the development of Trinity County and its resources. The construction of the forty miles of wagon road along the line of survey directed by the Legislature, required to connect the public roads of Trinity and Humboldt, would be of inestimable benefit. Followed with a railroad between Eureka and Redding, the mining, timber, fruit-raising, and grazing industries of this large section would soon develop as they should. For an electric road most favorable conditions exist, for all along the route are numerous streams which would furnish ample power. The distance would not exceed 150 miles; at no point need an elevation of over 4,000 feet be exceeded, and the road could be constructed almost entirely below the line of snow. The redwood lumber of Humboldt could then be sent direct to every part of California and the East, the forests of Trinity could be utilized and shipped, the machinery for mining and power plants could be easily and cheaply brought in, while the base ores and concentrates from its mines could then be shipped and treated at a profit. Then during the warm summer weather in the valley refuge would be taken in the mountains of Trinity and the invigorating breezes of the ocean, while the general travel to and from other parts of the State would vastly increase because of the ease of traveling by rail instead of by stage or team."

GENERAL STATISTICS.

Area, 3,276 square miles, or 2,096,640 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	540,476
Value of country real estate	\$1,285,731
Of improvements thereon	229,576
Of city and town lots	28,486
Of improvements thereon	92,192
Of personal property	341,988
Total value of all property	1,994,843

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle—Beef	55	\$1,650	Swine.....	925	\$2,332
Stock	7,197	107,955	Colts.....	55	655
Thoroughbred ..	2	100	Mules.....	190	5,630
Cows.....	267	6,675	Sheep.....	5,125	10,250
Calves.....	734	3,670	Lambs.....	20	10
Oxen.....	8	140	Goats.....	350	700
Horses—Standard-bred	2	200	Poultry (dozen).....	400	2,000
American	79	3,950	Hay	---	1,340
Common	872	20,915	Lumber.....	---	1,445

Number of acres sown for crop of 1904:

Wheat.....	500
Oats.....	30
Barley.....	50
Corn.....	50
Hay.....	14,000

Number of fruit trees growing in spring of 1904:

	Bearing.	Non-Bearing.		Bearing.	Non-Bearing.
Apple.....	4,800	2,500	Pear	500	200
Apricot.....	40	10	Prune (French).....	1,000	200
Cherry.....	500	140	Prune (other kinds)	500	100
Fig.....	15	10	Lemon.....	10	5
Olive.....	10	---	Almond.....	20	10
Peach.....	1,450	500	Walnut.....	75	25

School statistics:

Total number of census children, 1904	735
Number of teachers employed	24
Number of school houses	23
Number of school districts.....	23
Amount expended for public school purposes	\$13,662 72

TULARE COUNTY.

Tulare County, out of which three or four valley counties have been carved, is still one of the largest. It is about the size of Connecticut, and is almost square. It is a wonderful county—wonderful for the height and beauty of its mountains, for its enormous groves of giant sequoia, for the fertility of its soils, for the abundance of watercourses, for the variety of products, for scenery that many declare to be superior to the Yosemite, for the highest mountain (Mount Whitney) in the United States on its eastern border, for the successful citrus territory, where are grown oranges that equal the finest produced, and for being the earliest section to be settled up and devoted to agricultural purposes. It is one of the greatest stock-raising counties. Cattle are raised for meat rather than for dairying, although the latter industry is keeping pace. The glory of Tulare is its deciduous fruit orchards, all along the channels of the Kaweah and Tule rivers. The soil is a deep alluvial loam, rich in nitrates and potash, and free from alkali.

Late frosts are rare. The spring is warm and early, which gives the fruit a perfect richness and sweetness.

While irrigation is general, at least to the extent of giving the trees one good drenching a year, there are many ranches where the underflow is only 6 to 12 feet from the surface, rising even higher in spring, and therefore no artificial watering is needed.

The prune area is 2,800 acres. There are annually shipped out more than 15,000,000 pounds of cured prunes, averaging over 3 cents, probably $3\frac{1}{2}$ cents, a pound. The shipment of deciduous fruit aggregates about 30,000,000 pounds. Of this, more than half is dried, largely prunes, and the remainder green or canned. The picking, packing, drying, and canning of this crop call for the services of nearly four thousand people.

The principal town and the county seat is Visalia. It is the oldest city in the valley, having been founded in 1852 by the brothers Vice, for whom it was named. It is a modern, well-improved, prosperous city, of about 4,200 people, with every prospect of continuous active growth. In the old days it was the starting point of the overland stage, and to-day it is said of Visalia that it represents more per capita wealth than any other city of like population. Visalia is midway between San Francisco and Los Angeles, but it was not until 1897 that it was connected with the main lines of the railroad. The manufacturing interests include a flouring-mill, planing-mill, foundry, machine shops, granite-polishing plant, ice factory, bottling works, electric light plant, a fruit cannery, and four fruit-packing houses. Electric power is supplied from a mountain watercourse, and it may be expected to give considerable impetus to local manufacturing.

Tulare City is the second in point of size: it is about 10 miles south of Visalia, and has a population of about 2,500. The main line of the Southern Pacific, and the Tulare-Visalia line of the Santa Fé, pass

through the city. In the surrounding country, cattle, hogs, and horses are raised, and there are flourishing orchards and broad wheat and alfalfa fields. It has substantial brick buildings, on broad, beautiful streets.

The famed citrus belt of Tulare lies about 12 miles east of Visalia, and includes a series of settlements, or districts, chief of which are Lindsay, Exeter, and Porterville. This land is practically frostless. The soil is shown to contain in exact proportions the elements needed for the growth of citrus trees. Freedom from fog gives immunity from insect pests, which need moisture in the air to prosper. The long, warm summer brings the fruit to maturity earlier than is the case farther south (where the nights are colder), and as a result Tulare fruit reaches the Eastern market in November and the first weeks of December, in time for the Christmas trade.

Most of the district has a plentiful supply of water in the form of an underflow—a natural reservoir at a depth of from 50 to 75 feet. It is raised by pumping. Formerly the pumps were operated by gasoline, but electricity is now available at a reasonable price. Farm houses are lighted by electricity, and the cities of Visalia and Tulare and the towns of Exeter, Lindsay, and Porterville are supplied from the same plant.

There are about 7,500 acres under cultivation in citrus fruits, of which only a small part is in full bearing. The product averages about 1,500 carloads yearly, and is rapidly increasing. The Porterville oranges have repeatedly carried off first prizes in the citrus fairs of the State when entered against the products of the best sections of Southern California.

In the northwestern part, in the Alta district, a considerable acreage is devoted to raisins, which do quite as well in this county as in any other section of the valley, although their cultivation has not been attempted on so extensive a scale as elsewhere.

Tulare County is forging ahead with gratifying speed, in the year 1904 improvements made having eclipsed any previous period.

Four years ago, when the creamery at Visalia commenced business, the industry was in its infancy. To-day Tulare County has seven creameries—two at Tulare, and one each at Visalia, Dinuba, Traver, Poplar, and Woodville. There is a condensed milk factory at Visalia, and a cheese factory at Orosi. Cream is also shipped to adjacent counties. These creameries have established milk routes, and collect the cream without expense to the farmer. Though this industry is yet in its infancy, Tulare is one of the few counties producing over 1,000,000 pounds of butter-fat.

Situated midway between the cities of Los Angeles and San Francisco, the dairyman is enabled to take advantage of varying market conditions to secure the highest prices. During the year, about 11,000 acres of new land has been brought under cultivation and planted to alfalfa, with satisfactory results. There has been a marked increase in the dairy interests. A conservative estimate places the number of cows at 400 more than at the beginning of the year. Another noticeable gain was made in horses and mules. There is a growing demand for draft horses and large-boned, big-muscled mules, and these animals command good prices.

Thirteen hundred acres of barren land have been reclaimed by artificial irrigation, and this satisfactory result has led to the building

of more ditches. One irrigation canal, 5 miles long, near Porterville, carries water to one tract of 2,800 acres.

There is no part of the country in which diversified farming will pay better than in Tulare County. Soil and climate are generally adapted to diverse products. A crop of grain hay may be cut in May, and a harvest of potatoes, squashes, Indian or Egyptian corn taken from the same field in October. Alfalfa is one of the best honey plants. It supplies poultry with green feed the entire year. Its succulent shoots promote the rapid growth of young pigs and calves. The problem of meeting bills does not confront the diversified farmer. He has always something to sell. There is no waste. The hog gets what the reaper overlooks. The chicken in turn finds what the pig misses. A vast saving in labor is effected. With the aid of his family, daily tasks, trivial in themselves, accumulate in results that materially swell the income. Nor is there either drudgery or monotony on a farm of this kind. Varied interests and changing occupations give zest to life and rob labor of its burden.

Alfalfa hay has a broad market for shipment at from \$7 to \$9 per ton. Loose it sells for from \$5 per ton up. Egyptian corn sells for \$15 up per ton in the head. Indian corn, shelled, for from \$20 to \$25. Potatoes are not raised in sufficient quantities to supply the local markets, and sell for from 75c to \$1 per hundred pounds. Squashes are worth \$2 per wagonload. Onions and beans command good prices. Honey has an unlimited market, it being shipped east in carload lots. Poultry and eggs are higher than in the East, and their production cheaper. Berries of all kinds thrive, and meet with a ready demand in the local markets.

GENERAL STATISTICS.

Area, 4,935 square miles, or 3,158,400 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	1,360,450
Value of country real estate	\$9,262,914
Of improvements thereon	1,574,409
Of city and town lots	799,865
Of improvements thereon	1,239,925
Of personal property	2,544,498
Total value of all property	18,300,976

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle—Beef	539	\$13,650	Colts	2,058	\$30,340
Stock	33,495	558,570	Mules	1,806	66,640
Cows	7,178	187,000	Sheep	55,480	132,880
Calves	9,673	61,045	Lambs	17,935	18,165
Swine	20,921	55,160	Goats	1,060	2,055
Horses—Standard-bred	21	3,225	Poultry (dozen)	1,300	3,705
American	1,189	59,270	Hay		2,650
Common	6,054	161,275	Lumber		18,275

Number of acres sown for crop of 1904:

Wheat	40,255
Oats	250
Barley	3,533
Corn	1,475
Hay	26,870

Acres of grape vines growing in spring of 1904:

	Bearing.	Non-Bearing.
Table	375	485
Raisin	3,115	625
Wine	520	340

Number of fruit trees growing in spring of 1904:

	Bearing.	Non-Bearing.		Bearing.	Non-Bearing.
Apple	2,515	1,560	Prune (French)	333,010	15,975
Apricot	75,970	590	Prune (other kinds)	5,670	345
Cherry	250	---	Lemon	32,800	575
Fig	3,715	460	Orange	177,240	47,960
Olive	1,245	945	Almond	1,200	385
Peach	280,378	10,870	Walnut	500	240
Pear	5,895	---			

Value of grain assessed in storage:

Wheat	\$93,625
Oats	225
Barley	5,310
Corn	2,710

School statistics:

Total number of census children, 1904	5,899
Number of teachers employed	177
Number of school houses	114
Number of school districts	107
Amount expended for public school purposes	\$108,311 20

TUOLUMNE COUNTY.

Tuolumne County is in Central California, and is known as the Southern Mines. It is 150 miles nearly due east from San Francisco, and varies in width from 8 to 12 miles. The eastern portion extends into the western slope of the Sierra Nevada range. The entire surface is of a rugged character, with many small and fertile valleys and meadows, and sloping hills heavily covered with timber.

The county seat is Sonora, on the line of the railroad, and in about the center of the county.

The Sierra Railway connects at Oakdale with the line of the Southern Pacific, extending thence 53 miles in an easterly direction to Tuolumne, at which point junction is made with the Hetch-Hetchy & Yosemite Valley Railroad, which reaches into the high Sierras, tapping the vast timber belts, and affording transportation at reasonable rates for lumber and mining material. The railroad passes directly through all the large towns of the county, and makes stage connections for outlying places.

Tuolumne County has made some wonderful strides during the last few years. While the railroad has worked a hardship to some of our towns, by shutting off staging and teaming, it has been the means of bringing in many people who never would have come if compelled to travel by stage. The population has increased, the assessment roll is larger, mining machinery can be placed at the mine for less cost, and every point can be reached within twelve hours' ride from San Francisco.

The scenery is unsurpassed. The streams afford pleasures to the sportsman equal to any place in the State.

Tuolumne County is noticeable for its many roadways, aggregating something over 400 miles.

During the last six years the mining industry has been steadily on the improve. While mining is the greatest factor, the timber industry is fast coming to the front. The town of Tuolumne was laid out by the West Side Flume and Lumber Company in 1899. Since then it has installed a large sawmill plant, capable of turning out over 100,000 feet per day. It has also completed a box factory. The company, in its various branches, has over 1,000 employes. It has erected a fine hotel, also a large general store with offices overhead, and its lumber yards cover a large area. It has a narrow-gauge railroad which extends into the heavily timbered mountains, a distance of 25 miles. Logs are placed on flat cars, and hauled to the sawmill. This town is but a quarter of a mile west of the old town of Carters, and both are surrounded by producing mines.

MINING.

The annual output of the mines is about \$2,000,000. Some of the greatest producing mines in the State are located in Tuolumne County. There are about 500 patented mines. In the county there are about 1,200 stamps in place.

TIMBER BELT.

The timber belt is great in dimensions, comprising 60 per cent sugar pine, 20 per cent yellow pine, and the balance cedar and fir. Upon some tracts the timber will run 300,000 feet to the acre, many of the trees measuring 33 feet in circumference and 300 feet in height. The Tuolumne grove contains about 1,300 sequoias greater in dimensions than those of Calaveras.

SCENERY.

Table Mountain is, topographically, the most prominent feature of the county. It extends between 20 and 30 miles along the central portion, having an almost level top, lava-capped, with perpendicular sides rising to a height of 2,000 feet above the Stanislaus River. It was built up from a lava flow which first filled an ancient river channel, from which millions of dollars have been extracted, and where great deposits of gold still remain. As one travels through the county by team or on the railroad this mountain presents a most inspiring view. Another noticeable feature is Hetch-Hetchy Valley, which equals the famous Yosemite in beauty and grandeur, although not as large. Situate therein is Lake Elnor, which is filled with mountain trout.

STRUCTURAL GEOLOGY.

The famous Mother Lode traverses the entire western portion, upon which are situated the Eagle-Shawmut, Republican, Clio, Jumper, Dutch, and Rawhide mines, also many others of minor note. The foot wall of the Mother Lode is serpentine, with eruptive dikes accompanying, while mineralized slate forms the hanging wall. To the east we come to the granite, some of which is basalt, with eruptive dikes in places; then comes the Calaveras formation, which is slate, covering a large area; farther east comes in granite again. All east of the Mother Lode is what is known as the East Belt, upon which are situated many fine producing mines, together with prospects held under possessory title; there is also ground open for location. The East Belt has made quite a record, and is the principal mining section of the Southern Mines. The following list shows some of the metals found in Tuolumne County: Gold, silver, copper, arsenic, antimony, galena, zinc, iron, amphibolite, obsidian, asbestos, manganese, corundum, barite, and marble.

WATER SUPPLY.

The main rivers are the Stanislaus and Tuolumne, tributaries of the San Joaquin. The Tuolumne has its source entirely within the limits of the county, and may be termed the river of a thousand lakelets, although a number of these strictly come under the head of lakes; Lake Elnor, the largest, being 2 miles in width and 4 miles in length. The main or principal branch of the river flows through the Hetch-Hetchy Valley. This branch, with its many tributaries, commands about three fourths of the watershed of the county. The Stanislaus River, to the north, with one of its branches, forms the boundary line of this county and Calaveras.

From the main stream of the Stanislaus River to the south fork thereof, at a point where the upper dam of the Tuolumne County Water Company is located, there is a tunnel over one mile in length, costing about \$250,000. The water supply is controlled by the above-named company, which was organized in 1852. The supply is ample for all requirements, being used for mining and irrigation. It is furnished by a system of dams, reservoirs, and canals. The main canal runs from the south fork of the Stanislaus River, about 18 miles above Columbia, and extends to that town and vicinity. It is 7 feet on the bottom and 13 feet deep, with a grade of 16 feet to the mile. The main flume at the head is $7\frac{1}{2}$ feet wide and 2 feet deep. The canal carries 2,100 inches of water in summer. There are three timber dams, all on the south fork of the Stanislaus River. The lowest one is at Strawberry Flat, from 13 to 15 miles by way of the river to the head of the ditch. One mile above is the second dam or reservoir, and 10 miles above the lower reservoir is the big dam. The capacity of the three reservoirs is equal to something over two months' supply. About 6 miles from the head of the main canal is a lateral ditch, with a capacity of 500 inches. This is 9 miles in length, and supplies all mines in the vicinity of Carters, Tuolumne, Soulsbyville, thence to Algerine section, 8 miles south of Sonora.

Four miles east of Sonora is Phoenix Lake, which is the lower distributing point, covering Sonora district and the Mother Lode. At Phoenix Lake is an electric power plant of 2,500 horse-power, owned by the aforementioned company. This plant supplies power and lights to all the principal mines upon the Mother Lode. The canals and ditches aggregate about 100 miles in length, and distribute water over an area of 200 square miles. The towns of the county are furnished with electric lights from power generated by a plant situate upon the south fork of the Stanislaus River, 8 miles north of Sonora, and owned by the Tuolumne County Electric Light and Power Company.

FRUIT CULTURE.

In many places the soil is admirably adapted to fruit-growing, and in the foothills some of the finest apples in the State are grown. Semi-tropical fruits of every variety and vines are cultivated, and yield an abundance of highly flavored fruit. The almond and walnut are cultivated, with encouraging results. The county is not largely devoted to this industry, although the sections where small orchards of all varieties are cultivated prove that certain localities are particularly adapted to fruit. Lemon and orange trees do well in the southern portion.

Large quantities of grapes are shipped each year, while the second class is made into wine of good quality.

Apples sold in Sonora during recent seasons for \$15 per ton.

Champagne cider manufactured by McComber Bros. has a reputation throughout the United States.

The sunny, sheltered hillsides of Tuolumne County offer inducements for the culture of fruits. Land for such purpose can be purchased for from \$10 to \$20 per acre. With the present system of water ditches, land can easily be irrigated.

STOCK-RAISING.

Most of the stock-raisers produce sufficient hay for their own use, and considerable is raised upon small farms, also. Little, if any, is shipped out of the county. During winter, hay sells for \$30 per ton in the mountains. Stock-raising is controlled mostly by feed—by those who have ranges in the mountains for summer, and pastures in the foothills for winter. In the mountains in certain sections there are meadows upon which grows the finest kind of bunch grass, while upon the hill-sides wild oats and timothy afford a splendid feed. In some sections, and especially in the neighborhood of Groveland, the ranges are so sheltered that it is not necessary to remove cattle the entire year, and as a rule the stock remain in good condition. Grazing land is held from \$4 to \$8 per acre, while timber land ranges from \$8 to \$20 per acre.

PRINCIPAL TOWNS.

The principal towns are: Sonora (county seat), situate about the center of the county, with a population of 4,000. It has an elevation of about 1,825 feet, and is considered an exceptionally good business town. There is a courthouse, absolutely fireproof, and even age can not impair it. Columbia is 4 miles to the north of Sonora. It is one of California's famous mining camps of early days. Tuolumne and Carters lie 10 miles east of the county seat, and are situate in the center of the wonderful East Belt mining district, and have an exceptionally bright future, being the terminus of the Sierra Railway, and the junction of the Hetch-Hetchy & Yosemite Valley Railroad; also the headquarters of the West Side Flume and Lumber Company. Their population has increased in the last thirty months from 1,000 to 4,000.

GENERAL STATISTICS.

Area, 2,282 square miles, or 1,460,480 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	403,050
Value of country real estate	\$4,078,790
Of improvements thereon	1,641,745
Of city and town lots	261,080
Of improvements thereon	539,465
Of personal property	934,065
Total value of all property	7,732,810

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle—Stock	3,500	\$52,500	Colts	200	\$2,000
Thoroughbred	2	100	Mules	40	1,600
Cows	400	8,000	Sheep	6,000	15,000
Calves	500	2,500	Lambs	1,000	1,000
Swine	250	750	Goats	200	200
Horses—American	200	10,000	Poultry (dozen)	700	3,500
Common	1,000	25,000	Lumber		128,000

Number of acres sown for crop of 1904:

Wheat	4,950
Oats	500
Barley	4,600
Corn	30
Hay	9,300

Acres of grape vines growing in spring of 1904:

	Bearing.	Non-Bearing.
Table.....	360	220
Wine.....	1,700	280

Number of fruit trees growing in spring of 1904:

	Bearing.	Non-Bearing.		Bearing.	Non-Bearing.
Apple.....	4,000	5,000	Pear.....	2,300	500
Apricot.....	2,000	560	Prune.....	300	150
Cherry.....	2,800	365	Lemon.....	100	75
Fig.....	950	270	Orange.....	325	100
Olive.....	25	25	Almond.....	325	50
Peach.....	9,100	2,900	Walnut.....	860	850

School statistics:

Total number of census children, 1904.....	2,338
Number of teachers employed.....	57
Number of school houses.....	40
Number of school districts.....	37
Amount expended for public school purposes.....	\$30,705 64

VENTURA COUNTY.

BY THE VENTURA BOARD OF TRADE.

Ventura is located on the shores of the Pacific Ocean. It has about 208,000 acres of fertile, productive soil. There is one large valley, where all kinds of crops, and nuts, and fruits are raised. Principal among them is the lima bean, 40,000 acres; other beans, 18,000 acres; sugar beet, 20,000 acres; and wheat, barley, oats, hay, and corn, 95,000 acres. The annual income is from beans \$1,500,000, sugar beets \$1,000,000, walnuts \$300,000, oranges \$215,000, lemons \$100,000, apricots \$200,000. The total income for the products, including petroleum oil and stock, is \$5,000,000 annually.

TOPOGRAPHY—PRODUCTIONS.

The valleys of the county are watered by the Santa Clara and Ventura rivers and their numerous tributaries. The Santa Clara River extends from the northeast to the southwest across the county, and through a fertile and productive valley known as the Santa Clara Valley. The Ventura River extends from north to south through the western portion of the county and empties into the Pacific Ocean just west of the town of Ventura, from which river the town is supplied with water. These streams have an abundance of trout, and are excellent for fishing.

Another important valley is the Ojai, a great amphitheater, whose walls are mountains rising like citadels. This basin has the appearance of a nest, is well timbered, and has a very rich, productive soil, where are grown some of the best oranges in the State; a belt about three miles long and one wide being generally spoken of as frostless. Oranges raised in this belt are sweet, delicious, and juicy. The valley is attractive, where hundreds of people come and go because of the health conditions. It is one of the favored spots for those suffering from weak lungs, catarrh, asthma, and kindred diseases.

Other large valleys are the Conejo, admirably adapted to the raising of wheat, oats, barley, and other crops; the Simi, where large wheat fields are seen; also prunes, apricots, and other fruits are successfully grown. In this valley are artesian wells for irrigation. The Las Posas is another valley devoted to the raising of small grains, fruits, and beans. The Sespe, lying along each side of the Santa Clara River, is another ideal spot for the growth of the orange, lemon, apricot, walnut, and other fruits. An abundance of water is secured from the rivers and creeks for irrigation. The San Buenaventura Valley, locally mentioned as the avenue, on account of the beautiful drive, is dotted on each side by pleasant, well-kept homes, where our busy merchant devotes a few hours of the day to growing small orchards, and gardens, and chickens, for recreation.

The two large rivers furnish an abundance of water for irrigation when needed. Ventura is one of the best watered counties in Southern California; nearly every farm can be reached at little expense. The soil of the valleys is rich and inexhaustible, varying in depth from 10 to 150 feet, and yielding enormous returns.

SUGAR-BEET INDUSTRY.

The sugar beet is one of the most important industries. At Oxnard there is a sugar factory with a capacity of 2,000 tons per day. This factory was built about five years ago, at a cost of \$3,000,000, and is one of the most complete and up-to-date in the United States. It gives employment to a great many men during the season, covering a period of five to six months each year, besides quite a number the year round. The town of Oxnard has a population of 2,000 permanent residents, besides the floating population which comes and goes with the sugar-making season. Ventura County is recognized as the ideal locality for sugar-beet cultivation, both for tonnage, yield per acre, and the high percentage of sugar. There is no waste to the sugar beet, as the pulp is saved and fed to stock cattle to fatten them for the market. This is a most excellent food for this purpose. The average yield per acre is about 15 tons; average price paid per ton, about \$5; average per cent of sugar, 18.

TOWN OF VENTURA.

Ventura, the county seat, is in the extreme western portion of the Santa Clara Valley, and at the southern extremity of the San Buenaventura Valley. The town has a population of 3,500, is prettily situated on the seashore, between the mountains on the north and the sea on the south. There are two telegraph and two telephone companies, electric lights, natural gas for lights and fuel, perfect drainage, splendid sewer system, fine grammar and high schools, a public library, and churches of all denominations. There are three banks, whose deposits exceed \$1,000,000. The town is on the main line of the Southern Pacific, with through trains to the Eastern States, and has regular freight and passenger steamers up and down the coast, making cheap transportation and offering special facilities for manufacturing industries. The support of the town is the immense farming and fruit country surrounding it. There is a live board of trade, the secretary of which will promptly and willingly answer all inquiries about any section.

The county has no indebtedness, and excellent school buildings, with the best teachers that money can hire.

Vegetables of every description thrive, and large quantities are shipped to outside markets, principal among these being the Australian crimson rhubarb, Burbank's new production. This crop grows the year round, but brings the best returns during the months of November, December, January, and February. When the Eastern market is bare of green vegetables and fruits, this crop sells at 5 cents per pound at the cars. This is probably the only place in the world where rhubarb is productive during the entire year.

GENERAL STATISTICS.

Area, 1,850 square miles, or 1,184,000 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	581,120
Value of country real estate	\$5,034,371
Of improvements thereon	623,170
Of city and town lots	712,419
Of improvements thereon	610,000
Of personal property	1,513,071
Total value of all property	10,343,304

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle	12,248	\$97,978	Mules	678	\$21,710
Cows	2,323	34,846	Sheep	8,862	15,510
Calves	2,976	8,929	Goats	1,150	1,725
Swine	3,845	7,690	Poultry	---	1,821
Horses—American	1,879	75,165	Hay	---	3,495
Common	4,866	87,610	Wool	---	850
Colts	1,016	12,196	Lumber	---	32,850

Number of acres sown for crop of 1904:

Wheat	16,860
Oats	5,690
Barley	40,170
Corn	3,270
Hay	25,830
Sugar beets	8,000

Acres of bearing grape vines growing in spring of 1904:

Table	75
Raisin	185
Wine	140

Number of fruit trees growing in spring of 1904:

	Bearing.	Non-Bearing.		Bearing.	Non-Bearing.
Apple	7,025	1,165	Prune (French)	25,875	---
Apricot	176,910	24,340	Lemon	61,530	4,190
Cherry	1,400	---	Orange	83,135	19,990
Olive	35,380	---	Almond	14,385	---
Peach	6,380	---	Walnut	69,240	10,965

Value of grain assessed in storage:

Wheat	\$24,430
Barley	24,650
Corn	610

School statistics:

Total number of census children, 1904	4,098
Number of teachers employed	104
Number of school houses	55
Number of school districts	49
Amount expended for public school purposes	\$76,402 47

YOLO COUNTY.

By J. REITH, JR.,

President of Chamber of Commerce, Woodland.

Yolo County is acknowledged by those at all acquainted with its wonderful fertility to be the gem of the great Sacramento Valley. Approaching it from the north or from the south, one is impressed with the increasing richness of the soil, and it is hardly necessary to look for the county-line guideboard to know that you have crossed the line and are in the fertile section.

TOPOGRAPHY.

About four fifths of its area is level, but the western portion breaks into hills, with cañons and valleys of considerable extent, chief among which is Capay Valley, noted as one of the earliest fruit sections of the State. The hills are nearly all used for grazing, except the numerous homesteads. Along the eastern side of the county, near the Sacramento River, is what is known as the "tule basin," which contains about 40,000 acres. These lands are overflowed during high water, but as the water recedes furnish rich pasture for immense herds of stock. The county has very little waste land.

WATER SUPPLY.

The two principal streams are Putah Creek and Cache Creek, the former being the boundary line, for a portion of the way, between Solano and Yolo counties. Cache Creek is the outlet of Clear Lake, and where it leaves the hills it flows east, through the center of the county. Clear Lake, which lies in Lake County, is 25 miles long and about 8 miles wide, and receives the drainage of 420 square miles of the Coast Range. Its elevation is 1,300 feet above sea-level, and with Cache Creek as its only outlet, it will be seen that nature has furnished a magnificent natural reservoir. It is estimated that 50,000 horsepower could be generated by its waters, and that there would be enough left to irrigate every acre of land on each side of the creek, after it reaches the valley.

SOIL.

During high water, Cache Creek has brought down from the hills and mountains immense quantities of the very cream of the soil, and for ages has been depositing this upon the land. The result is that there is a rich sedimentary deposit of from 20 to 30 feet in depth, entirely without hardpan, which is as rich as the valley of the Nile. This is particularly true of a large area around Woodland, of which Professor Wilson, of the University of California (see Bulletin No. 100, page 162), says: "There is a strip of this material at Woodland, several miles wide,



The
Source



The irrigation ditch



The Orchard

extending a distance of 18 miles. There is no finer agricultural soil than this sedimentary deposit. It is warm and fertile, with good drainage, yet holding a reserve of moisture to resist drought. It is ideal fruit land. You may find growing on this soil, wheat, barley, oats, corn, alfalfa, all the vegetables of a temperate and sub-tropical climate, apples, apricots, nectarines, plums, pears, peaches, prunes, oranges, lemons, limes, figs, pomegranates, grapes (table, wine, and raisin), olives, almonds, walnuts, berries, and melons. Some of these lands are better adapted to particular crops than others, yet I venture to say that there are eighty-acre tracts of this sedimentary soil in the valley, on which everything that has been named is now produced, and I am not sure but that within a single block in the town of Woodland most of these fruits and vegetables can be found growing." Of course, not all the land of the county is as fertile as that described by Professor Wilson,



CATTLE FEEDING ON PASTURE LANDS OF YOLO COUNTY.

but it is true that no other county in the State has so large an unbroken body of strictly first-class land. The same quality of soil is found in many other sections of the county, notably at Knight's Landing, Yolo, Davisville, Winters, Esparto, Capay Valley, and the Sacramento River region, but not in as large an unbroken body as around Woodland. The foothills in the western part, from Winters to Capay, and north, as well as those bordering Capay Valley, are mostly very fertile, and a great many have planted orchards and vineyards, the warm soil and exemption from frost making it a very desirable location.

The average annual rainfall is 17.25 inches at Woodland, but in the western part, along the foothills, the precipitation is considerably more.

PRODUCTS OF THE COUNTY.

The products are varied. Until within a few years, the cultivated area was devoted almost entirely to the production of wheat and to stock-raising. Yolo still holds the banner as the largest producer of wheat and barley, according to acreage, but in the meantime she is

coming to the front as a fruit-producer. Edwin S. Holmes, Jr., of the U. S. Department of Agriculture, credits Yolo County with 1,114,300 bearing fruit trees, or over one eighth of the bearing fruit trees of the State.

The grape industry is a very important item. Yolo has the honor of producing the first raisins of commerce in America, and the late R. B. Blowers was the pioneer grower. The Seedless Sultana grape, which is grown here quite extensively, makes a very plump and "meaty" raisin, and for years the Woodland Sultanas have been acknowledged by the trade to be the best in the State. The most of the Sultanas grown are bleached, and last year over 90 per cent of all the bleached Sultanas of the State were produced in the Woodland district. The shipment of table grapes to the New York market is quite an industry, and Yolo stands well to the front as regards quality, and prices received.

This county is noted for producing some of the fastest horses in California, and any day, on the streets and roads, can be seen fine specimens of driving horses. Woodland has been a center from which thousands of horses and mules have been shipped during the past few years, and they have gone to all parts of the country, notably to Hawaii, the Philippines, South Africa, and the Southern States.

The dairy interest is becoming quite a factor. One creamery at Woodland is annually turning out over 150 tons of fine butter. It is all handled by one firm, and it is claimed that the product does not more than half supply the demand. There are now four creameries in the county, besides three skimming stations.

It is estimated that there are 40,000 acres of alfalfa, and the area is rapidly increasing. As each acre will yield from six to eight tons of hay, it can readily be seen how important the dairy interest may become. For stock of any kind there can be no better feed than alfalfa, either green or cured for hay.

PRINCIPAL TOWNS.

The county seat is Woodland, a beautiful city of 3,500 population. Its streets are wide and clean, and lined with shade trees, while here and there can still be seen some of the majestic old oaks which suggested the name of the city. It has a fine city hall, a free public library, a sewer system, owns its own water works, has a gas, electric light, and power system, a fine fire department, four banks (one of which has a paid-up capital of \$1,000,000), large fruit-packing house, raisin-seeding plant, two creameries, a 200-barrel flouring-mill, a fine opera house, a business college, a high school, an academy, grammar schools, churches of all denominations, fine business blocks, and elegant private residences.

Winters, with a population of about 1,000, is located on Putah Creek, in the southwestern part of the county, and is noted as the earliest fruit section in the State. Immense quantities of both green and dried fruit are shipped to the East. It has the distinction of growing the northernmost date palm tree in the world which fully ripens its fruit, with the exception of one at Nice, France, and that is said to be not a true date palm.

Davisville, also located on Putah Creek, is in a very fertile section. There are probably more almonds grown here than in any other district in the State.

Yolo, a town of about 600 population, is on Cache Creek. It is also in a very fine fruit section, and boasts of having the largest almond orchard in the world. It has an olive-oil and pickling plant. The olives used for oil are first dried, and then run through a mill, which separates the seed from the pulp, the latter being then pressed to extract the oil. It is claimed that this process gives an oil of superior flavor, and is the only mill in existence which uses this process. The olives, after being dried, can be stored away and will keep in that condition for an indefinite time, thus giving the mill the entire year in which to work up the product.

Esparto is near the mouth of Capay Valley, on Cache Creek. It is surrounded by a fine body of land, largely devoted to fruit, vines, and alfalfa. It has a high school, a creamery, a large brick hotel, and is quite a shipping point for wheat and barley.

LAND VALUES.

Prices of land range from \$100 to \$250 per acre for the choicest land in the vicinity of Woodland, and in some of the other sections most fully developed, while land a little farther away can be had for from \$60 to \$100 per acre. Wheat lands range from \$20 to \$60, while good grazing land can be had at from \$2.50 to \$10 per acre.

The Woodland Chamber of Commerce, the Winters Board of Trade, and the Guinda Board of Trade are active public organizations. Communications addressed to them will receive courteous attention and furnish those desiring further information, pamphlets, etc., descriptive of their respective localities, which will treat in detail subjects of particular interest to the sections represented by these different bodies.

GENERAL STATISTICS.

Area, 1,017 square miles, or 650,880 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	595,287
Value of country real estate	\$10,027,080
Of improvements thereon	1,098,020
Of city and town lots	793,630
Of improvements thereon	1,285,055
Of personal property	1,698,102
Total value of all property	16,524,471

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle—Beef	348	\$10,390	Colts	1,144	\$20,175
Stock	8,073	121,500	Mules	3,422	165,850
Thoroughbred	166	7,990	Sheep—Graded	1,400	7,000
Cows	5,081	150,590	Common	39,026	78,365
Calves	2,900	28,995	Lambs	2,250	3,405
Swine	11,390	40,740	Goats	396	615
Horses—Thoroughbred	48	5,300	Poultry (dozen)	2,518	6,300
Standard-bred	350	17,140	Hay	—	3,190
Common	4,227	125,695	Lumber	—	16,300

Number of acres sown for crop of 1904:

Wheat	130,000
Barley	110,000
Hay	20,000

Acres of bearing grape vines growing in spring of 1904:

Raisin.....	2,950
Wine.....	180

Number of bearing fruit trees growing in spring of 1904:

Apple.....	420	Pear.....	51,000
Apricot.....	198,000	Prune (French).....	122,000
Cherry.....	7,500	Lemon.....	1,500
Fig.....	4,100	Orange.....	8,000
Olive.....	20,000	Almond.....	120,000
Peach.....	149,500	Walnut.....	2,500

Value of grain assessed in storage:

Wheat.....	\$144,980
Barley.....	75,660

School statistics:

Total number of census children, 1904.....	3,123
Number of teachers employed.....	91
Number of school houses.....	53
Number of school districts.....	48
Amount expended for public school purposes.....	\$63,029 27

YUBA COUNTY.

By C. F. AARON.

Secretary of the Marysville Chamber of Commerce.

In Yuba County almost every pursuit known to California can be engaged in, and the cost of lands is extremely low.

The county comprises about 105,000 acres of valley land, 136,000 of foothill, and 199,000 of mountainous. It extends from high up in the Sierra Nevada Mountains down to the level valley along the Feather River. It is centrally located in the Sacramento Valley.

In the mountains lumbering, mining, and stock-raising are the leading industries. There are thousands of acres of the best timber land in the State within its confines, and within the past two years a large amount of capital has been invested in sawmills.

MINING INDUSTRY.

Mining is an industry that is receiving more attention now than at any time in the past. Aside from dredge-mining no great amount of capital has been invested, but many small claims are in operation, and hundreds of prospectors are making good money while seeking ledges and gravel deposits. Mines that have not been operated for years are now worked successfully by improved processes. Dredge-mining is the most extensive mode of extracting gold, and more than \$2,500,000 has been invested in such enterprises along the Yuba River, which intersects the county. Two monster dredges are engaged in the industry, handling several thousand cubic yards of gravel from the river bed every twenty-four hours. Four more are being built by the firm owning them, and the same firm contemplates the construction of three others this year, which will give them a total of nine. Another firm has let contracts for the building of two machines this year, and through a deal recently consummated a third firm will build at least two of the machines. They cost \$90,000 each. One firm admits that its land contains more than \$50,000,000 in gold, and this firm has continued to add to its lands on all sides. All this development has come about within two years, and land that would sell for less than \$10 per acre two years ago brings as much as \$150 per acre now for mining purposes.

AGRICULTURE—HORTICULTURE.

But Yuba is a great county for agricultural pursuits. Land is cheap, when soil and climatic conditions are considered. Good farms can be purchased at from \$20 to \$75 per acre. This land will produce many varieties of crops. At present it is devoted chiefly to grain and stock-raising—cattle, sheep, swine, etc.—but there are many orchards and vineyards, while some thrifty persons have made a success of poultry-raising, an industry highly profitable when properly handled. Some

have sown to alfalfa and clover, and are engaging successfully in dairying, another profitable pursuit.

To enumerate the fruits grown would be simply to give a list of all varieties produced in California. Oranges grow to perfection, and ripen from four to six weeks earlier than in Southern California, but they are not so profitable as deciduous fruits, and are not cultivated so largely. Peaches, pears, apricots, cherries, prunes, figs, walnuts, almonds, and olives are more profitable and are extensively grown. Every dooryard has its orange and lemon trees to supply the needs of the owner. The world can produce no finer peaches than come from the orchards of Yuba County. On account of the superior quality of the peaches, three large fruit-canning establishments run every summer in Marysville and Yuba City, which towns are separated only by the Feather River. A fourth cannery will be in operation this year, and a third green-fruit packing-house will be established. In addition, there is one extensive dried-fruit packing-house. These institutions employ more than 1,000 women several months each year, and hundreds of men are engaged in the orchards during the fruit season.

The grape industry is engaged in on a large scale, and is profitable. The Thompson Seedless and the Flame Tokay are the favorite varieties, and have always a ready sale in the Eastern and home markets, the demand having never yet been fully supplied. Wine grapes are grown in great quantities, and a large part of the crop is taken by the Marysville Winery.

During recent years greater attention has been given to gardening, and there are now broad fields of potatoes, tomatoes, beans, and many varieties of berries. Strawberries are profitable and easily grown.

Hops grow profusely along the Bear and Feather rivers, and are an important industry. Hundreds of people are given employment during the planting, training, and picking seasons.

The rainfall averages from 17 to 20 inches annually, and is abundant, although by irrigation during the summer heavier crops can be produced.

CITY OF MARYSVILLE.

Marysville, the county seat, is the principal town, and is a wholesale center. It has excellent transportation facilities in all directions by rail and stage. It has the best equipped woolen mill on the Coast and it is one of the largest, having had its capacity increased within the past few months to double what it had been. Its trade is with all the States in the Union. The town has two of the largest hardware establishments in Northern California, and many other industries that give it commercial importance, such as an ice and cold-storage plant, brewery, creamery, three banks, a foundry, and harvester works, drapery factories that supply the whole Pacific Coast, a bag factory, steam laundry, flouring-mill, and good hotels. It has good high and grammar schools, a Catholic college, and seven churches of different denominations. The town has 5,000 population.

The Western Pacific Railroad Company has secured 16 blocks of land within the city limits of Marysville for terminal and shop facilities, and a franchise through the city. A survey has been completed for an electric railway to Grass Valley, Nevada City, and Auburn. Franchises have been asked for to connect Oroville, Chico, Colusa, Gridley, Biggs,

and a number of smaller towns with Marysville by electric roads. In addition, preliminary work is under way for an electric road from Marysville to Downieville.

IRRIGATION AND POWER.

There is an abundance of water for power and irrigation. The waters of the Yuba River are supplying power for mills, factories, railways, and lighting, in San Francisco, Sacramento, and all intermediate towns. The great Colgate electric plant is located in the mountains 28 miles east of Marysville, and it sends its energy throughout Northern California, being one of the largest plants in the West.

GENERAL STATISTICS.

Area, 625 square miles, or 400,000 acres.

The following figures are given by the County Assessor for the year 1904:

Number of acres assessed	366,049
Value of country real estate	\$2,402,890
Of improvements thereon	451,815
Of city and town lots	415,655
Of improvements thereon	909,680
Of personal property	1,144,705
Total value of all property	5,995,537

Number and value of live stock, etc.:

	Number.	Value.		Number.	Value.
Cattle—Beef	120	\$2,400	Colts	300	\$3,000
Stock	6,100	73,200	Mules	1,057	23,340
Cows	1,800	36,000	Sheep	30,000	60,000
Calves	600	4,800	Goats	350	400
Oxen	20	1,000	Poultry (dozen)	450	900
Swine	2,900	9,600	Hay	—	1,000
Horses—Thoroughbred	5	700	Wool	—	1,960
American	13	1,300	Lumber	—	5,500
Common	3,720	83,150			

Number of acres sown for crop of 1904:

Wheat	32,400
Oats	4,000
Barley	5,740
Corn	40
Hay	71,440

Acres of grape vines growing in spring of 1904:

	Bearing.	Non-Bearing.
Table	70	20
Raisin	165	15
Wine	315	80

Number of fruit trees growing in spring of 1904:

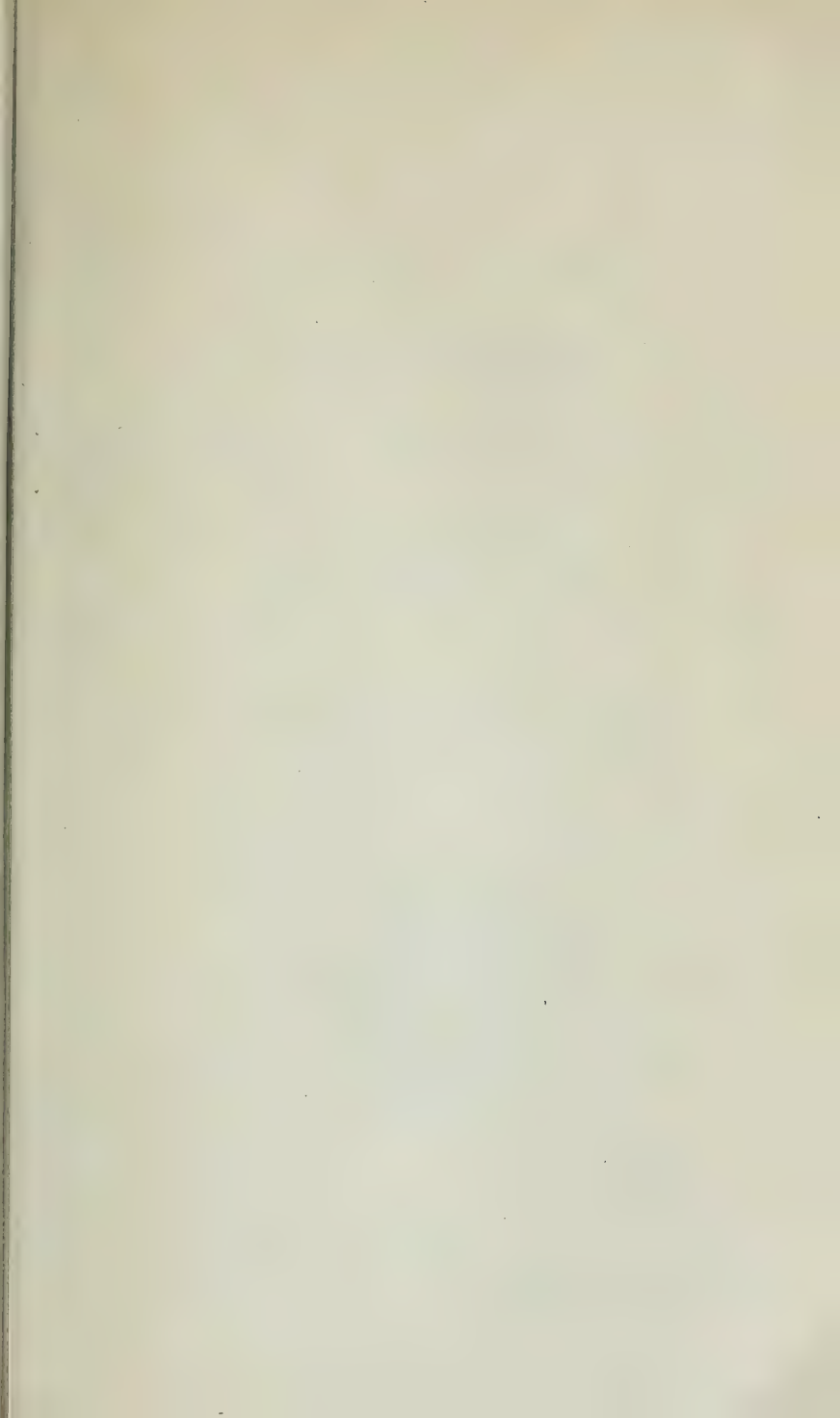
	Bearing.	Non-Bearing.		Bearing.	Non-Bearing.
Apple	7,400	10,090	Prune (French)	179,000	5,060
Apricot	15,000	41,000	Prune (other kinds)	3,400	600
Cherry	1,000	3,000	Lemon	30,700	2,100
Fig	4,500	2,000	Orange	33,800	29,600
Olive	8,000	1,800	Almond	5,000	700
Peach	64,000	27,000	Walnut	2,100	5,060
Pear	18,000	3,100			

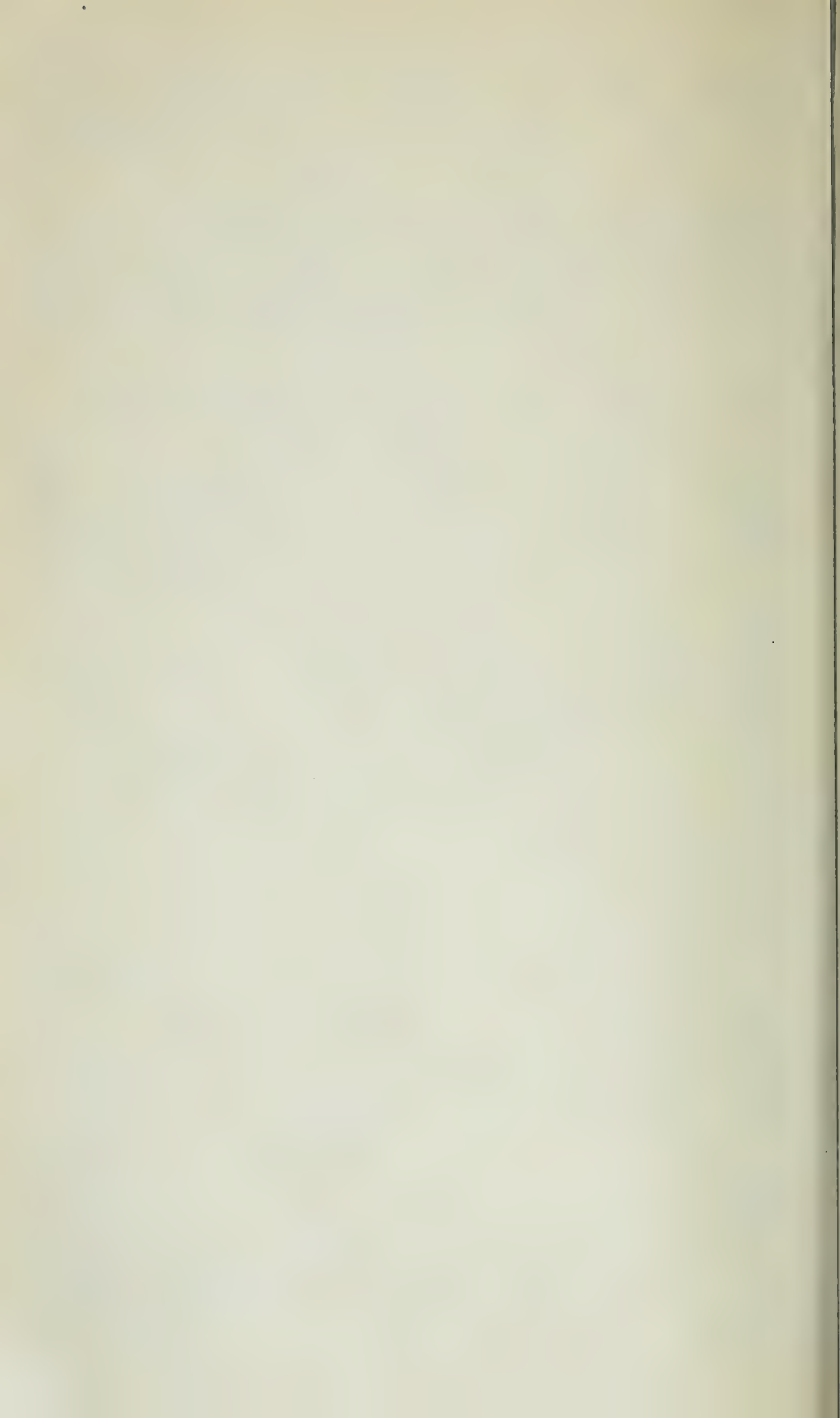
Value of grain assessed in storage:

Wheat	\$43,590
Barley	4,835

School statistics:

Total number of census children, 1904	1,842
Number of teachers employed	52
Number of school houses	38
Number of school districts	39
Amount expended for public school purposes	\$44,167 13





REPORT
OF THE
CALIFORNIA
STATE AGRICULTURAL
SOCIETY

FOR THE YEAR 1905



SACRAMENTO:

W. W. SHANNON, : : : : SUPERINTENDENT STATE PRINTING.
1906.

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REPORT

OF THE

STATE AGRICULTURAL SOCIETY.

To His Excellency, HON. GEORGE C. PARDEE,
Governor of the State of California,

SIR: We herewith submit the fifty-second annual report of the State Agricultural Society. Shortcomings may be accounted for to some extent from the fact that the present Secretary found the work of preparing this report one among his first duties on entering the office, and it can hardly be expected that one is as able to report the transactions of another as completely and satisfactorily as he would his own. Neither is it the fault of the present Secretary that this report was not placed in your hands at an earlier date, as contemplated by that provision of the law which says the Board shall, "on or before the first day of February of each year, report to the Governor a full and detailed account of its transactions, statistics, and information gained, and also a full financial statement of all funds received and disbursed."

Relying on the data available, we must confine this report to a financial statement of all funds received and disbursed, to a reference to the exhibits and premiums awarded at the last State Fair, to some special papers on pertinent subjects by men learned in the department of the industry on which they write, and to an exposition of the industrial conditions of the State as revealed by the statistics reported from the different counties, as per the Act of the Legislature approved March 20, 1905.

In this connection we want to say that the Act of the Legislature making it the duty of the Board of Supervisors of each county to supply the Secretary of the State Agricultural Society with certain statistics once a year, while thoughtful in its conception and very valuable in its purpose, has not as yet been complied with by the Supervisors, excepting in the case of a few counties, with that spirit and thoroughness which its importance would justify. The intention of this Act was to keep California abreast with the most progressive communities by

providing the means for informing residents, homeseekers, and investors of the true industrial condition of the State, but in spite of repeated notices and appeals some of the Supervisors have failed to supply the data required. On the other hand, some of the Boards of Supervisors seem to have grasped the importance of the provision at once, and realizing the great value of such facts as the law contemplates, not only to our own people, but also to the commercial world, made prompt provision for obtaining the necessary statistics and sending in their report. Others made a show at reporting, but the lack of completeness, the evidence of guesswork, the slipshod character of the returns generally, show that they either failed to obtain competent help or were indifferent to the importance of the work. Hence the reports as received in the aggregate are of little value.

Separately, they are of considerable interest. We have therefore treated them separately; that is, we have compiled a showing of the industrial conditions of each county that reported, based on the returns received from the county, and avoided any attempt at State aggregates, which are impossible of ascertainment by reason of having no figures at all from some of the counties. Statistics are of use only in so far as they are correct and complete and specify the term or season which they cover.

Notwithstanding this situation we congratulate those Supervisors who showed an appreciation of the importance of the subject by making a faithful return, and sincerely hope that in another year the work will be so thoroughly inaugurated in the State as to insure from every county a full and satisfactory compliance with the law.

It is our judgment, however, that the law ought to be amended so as to include the calendar year in the report, and require the same to be filed with the Secretary of the State Board of Agriculture on or before the 31st day of January instead of the 1st day of November. There ought to be inserted, also, a penalty clause for non-compliance with its provisions. If Supervisors who ignore the law were liable to have their seats declared vacant and filled by appointment of the Governor, we have an idea the State would get the facts it is asking for, collected by men who have some aptitude for the work and would do it thoroughly and reliably, and certainly no other kind of men ought to be imposed with such a task. On this subject Mr. S. N. Wyckoff, superintendent of the bureau that sent in the very satisfactory report from Alameda County, says: "The requirement that this report should be made November 1st made it necessary to do field work in September and October, and at the time some of the crops were only partially harvested. Owing to this fact the information regarding some of the agricultural products is necessarily based partially on estimates. If the report were due December 15th, most of the estimates could be eliminated and actual

figures of production given instead. Many manufacturers regret that they are called on to give figures of their productions to November 1st instead of from January to January. Most of their annual reports are made up in January for the preceding year, and if they were asked for this information about February 1st it would be much easier to give, and it could be more complete and accurate."

If the law should be amended changing the date for filing the returns from November to January, then the provision requiring the Secretary of the State Board of Agriculture to file his report with the Governor on the 1st day of February should also be changed by extending the time for compiling these statistics and completing his report, to at least the end of March.

Whatever is done, we hope the Legislature will not be so discouraged at the unsatisfactory beginning as to repeal the Act, for it certainly is a move in the right direction, and with a suitable penalty clause and a few other well-considered modifications, its working will become of very great importance to California.

As previously stated, any tabulation of the returns received attempting to show State aggregates would be so incomplete as to be of no value. We have been compelled, therefore, to ignore the matter of State tables until we can get these figures more complete, and in the meantime use those reports that have been returned in a satisfactory shape in a summary review and tabulated showing of the physical and industrial and productive conditions of the respective counties to which they relate. Hence, in the following pages the reader, under the summary given, may learn much of value regarding the California counties that sent in reports. If the figures of any county are looked for and not found, it will be because the county has made no return, and the fault lies alone with the Supervisors of that county. It might be said this Society ought to make an effort to repair the omission. If we do it once we will have to keep on doing it, and instead of prompting the indifferent ones to action, such work on our part would be a premium on neglect, by a virtual notice to those who are now doing their duty that if they also fail to perform the work we will do it for them.

The best we are able to do for the counties failing to report statistics is to give them each a descriptive article briefly outlining their general geographical, topographical, and principal industrial features.

Lacking as this report is, however, in what it should be, there will be found in the State Fair data, in the special articles from eminent specialists, and from descriptive and statistical matter from at least a very large majority of the counties of the State, a great deal of more than passing interest to the general reader and of special interest to the student of California.

The Society is now undertaking the collection of original and special information bearing on industrial subjects of interest to California producers, and as data of this character is obtained it will be disseminated to the people in the form of bulletins, and these bulletins, we anticipate, embodied in future reports, will add greatly to their value.

Respectfully submitted.

B. F. RUSH, President.

Attest: J. A. FILCHER. Secretary.

FINANCIAL STATEMENT.

RECEIPTS.

1905.			
Feb. 1—	Cash balance.....	\$2,979 22	
	Park and Pavilion receipts.....	10,498 01	
	State appropriations.....	149,812 46	
	Races.....	14,434 70	
	Entrances due, collected.....	173 00	
	Fixed events.....	2,700 00	
	Advertising.....	35 00	
	American Shorthorn Breeders' Association.....	327 00	
	James Whitaker, Special Treasurer.....	7,460 00	
			\$188,419 39

DISBURSEMENTS.

	Expense.....	\$14,606 21	
	Bills payable.....	55,996 35	
	Races.....	24,419 00	
	Interest.....	1,353 86	
	Salaries.....	5,840 00	
	Advertising.....	1,060 91	
	Construction.....	65,795 27	
	Entrance due.....	1,100 00	
	Premiums.....	6,656 75	
	Refunds Stallion Stake of 1903.....	220 00	
	James Whitaker, Special Treasurer.....	9,360 00	
1906.			
April 1—	Cash balance.....	2,011 04	
			\$188,419 39

PREMIUMS AWARDED—1905.

FIRST DEPARTMENT—LIVE STOCK.

HORSES.

Exhibit.	Exhibitor.	Award.
CLASS I—THOROUGHBRED HORSES.		
<i>Stallions.</i>		
Claudius, best four-year-old	Wm. Gardner, Sacramento	\$20 00
Vulcan, second best	Dan McCarty, San Francisco	10 00
<i>Mares.</i>		
Wandering Nun, best four-year-old	La Siesta Ranch, San José	10 00
Nunie of La Siesta, best one-year-old	La Siesta Ranch, San José	5 00
<i>Family.</i>		
Zolock, best stallion other than thoroughbred and five colts	Ben Davies, San Bernardino	G'd Med
Wanda, best dam other than thoroughbred and two colts	La Siesta Ranch, San José	Sil. Med.
CLASS II—STANDARD TROTTERS.		
<i>Stallions.</i>		
Zolock, best four-year-old	Ben Davies, San Bernardino	\$20 00
Iran Alto, second best	Jas. W. Rea, San José	10 00
Silver Hunter, best two-year-old	L. H. Todhunter, Sacramento	7 50
Bay colt, best suckling	La Siesta Ranch, San José	5 00
Search Me, best gelding, any age	La Siesta Ranch, San José	5 00
<i>Mares.</i>		
Wanda, best four-year-old	La Siesta Ranch, San José	20 00
Abbie Woodnut, second best	Mrs. W. W. Callendine, Sac'to	10 00
Datura C., third best	Mrs. J. E. Bates, Sacramento	5 00
Bernise P., best three-year-old	S. U. Mitchell, Sacramento	10 00
Bay filly, best suckling filly	Mrs. E. W. Callendine, Sac'to	5 00
CLASS III—HARNESS HORSES.		
Span, best 16 hands	W. A. Caswell, Sacramento	10 00
Lady Keating, best single animal 15 and under 16 hands	Mrs. W. W. Callendine, Sac'to	10 00
Lady Belle Isle, best single animal 16 hands	La Siesta Ranch, San José	10 00
Jim Voorhees, second best	F. W. Foskett, Concord	5 00
CLASS IV—CARRIAGE TEAMS.		
Allie B. and Opal C., best matched span	J. Crouch & Son, San José	G'd Med
CLASS VII—PERCHERONS.		
<i>Stallions.</i>		
Sansounet, best four-year-old	J. Crouch & Son, San José	\$20 00
Cæsar, second best	Dunham Fletcher, Woodland	10 00
Ministere, third best	Dunham Fletcher, Woodland	5 00
Velo, best three-year-old	Dunham Fletcher, Woodland	20 00
Cosaque, second best	Dunham Fletcher, Woodland	10 00
Metayer, third best	J. Crouch & Son, San José	5 00
Sarcièr, best two-year-old	Dunham Fletcher, Woodland	15 00
Franconi, second best	J. Crouch & Son, San José	8 00
Ildervert, third best	J. Crouch & Son, San José	4 00
<i>Mares.</i>		
Kalona and filly, best mare and colt four years old and over	C. Chipman, Wilmington	10 00
Keota Maize, best four-year-old	C. Chipman, Wilmington	7 50
Queen, best under one year	C. Chipman, Wilmington	5 00

FIRST DEPARTMENT—HORSES—*Continued.*

Exhibit.	Exhibitor.	Award.
CLASS VIII—BELGIAN.		
<i>Stallions.</i>		
Argument, best four-year-old	Dunham & Fletcher, Woodland ..	\$20 00
Dosto, second best	J. Crouch & Son, San José	10 00
Sidi, third best	Landis Bros., Folsom	5 00
Bothade Inevaucampo, best three-year-old ..	Dunham & Fletcher, Woodland ..	20 00
Pluton, second best	Landis Bros., Folsom	10 00
CLASS IX—CLYDESDALES.		
<i>Stallions.</i>		
Border Chief, best four-year-old	Landis Bros., Folsom	10 00
CLASS XI—COACH HORSES.		
<i>Stallions.</i>		
Pochas, best four-year-old	Dunham & Fletcher, Woodland ..	20 00
Gustave, second best	J. Crouch & Son, San José	10 00
Nordstrard, third best	Landis Bros., Folsom	5 00
Rother, best three-year-old	J. Crouch & Son, San José	15 00
Ontige, second best	J. Crouch & Son, San José	8 00
Thado, third best	J. Crouch & Son, San José	4 00
Actival, best two-year-old	J. Crouch & Son, San José	7 50
<i>Mares.</i>		
Kissing Cup, best four-year-old with colt ..	Chas. Butters, Berkeley	10 00
Chestnut filly, best foal under one year ..	Chas. Butters, Berkeley	5 00
Velocity III and colt, best get of sire	Chas. Butters, Berkeley	10 00
CLASS XIII—DRAFT SWEEPSTAKES.		
Molly and colt, best mare any age and two colts ..	H. S. Moddison, Broderick	25 00
CLASS XIV—GRADE DRAFT.		
<i>Mares.</i>		
Jane and colt, best mare with foal	H. S. Moddison, Broderick	20 00
Queen and colt, second best	J. J. Fairbairn, Walsh Station ..	10 00
Daisy, best mare or gelding three years old ..	H. S. Moddison, Broderick	15 00
Chuh, second best	J. J. Fairbairn, Walsh Station ..	10 00
Belle, third best	H. S. Moddison, Broderick	5 00
Maggie, best two-year-old	J. J. Fairbairn, Walsh Station ..	15 00
Pet, second best	H. S. Moddison, Broderick	10 00
Daisy, best colt under one year	H. S. Moddison, Broderick	10 00
Sam, second best	J. J. Fairbairn, Walsh Station ..	5 00
Team of chunks, 2500 pounds	H. S. Moddison, Broderick	20 00
Team, second best	J. J. Fairbairn, Walsh Station ..	10 00
CLASS XV—GRADE COACH.		
<i>Mares.</i>		
Sally and colt, best brood mare	J. J. Fairbairn, Walsh Station ..	20 00
Molly and colt, second best	H. S. Moddison, Broderick	10 00
Jim, best three-year-old (gelding)	J. J. Fairbairn, Walsh Station ..	15 00
Ned, second best	H. S. Moddison, Broderick	8 00
Joe, best two-year-old	H. S. Moddison, Broderick	15 00
Jane, second best	J. J. Fairbairn, Walsh Station ..	8 00
Pet, best colt under one year	H. S. Moddison, Broderick	10 00
Dan, second best	J. J. Fairbairn, Walsh Station ..	5 00
CLASS XVI—SADDLE HORSES.		
Seyyid, best stallion three years old	Chas. Butters, Berkeley	10 00
Kentucky Prince, best mare or gelding ..	F. Cornehl, San Francisco	20 00
Sylvia, second best	Mrs. L. I. Zapp, Fresno	10 00
CLASS XVIII—SHETLAND PONIES.		
Six Shetlands	Mrs. L. I. Zapp, Fresno	Sil. Med
Four-in-hand	Mrs. L. I. Zapp, Fresno	Sil. Med
CLASS XIX—JACKS.		
Ely, best two-year-old	J. W. Wakefield, Lockeford	\$7 50

CATTLE.

Exhibit.	Exhibitor.	Award.
CLASS I—SHORTHORNS.		
<i>Bulls.</i>		
King Edward, best three-year-old.....	J. H. Glide & Son, Sacramento ..	\$40 00
Hilcrest Hero, second best.....	J. H. Glide & Son, Sacramento ..	20 00
Nonpareil King, third best.....	Rush & Pierce, Suisun.....	10 00
Glide's Gloucester, best two-year-old.....	J. H. Glide & Son, Sacramento ..	30 00
Scotch Marshal, second best.....	J. H. Glide & Son, Sacramento ..	15 00
Luster Chief, third best.....	Cal. Pastoral Agr. Co., Merced.....	7 00
Aberdeen, best over 18 mos. and under 24 mos.....	J. H. Glide & Son, Sacramento ..	20 00
Golden Fashion, second best.....	Howard Cattle Co., San Francisco ..	10 00
Spicey, third best.....	Howard Cattle Co., San Francisco ..	5 00
Bampton Hero, best over 12 mos. and under 18 mos.....	H. P. Eakle, Jr., Woodland.....	15 00
Pioneer, second best.....	Howard Cattle Co., San Francisco ..	8 00
Harlequin, third best.....	Jal. Pastoral Agr. Co., Merced.....	4 00
McGregor, best calf under 12 mos.....	J. H. Glide & Son, Sacramento ..	10 00
Greenwood Ensign, second best.....	J. H. Glide & Son, Sacramento ..	5 00
Watchful Conqueror, third best.....	Rush & Pierce, Suisun.....	3 00
<i>Cows.</i>		
Elgitha 25th, best three-year-old.....	J. H. Glide & Son, Sacramento ..	40 00
Star Queen, second best.....	J. H. Glide & Son, Sacramento ..	20 00
Sarah, third best.....	Rush & Pierce, Suisun.....	10 00
Roan Myrtle, best two-year-old.....	J. H. Glide & Son, Sacramento ..	30 00
Sweet Harmony, second best.....	Rush & Pierce, Suisun.....	15 00
Silver Rosalind, third best.....	J. H. Glide & Son, Sacramento ..	7 00
Laura, best over 18 mos. and under 24 mos.....	Cal. Pastoral Agr. Co., Merced.....	20 00
Mysie Secret, second best.....	Rush & Pierce, Suisun.....	10 00
Diamond Princess, third best.....	J. H. Glide & Son, Sacramento ..	5 00
Diamond Clara, best over 12 mos. and under 18 mos.....	J. H. Glide & Son, Sacramento ..	15 00
Dumpsie, second best.....	Rush & Pierce, Suisun.....	8 00
Dorinda, third best.....	Cal. Pastoral Agr. Co., Merced.....	4 00
Diamond Lady, best under 12 mos.....	J. H. Glide & Son, Sacramento ..	10 00
Miss Edward, second best.....	J. H. Glide & Son, Sacramento ..	5 00
Peggie Waunall, third best.....	Rush & Pierce, Suisun.....	3 00
<i>Exhibitors' Herds.</i>		
Best herd.....	J. H. Glide & Son, Sacramento ..	50 00
Second best.....	J. H. Glide & Son, Sacramento ..	25 00
Third best.....	Rush & Pierce, Suisun.....	10 00
Best breeders' young herd.....	Cal. Pastoral Agr. Co., Merced.....	40 00
Second best.....	Howard Cattle Co., San Francisco ..	20 00
Best get of sire, bull and four animals.....	J. H. Glide & Son, Sacramento ..	30 00
Second best.....	Rush & Pierce, Suisun.....	20 00
Third best.....	Cal. Pastoral Agr. Co., Merced.....	10 00
Best produce of dam.....	Cal. Pastoral Agr. Co., Merced.....	20 00
Second best.....	Howard Cattle Co., San Francisco ..	15 00
Third best.....	Cal. Pastoral Agr. Co., Merced.....	10 00
<i>Champions.</i>		
King Edward, best senior bull.....	J. H. Glide & Son, Sacramento ..	G'd Med
McGregor, best junior bull.....	J. H. Glide & Son, Sacramento ..	G'd Med
Elgitha 25th, senior champion cow.....	J. H. Glide & Son, Sacramento ..	G'd Med
Diamond Clara, junior champion cow.....	J. H. Glide & Son, Sacramento ..	G'd Med
King Edward, grand champion bull.....	J. H. Glide & Son, Sacramento ..	G'd Med
McGregor, reserve champion bull.....	J. H. Glide & Son, Sacramento ..	Sil. Med
Elgitha 25th, grand champion cow.....	J. H. Glide & Son, Sacramento ..	G'd Med
Star Queen, reserve champion cow.....	J. H. Glide & Son, Sacramento ..	Sil. Med

FIRST DEPARTMENT—CATTLE—Continued.

Exhibit.	Exhibitor.	Award.
CLASS II—DEVONS.		
<i>Bulls.</i>		
Royal Somerset, best three-year-old	L. McWhorter, N. Yakima, Wash.	\$20 00
Nimo, best under 18 mos. and over 12 mos.	L. McWhorter, N. Yakima, Wash.	7 50
Red Cloud, best under 12 mos.	L. McWhorter, N. Yakima, Wash.	5 00
<i>Cows.</i>		
Francis, best three-year-old and over	L. McWhorter, N. Yakima, Wash.	20 00
Rose of Muskengen, best two-year-old	L. McWhorter, N. Yakima, Wash.	15 00
Pleiades, best over 18 and under 24 mos.	L. McWhorter, N. Yakima, Wash.	10 00
Midget, best under 12 mos.	L. McWhorter, N. Yakima, Wash.	5 00
<i>Exhibitors' Herd.</i>		
Best herd	L. McWhorter, N. Yakima, Wash.	25 00
Best get of sire	L. McWhorter, N. Yakima, Wash.	15 00
Best produce of dam	L. McWhorter, N. Yakima, Wash.	10 00
Royal Somerset, senior champion bull	L. McWhorter, N. Yakima, Wash.	G'd Med
Nimo, junior champion bull	L. McWhorter, N. Yakima, Wash.	G'd Med
Rose of Muskengen, senior champion cow	L. McWhorter, N. Yakima, Wash.	G'd Med
Pleiades, junior champion cow	L. McWhorter, N. Yakima, Wash.	G'd Med
Royal Somerset, grand champion bull	L. McWhorter, N. Yakima, Wash.	G'd Med
Chief Gregory, reserve champion bull	L. McWhorter, N. Yakima, Wash.	Sil. Med
Rose of Muskengen, grand champion cow	L. McWhorter, N. Yakima, Wash.	G'd Med
McWhorter 25th, reserve champion cow	L. McWhorter, N. Yakima, Wash.	Sil. Med
CLASS VI—HOLSTEINS.		
<i>Bulls.</i>		
Jetze Zwarthak, best three-year-old and over	Pierce L. & S. Co., Stockton	\$20 00
Corrector of Riverside, best two-year-old	Pierce L. & S. Co., Stockton	15 00
Lanark Blaco Paul of Riverside, best one-year-old	Pierce L. & S. Co., Stockton	20 00
Simor, second best	Pierce L. & S. Co., Stockton	10 00
Mehthilde's Cook, third best	F. H. Burke, San José	5 00
Juliana King of Riverside, best over six months and under one year	Pierce L. & S. Co., Stockton	7 50
Jetze Stein of Riverside, best under six months	Pierce L. & S. Co., Stockton	10 00
Jetze Hunt, second best	Pierce L. & S. Co., Stockton	5 00
Bull calf, third best	F. H. Burke, San José	3 00
<i>Cows.</i>		
Fidessa, best three-year-old	Pierce L. & S. Co., Stockton	20 00
Leda Hartog Colanitha, best two-year-old	Pierce L. & S. Co., Stockton	15 00
Inka Tritonia II, best one-year-old	Pierce L. & S. Co., Stockton	20 00
Griselda of Riverside, second best	Pierce L. & S. Co., Stockton	10 00
Rudda Princess II, third best	Pierce L. & S. Co., Stockton	5 00
Riverside Corona, best over six months and under one year	Pierce L. & S. Co., Stockton	15 00
Riverside Drosky, second best	Pierce L. & S. Co., Stockton	8 00
Riverside Konigen, third best	Pierce L. & S. Co., Stockton	4 00
Eva Korndyke of Riverside, best under six months	Pierce L. & S. Co., Stockton	5 00
<i>Exhibitors' Herds.</i>		
Best herd	Pierce L. & S. Co., Stockton	25 00
Best breeders' young herd	Pierce L. & S. Co., Stockton	40 00
Second best	Pierce L. & S. Co., Stockton	20 00
Third best	F. H. Burke, San José	10 00
Best get of sire	Pierce L. & S. Co., Stockton	20 00
Best produce of dam	Pierce L. & S. Co., Stockton	20 00
Second best	F. H. Burke, San José	15 00
Jetze Zwarthak, senior champion bull	Pierce L. & S. Co., Stockton	G'd Med
Juliana King of Riverside, junior champion bull	Pierce L. & S. Co., Stockton	G'd Med
Fidessa, senior champion cow	Pierce L. & S. Co., Stockton	G'd Med
Inka Tritonia II, junior champion cow	Pierce L. & S. Co., Stockton	G'd Med
Jetze Zwarthak, grand champion bull	Pierce L. & S. Co., Stockton	G'd Med

FIRST DEPARTMENT—CATTLE—*Continued.*

Exhibit.	Exhibitor.	Award.
CLASS VI—HOLSTEINS—<i>Continued.</i>		
Julianna King of Riverside, reserve champion bull	Pierce L. & S. Co., Stockton	Sil. Med
Fidessa, grand champion cow	Pierce L. & S. Co., Stockton	G'd Med
Soukje, reserve champion cow	Pierce L. & S. Co., Stockton	Sil. Med
CLASS VII—JERSEYS.		
<i>Bulls.</i>		
Alice's Recorder, best three-year-old	T. B. C. Sielcken, Calistoga	\$20 00
Sir Carlyle, best two-year-old	Thos. Waite, Perkins	15 00
Golden Lad of Oakhurst, best one-year-old	W. R. Shafter, San Francisco	20 00
Star of Kern, second best	W. R. Shafter, San Francisco	10 00
Roy W., third best	Thos. Waite, Perkins	5 00
Brown Jimmie, best calf under one year and over six months	W. R. Shafter, San Francisco	7 50
Guy W., best under six months	Thos. Waite, Perkins	10 00
Exile of San Geronimo, second best	W. R. Shafter, San Francisco	5 00
<i>Cows.</i>		
Rosalie of Y. B., best three-year-old	W. R. Shafter, San Francisco	40 00
Grace W., second best	Thos. Waite, Perkins	20 00
Rossa B., third best	W. R. Shafter, San Francisco	10 00
Laura W., best two-year-old	Thos. Waite, Perkins	30 00
Queenie, second best	T. B. C. Sielcken, Calistoga	15 00
Rosa W., best one-year-old	Thos. Waite, Perkins	20 00
Noba, second best	W. R. Shafter, San Francisco	10 00
Irma, third best	T. B. C. Sielcken, Calistoga	5 00
Marjorie of Kern, best under one year and over six months	W. R. Shafter, San Francisco	7 50
Edna W., best under six months	Thos. Waite, Perkins	10 00
Calf, second best	T. B. C. Sielcken, Calistoga	5 00
<i>Exhibitors' Herds.</i>		
Best herd	Thos. Waite, Perkins	50 00
Second best	T. B. C. Sielcken, Calistoga	25 00
Rosalie of Y. B., best produce of dam	Thos. Waite, Perkins	10 00
Sir Carlyle, senior champion bull	Thos. Waite, Perkins	G'd Med
Golden Lad of Oakhurst, junior champion bull	W. R. Shafter, San Francisco	G'd Med
Rosalie of Y. B., senior champion cow	W. R. Shafter, San Francisco	G'd Med
Rosa W., junior champion cow	Thos. Waite, Perkins	G'd Med
Golden Lad of Oakhurst, grand champion bull	W. R. Shafter, San Francisco	G'd Med
Brown Jimmie, reserve champion bull	W. R. Shafter, San Francisco	Sil. Med
Rosalie of Y. B., grand champion cow	W. R. Shafter, San Francisco	G'd Med
Rosa W., reserve champion cow	Thos. Waite, Perkins	Sil. Med
CLASS X—BROWN SWISS.		
<i>Bulls.</i>		
Huff, best three-year-old	J. M. Jayne, N. Yakima, Wash.	\$20 00
Stephen B., best two-year-old	J. M. Jayne, N. Yakima, Wash.	15 00
Oom Paul, best one-year-old	J. M. Jayne, N. Yakima, Wash.	10 00
Philip J., best under one year and over six months	J. M. Jayne, N. Yakima, Wash.	7 50
Tom Watson, best under six months	J. M. Jayne, N. Yakima, Wash.	5 00
<i>Cows.</i>		
Grisalda, best three-year-old and over	J. M. Jayne, N. Yakima, Wash.	20 00
Independence, best two-year-old	J. M. Jayne, N. Yakima, Wash.	15 00
Violet J., best one-year-old	J. M. Jayne, N. Yakima, Wash.	10 00
Blue Belle J., best under one year and over six months	J. M. Jayne, N. Yakima, Wash.	7 50

FIRST DEPARTMENT—CATTLE—*Continued.*

Exhibit.	Exhibitor.	Award.
CLASS X—BROWN SWISS— <i>Continued.</i>		
<i>Exhibitors' Herds.</i>		
Best herd	J. M. Jayne, N. Yakima, Wash.	\$25 00
Best breeders' herd	J. M. Jayne, N. Yakima, Wash.	20 00
Best get of sire	J. M. Jayne, N. Yakima, Wash.	15 00
Best produce of dam	J. M. Jayne, N. Yakima, Wash.	10 00
Huff, senior champion bull	J. M. Jayne, N. Yakima, Wash.	G'd Med
Tom Watson, junior champion bull	J. M. Jayne, N. Yakima, Wash.	G'd Med
Violet J., junior champion cow	J. M. Jayne, N. Yakima, Wash.	G'd Med
Huff, grand champion bull	J. M. Jayne, N. Yakima, Wash.	G'd Med
Tom Watson, reserve champion bull	J. M. Jayne, N. Yakima, Wash.	Sil. Med
Grisalda, grand champion cow	J. M. Jayne, N. Yakima, Wash.	G'd Med
Independence, reserve champion cow	J. M. Jayne, N. Yakima, Wash.	Sil. Med
CLASS XII—FAT CATTLE.		
John Clay, best two-year-old steer	Cal. Pastoral Agr. Co., Merced	\$7 50
Johnnie Riggs, best under one year	Cal. Pastoral Agr. Co., Merced	7 50
John Clay, champion steer	Cal. Pastoral Agr. Co., Merced	G'd Med
CLASS XIV—GRAND SWEEPSTAKES DAIRY BREED.		
Best aged herd	Pierce L. & S. Co., Stockton	\$60 00
Best young herd	Pierce L. & S. Co., Stockton	52 00
Second best	Pierce L. & S. Co., Stockton	20 00

SHEEP.

CLASS II—FRENCH MERINO.		
<i>Rams.</i>		
Best two-year-old	J. H. Glide & Son, Sacramento	\$6 00
Best one-year-old	J. H. Glide & Son, Sacramento	6 00
Best under one year	J. H. Glide & Son, Sacramento	5 00
<i>Ewes.</i>		
Best two-year-old	J. H. Glide & Son, Sacramento	6 00
Best one-year-old	J. H. Glide & Son, Sacramento	6 00
Best under one year	J. H. Glide & Son, Sacramento	5 00
<i>Flocks.</i>		
Pen	J. H. Glide & Son, Sacramento	7 50
Flock	J. H. Glide & Son, Sacramento	7 50
Best ram, any age	J. H. Glide & Son, Sacramento	G'd Med
Best ewe, any age	J. H. Glide & Son, Sacramento	G'd Med
CLASS III—SOUTHDOWN.		
<i>Rams.</i>		
Best one-year-old	Eaton & Shaw, Cosumnes	\$12 00
Second best	Thos. Waite, Perkins	8 00
Best under one year	Thos. Waite, Perkins	10 00
Second best	Thos. Waite, Perkins	5 00
Third best	E. J. Lynch, Walsh Station	Diploma
<i>Ewes.</i>		
Best two-year-old	Thos. Waite, Perkins	\$12 00
Second best	E. J. Lynch, Walsh Station	8 00
Third best	Thos. Waite, Perkins	Diploma
Best one-year-old	Thos. Waite, Perkins	\$12 00
Second best	E. J. Lynch, Walsh Station	8 00
Third best	Thos. Waite, Perkins	Diploma
Best under one year	Thos. Waite, Perkins	\$10 00
Second best	Thos. Waite, Perkins	5 00
Third best	E. J. Lynch, Walsh Station	Diploma

FIRST DEPARTMENT—SHEEP—*Continued.*

Exhibit.	Exhibitor.	Award.
CLASS III—SOUTHDOWN—<i>Continued.</i>		
<i>Flocks.</i>		
Best flock	Thos. Waite, Perkins	\$15 00
Second best	Thos. Waite, Perkins	10 00
Third best	E. J. Lynch, Walsh Station	5 00
Best pen of four lambs	Thos Waite, Perkins	15 00
Second best	E. J. Lynch, Walsh Station	10 00
Best ram, any age	Eaton & Shaw, Cosumnes	G'd Med
Best ewe, any age	Thos. Waite, Perkins	G'd Med
CLASS IV—SHROPSHIRE.		
<i>Rams.</i>		
Best two-year-old	J. H. Glide & Son, Sacramento	\$6 00
Best one-year-old	J. H. Glide & Son, Sacramento	6 00
Best under one year	J. H. Glide & Son, Sacramento	5 00
<i>Ewes.</i>		
Best two-year-old	J. H. Glide & Son, Sacramento	6 00
Best one-year-old	J. H. Glide & Son, Sacramento	6 00
Best under one year	J. H. Glide & Son, Sacramento	5 00
<i>Flocks.</i>		
Best flock	J. H. Glide & Son, Sacramento	7 50
Best pen of four lambs	J. H. Glide & Son, Sacramento	7 50
Best ram, any age	J. H. Glide & Son, Sacramento	G'd Med
Best ewe, any age	J. H. Glide & Son, Sacramento	G'd Med
CLASS VI—PERSIANS.		
Best buck two years old or over	C. P. Bailey, San José	\$6 00
CLASS VIII—DORSET HORNS.		
<i>Rams.</i>		
Best two-year-old	J. W. Wakefield, Lockeford	6 00
<i>Ewes.</i>		
Best two-year-old	J. W. Wakefield, Lockeford	6 00
Best one-year-old	J. W. Wakefield, Lockeford	6 00
CLASS XIV—ANGORA GOATS.		
<i>Bucks.</i>		
Best two-year-old and over	C. P. Bailey, San José	12 00
Second best	C. P. Bailey, San José	5 00
Best one-year-old and over	C. P. Bailey, San José	12 00
Second best	C. P. Bailey, San José	5 00
Best under one year	C. P. Bailey, San José	8 00
Second best	C. P. Bailey, San José	4 00
<i>Does.</i>		
Best two-year-old and over	C. P. Bailey, San José	12 00
Second best	C. P. Bailey, San José	5 00
Best one-year-old and over	C. P. Bailey, San José	12 00
Second best	C. P. Bailey, San José	5 00
Best under one year	C. P. Bailey, San José	8 00
Second best	C. P. Bailey, San José	4 00

SWINE.

Exhibit.	Exhibitor.	Award.
CLASS I—BERKSHIRE.		
<i>Boars.</i>		
White Lug, best two-year-old	C. W. Reed, San Francisco	\$20 00
Prince of Perkins, second best	G. A. Murphy, Perkins	10 00
Rio Bonita Prince, third best	C. W. Reed, San Francisco	5 00
Perkins Oxford, best one-year-old	Thos. Waite, Perkins	15 00
Prince of Perkins III, second best	G. A. Murphy, Perkins	8 00
Prince of Perkins IV, third best	G. A. Murphy, Perkins	5 00
Lone Pine Champion, best over 6 mos.	Carroll Cook, San Francisco	10 00
Sam W., second best	Thos. Waite, Perkins	5 00
Lone Pine Artful, third best	Carroll Cook, San Francisco	3 00
Semperins, best under six months	C. W. Reed, San Francisco	10 00
Boar, second best	G. A. Murphy, Perkins	5 00
Boar, third best	G. A. Murphy, Perkins	3 00
<i>Sows.</i>		
Perkins Farm Beauty, best two-year-old and over	G. A. Murphy, Perkins	20 00
Belle of Perkins, second best	G. A. Murphy, Perkins	10 00
Brace Girdle, third best	C. W. Reed, San Francisco	5 00
Clairette III, best one-year-old	G. A. Murphy, Perkins	15 00
Queen Mary, second best	C. W. Reed, San Francisco	8 00
Rosa W., third best	Thomas Waite, Perkins	5 00
Sunshine W., best over six months and under one year	Thomas Waite, Perkins	5 00
Rosa W. II, best under six months	Thomas Waite, Perkins	10 00
Betsey W. II, second best	Thomas Waite, Perkins	5 00
Sow, third best	G. A. Murphy, Perkins	3 00
Fashion, best produce of sow	G. A. Murphy, Perkins	20 00
Royal Belle, second best	G. A. Murphy, Perkins	10 00
Sacramento Princess, third best	Thomas Waite, Perkins	5 00
White Lug, best get of sire over one year ..	C. W. Reed, San Francisco	7 50
Best get of sire under one year	G. A. Murphy, Perkins	15 00
Second best	Thomas Waite, Perkins	10 00
Best boar any age	C. W. Reed, San Francisco	G'd Med
Lone Pine Champion, second best	Carroll Cook, San Francisco	Sil. Med
Best sow, any age	G. A. Murphy, Perkins	G'd Med
Second best	G. A. Murphy, Perkins	Sil. Med
CLASS III—POLAND-CHINA.		
<i>Boars.</i>		
Chief Guy, best two-year-old	W. R. McCaslin, Walsh Station	\$20 00
Ohio's Chief, second best	W. R. McCaslin, Walsh Station	10 00
Western Star, third best	P. H. Murphy, Perkins	5 00
Scrapper, best one-year-old	W. R. McCaslin, Walsh Station	15 00
Chief I Know, second best	P. H. Murphy, Perkins	8 00
Blockey, best over six months and under one year	W. R. McCaslin, Walsh Station	10 00
Money Maker, second best	P. H. Murphy, Perkins	5 00
Darkest of All, third best	W. R. McCaslin, Walsh Station	3 00
Best under six months	W. R. McCaslin, Walsh Station	10 00
Second best	W. R. McCaslin, Walsh Station	5 00
Model of 1905, third best	P. H. Murphy, Perkins	3 00
<i>Sows.</i>		
Fredora, best two-year-old	W. R. McCaslin, Walsh Station	20 00
May Fair, second best	W. R. McCaslin, Walsh Station	10 00
Hope of Lynwood, third best	P. H. Murphy, Perkins	5 00
Blackie Queen, best one-year-old	W. R. McCaslin, Walsh Station	15 00
Black Queen, second best	W. R. McCaslin, Walsh Station	8 00
Black Nan, third best	W. R. McCaslin, Walsh Station	5 00
Black Perfection, best over six months and under one year	P. H. Murphy, Perkins	10 00
Beauty's Best, second best	W. R. McCaslin, Walsh Station	5 00
Best of 1905, third best	W. R. McCaslin, Walsh Station	3 00
Best under six months	W. R. McCaslin, Walsh Station	10 00
Second best	W. R. McCaslin, Walsh Station	5 00

FIRST DEPARTMENT—SWINE—*Continued.*

Exhibit.	Exhibitor.	Award.
CLASS III—POLAND CHINA—<i>Continued.</i>		
Black Beauty, third best	P. H. Murphy, Perkins	\$3 00
Lou Netta, best produce of sow	W. R. McCaslin, Walsh Station	20 00
Perfect Lady, second best	P. H. Murphy, Perkins	10 00
Chief Guy, best get of sire over one year	W. R. McCaslin, Walsh Station	7 50
Western Star, best get of sire under one year	P. H. Murphy, Perkins	7 50
Chief Guy, best boar any age	W. R. McCaslin, Walsh Station	G'd Med
Scrapper, second best	W. R. McCaslin, Walsh Station	Sil. Med
Black Queen, best sow of any age	W. R. McCaslin, Walsh Station	G'd Med
Blackie Queen, second best	W. R. McCaslin, Walsh Station	Sil. Med
CLASS V—DUROC JERSEY.		
Best boar over six months and under one year	H. P. Eakle, Jr., Woodland	\$5 00
Best boar under six months	H. P. Eakle, Jr., Woodland	5 00
Best sow under six months	H. P. Eakle, Jr., Woodland	5 00
Best boar, any age	H. P. Eakle, Jr., Woodland	G'd Med
Best sow, any age	H. P. Eakle, Jr., Woodland	G'd Med

POULTRY DEPARTMENT.

Exhibit.	Exhibitor.	Award.
DARK BRAHMA.		
Best breeding pen	T. B. C. Sielcken, Calistoga	\$5 00
Second best	T. B. C. Sielcken, Calistoga	3 50
Third best	T. B. C. Sielcken, Calistoga	1 50
Best cock	T. B. C. Sielcken, Calistoga	1 50
Second best	T. B. C. Sielcken, Calistoga	1 00
Third best	T. B. C. Sielcken, Calistoga	50
Best hen	T. B. C. Sielcken, Calistoga	1 50
Second best	T. B. C. Sielcken, Calistoga	1 00
Third best	T. B. C. Sielcken, Calistoga	50
LIGHT BRAHMA.		
Best breeding pen	John Russell, East Oakland	5 00
Second best	John Russell, East Oakland	3 50
Third best	T. B. C. Sielcken, Calistoga	1 50
Best cock	John Russell, East Oakland	1 50
Second best	John Russell, East Oakland	1 00
Third best	T. B. C. Sielcken, Calistoga	50
Best hen	F. E. Mason, Alameda	1 50
Second best	F. E. Mason, Alameda	1 00
Third best	John Russell, East Oakland	50
Best cockerel	John Russell, East Oakland	1 50
Second best	John Russell, East Oakland	1 00
Third best	John Russell, East Oakland	50
Best pullet	John Russell, East Oakland	1 50
Second best	John Russell, East Oakland	1 00
Third best	John Russell, East Oakland	50
BUFF COCHIN.		
Best breeding pen	Santa Teresa Farm, Eden Vale	5 00
Best cock	T. B. C. Sielcken, Calistoga	1 50
Second best	T. B. C. Sielcken, Calistoga	1 00
Best hen	T. B. C. Sielcken, Calistoga	1 50
Second best	T. B. C. Sielcken, Calistoga	1 00
Third best	T. B. C. Sielcken, Calistoga	50
Best cockerel	Santa Teresa Farm, Eden Vale	1 50
Second best	Santa Teresa Farm, Eden Vale	1 00
Third best	Horace V. Carter, Fruitvale	50
Best pullet	Horace V. Carter, Fruitvale	1 50
Second best	Horace V. Carter, Fruitvale	1 00

POULTRY DEPARTMENT—Continued.

Exhibit.	Exhibitor.	Award.
PARTRIDGE COCHIN.		
Best cock.....	T. B. C. Sielcken, Calistoga.....	\$1 50
WHITE COCHIN.		
Best cock.....	T. B. C. Sielcken, Calistoga.....	1 50
Best hen.....	T. B. C. Sielcken, Calistoga.....	1 50
Second best.....	T. B. C. Sielcken, Calistoga.....	1 00
BLACK COCHIN.		
Best hen.....	T. B. C. Sielcken, Calistoga.....	1 50
Second best.....	T. B. C. Sielcken, Calistoga.....	1 00
Third best.....	T. B. C. Sielcken, Calistoga.....	50
Third best pullet.....	T. B. C. Sielcken, Calistoga.....	50
WHITE LANGSHAN.		
Best cock.....	T. B. C. Sielcken, Calistoga.....	1 50
Best hen.....	T. B. C. Sielcken, Calistoga.....	1 50
Second best.....	T. B. C. Sielcken, Calistoga.....	1 00
BARRED PLYMOUTH ROCK.		
Best breeding pen.....	Mrs. Florence Bemis, E. Oakland.....	5 00
Second best.....	Mrs. Florence Bemis, E. Oakland.....	3 50
Third best.....	H. C. Blake, Vacaville.....	1 50
Best cock.....	Mrs. Florence Bemis, E. Oakland.....	1 50
Second best.....	Mrs. Florence Bemis, E. Oakland.....	1 00
Third best.....	Mrs. Florence Bemis, E. Oakland.....	50
Best hen.....	W. F. Uhl, Sacramento.....	1 50
Second best.....	W. F. Uhl, Sacramento.....	1 00
Third best.....	W. F. Uhl, Sacramento.....	50
Best cockerel.....	Mrs. Florence Bemis, E. Oakland.....	1 50
Second best.....	Mrs. Florence Bemis, E. Oakland.....	1 00
Third best.....	Mrs. Florence Bemis, E. Oakland.....	50
Best pullet.....	W. F. Uhl, Sacramento.....	1 50
Second best.....	H. C. Blake, Vacaville.....	1 00
Third best.....	W. F. Uhl, Sacramento.....	50
WHITE PLYMOUTH ROCK.		
Best breeding pen.....	S. A. Hendren, Sacramento.....	5 00
Second best.....	S. A. Hendren, Sacramento.....	3 50
Third best.....	S. A. Hendren, Sacramento.....	1 50
Best cock.....	S. A. Hendren, Sacramento.....	1 50
Second best.....	G. S. Hinkle, Sacramento.....	1 00
Third best.....	G. S. Hinkle, Sacramento.....	50
Best hen.....	S. A. Hendren, Sacramento.....	1 50
Second best.....	S. A. Hendren, Sacramento.....	1 00
Third best.....	S. A. Hendren, Sacramento.....	50
Best cockerel.....	G. S. Hinkle, Sacramento.....	1 50
Second best.....	G. S. Hinkle, Sacramento.....	1 00
Third best.....	G. S. Hinkle, Sacramento.....	50
Best pullet.....	S. A. Hendren, Sacramento.....	1 50
Second best.....	H. C. Blake, Vacaville.....	1 00
Third best.....	S. A. Hendren, Sacramento.....	50
BUFF PLYMOUTH ROCK.		
Best breeding pen.....	E. F. Gauger, Calistoga.....	5 00
Second best.....	E. F. Gauger, Calistoga.....	3 50
Best cock.....	E. F. Gauger, Calistoga.....	1 50
Second best.....	T. B. C. Sielcken, Calistoga.....	1 00
Best hen.....	E. F. Gauger, Calistoga.....	1 50
Second best.....	T. B. C. Sielcken, Calistoga.....	1 00
Third best.....	T. B. C. Sielcken, Calistoga.....	50
Best cockerel.....	E. F. Gauger, Calistoga.....	1 50
Second best.....	E. F. Gauger, Calistoga.....	1 00
Best pullet.....	E. F. Gauger, Calistoga.....	1 50
Second best.....	E. F. Gauger, Calistoga.....	1 00
Third best.....	E. F. Gauger, Calistoga.....	50

POULTRY DEPARTMENT—Continued.

Exhibit.	Exhibitor.	Award.
SILVER WYANDOTTE.		
Best breeding pen	Mrs. J. C. Stevenson, San José	\$5 00
Best cock	Mrs. J. C. Stevenson, San José	1 50
Second best	T. B. C. Sielcken, Calistoga	1 00
Best hen	T. B. C. Sielcken, Calistoga	1 50
Second best	Mrs. J. C. Stevenson, San José	1 00
Third best	Mrs. J. C. Stevenson, San José	50
Best cockerel	Mrs. J. C. Stevenson, San José	1 50
Second best	Mrs. J. C. Stevenson, San José	1 00
Best pullet	Mrs. J. C. Stevenson, San José	1 50
Second best	Mrs. J. C. Stevenson, San José	1 00
Third best	Mrs. J. C. Stevenson, San José	50
GOLDEN WYANDOTTE.		
Best cock	T. B. C. Sielcken, Calistoga	1 50
Best hen	T. B. C. Sielcken, Calistoga	1 50
Second best	T. B. C. Sielcken, Calistoga	1 00
Third best	T. B. C. Sielcken, Calistoga	50
WHITE WYANDOTTE.		
Best breeding pen	Santa Teresa Farm, Eden Vale	5 00
Second best	W. S. Childs, Fruitvale	3 50
Third best	T. B. C. Sielcken, Calistoga	1 50
Best cock	W. S. Childs, Fruitvale	1 50
Second best	Santa Teresa Farm, Eden Vale	1 00
Third best	T. B. C. Sielcken, Calistoga	50
Best hen	Santa Teresa Farm, Eden Vale	1 50
Second best	Santa Teresa Farm, Eden Vale	1 00
Third best	W. S. Childs, Fruitvale	50
Best cockerel	W. S. Childs, Fruitvale	1 50
Second best	W. S. Childs, Fruitvale	1 00
Best pullet	W. S. Childs, Fruitvale	1 50
Second best	W. S. Childs, Fruitvale	1 00
Third best	Santa Teresa Farm, Eden Vale	50
BUFF WYANDOTTE.		
Best breeding pen	Phil Robinson, Benicia	5 00
Second best	Phil Robinson, Benicia	3 50
Best cock	Phil Robinson, Benicia	1 50
Second best	Phil Robinson, Benicia	1 00
Best hen	Phil Robinson, Benicia	1 50
Second best	Phil Robinson, Benicia	1 00
Third best	Phil Robinson, Benicia	50
Best cockerel	Phil Robinson, Benicia	1 50
Best pullet	Phil Robinson, Benicia	1 50
Second best	Phil Robinson, Benicia	1 00
Third best	Phil Robinson, Benicia	50
PARTRIDGE WYANDOTTE.		
Best breeding pen	T. B. C. Sielcken, Calistoga	5 00
Best cock	T. B. C. Sielcken, Calistoga	1 50
Best hen	T. B. C. Sielcken, Calistoga	1 50
Second best	T. B. C. Sielcken, Calistoga	1 00
Third best	T. B. C. Sielcken, Calistoga	50
Third best pullet	T. B. C. Sielcken, Calistoga	50
BLACK WYANDOTTE.		
Best cock	E. F. Gauger, Calistoga	1 50
Best hen	E. F. Gauger, Calistoga	1 50
Third best pullet	E. F. Gauger, Calistoga	50
BLACK JAVA.		
Best cock	T. B. C. Sielcken, Calistoga	1 50
Best hen	T. B. C. Sielcken, Calistoga	1 50
Second best	T. B. C. Sielcken, Calistoga	1 00
Third best	T. B. C. Sielcken, Calistoga	50
Best pullet	E. F. Gauger, Calistoga	1 50

POULTRY DEPARTMENT—Continued.

Exhibit.	Exhibitor.	Award.
S. C. BROWN LEGHORN.		
Best breeding pen	Williams Bros., Fruitvale	\$5 00
Second best	J. G. Costa, Concord	3 50
Best cock	Williams Bros., Fruitvale	1 50
Best hen	Williams Bros., Fruitvale	1 50
Second best	Williams Bros., Fruitvale	1 00
Best cockerel	J. G. Costa, Concord	1 50
S. C. WHITE LEGHORN.		
Best breeding pen	C. B. Carrington, Hayward	5 00
Second best	C. B. Carrington, Hayward	3 50
Third best	H. F. Bidwell, Sacramento	1 50
Best cock	C. B. Carrington, Hayward	1 50
Second best	C. B. Carrington, Hayward	1 00
Third best	C. B. Carrington, Hayward	50
Best hen	H. F. Bidwell, Sacramento	1 50
Second best	H. F. Bidwell, Sacramento	1 00
Third best	C. B. Carrington, Hayward	50
Best cockerel	C. B. Carrington, Hayward	1 50
Second best	C. B. Carrington, Hayward	1 00
Third best	C. B. Carrington, Hayward	50
Best pullet	H. F. Bidwell, Sacramento	1 50
Second best	H. F. Bidwell, Sacramento	1 00
Third best	H. F. Bidwell, Sacramento	50
BUFF LEGHORN.		
Best breeding pen	B. D. Naylor, Hayward	5 00
Best cock	B. D. Naylor, Hayward	1 50
Best hen	B. D. Naylor, Hayward	1 50
Second best	B. D. Naylor, Hayward	1 00
Third best	B. D. Naylor, Hayward	50
Best cockerel	B. D. Naylor, Hayward	1 50
Second best	B. D. Naylor, Hayward	1 00
Third best	B. D. Naylor, Hayward	50
Best pullet	B. D. Naylor, Hayward	1 50
Second best	B. D. Naylor, Hayward	1 00
Third best	B. D. Naylor, Hayward	50
R. C. BROWN LEGHORN.		
Best breeding pen	T. B. C. Sielcken, Calistoga	5 00
Best cock	T. B. C. Sielcken, Calistoga	1 50
Best hen	T. B. C. Sielcken, Calistoga	1 50
Second best	T. B. C. Sielcken, Calistoga	1 00
Third best	T. B. C. Sielcken, Calistoga	50
Best cockerel	T. B. C. Sielcken, Calistoga	1 50
Second best	T. B. C. Sielcken, Calistoga	1 00
Third best	T. B. C. Sielcken, Calistoga	50
Best pullet	T. B. C. Sielcken, Calistoga	1 50
Second best	T. B. C. Sielcken, Calistoga	1 00
Third best	T. B. C. Sielcken, Calistoga	50
R. C. WHITE LEGHORN.		
Best breeding pen	T. B. C. Sielcken, Calistoga	5 00
Best hen	T. B. C. Sielcken, Calistoga	1 50
Second best	T. B. C. Sielcken, Calistoga	1 00
Second best cockerel	T. B. C. Sielcken, Calistoga	1 00
Third best	T. B. C. Sielcken, Calistoga	50
Best pullet	T. B. C. Sielcken, Calistoga	1 50
Second best	T. B. C. Sielcken, Calistoga	1 00
Third best	T. B. C. Sielcken, Calistoga	50
BLACK MINORCA.		
Best breeding pen	W. S. Childs, Fruitvale	5 00
Second best	Santa Teresa Farm, Eden Vale	3 50
Third best	W. S. Childs, Fruitvale	1 50
Second best cock	T. B. C. Sielcken, Calistoga	1 00
Third best	Santa Teresa Farm, Eden Vale	50
Best hen	W. S. Childs, Fruitvale	1 50
Second best	W. S. Childs, Fruitvale	1 00
Third best	W. S. Childs, Fruitvale	50

POULTRY DEPARTMENT—*Continued.*

Exhibit.	Exhibitor.	Award.
BLACK MINORCA—Continued.		
Best cockerel.....	W. S. Childs, Fruitvale.....	\$1 50
Second best.....	W. S. Childs, Fruitvale.....	1 00
Third best.....	J. G. Costa, Concord.....	50
Best pullet.....	W. S. Childs, Fruitvale.....	1 50
Second best.....	W. S. Childs, Fruitvale.....	1 00
Third best.....	W. S. Childs, Fruitvale.....	50
WHITE MINORCA.		
Best breeding pen.....	T. B. C. Sielcken, Calistoga.....	5 00
Second best.....	S. A. Hendren, Sacramento.....	3 50
Third best.....	T. B. C. Sielcken, Calistoga.....	1 50
Best cock.....	T. B. C. Sielcken, Calistoga.....	1 50
Best hen.....	S. A. Hendren, Sacramento.....	1 50
Second best.....	T. B. C. Sielcken, Calistoga.....	1 00
Third best.....	T. B. C. Sielcken, Calistoga.....	50
Best pullet.....	S. A. Hendren, Sacramento.....	1 50
Second best.....	S. A. Hendren, Sacramento.....	1 00
Third best.....	S. A. Hendren, Sacramento.....	50
BLACK SPANISH.		
Best breeding pen.....	T. B. C. Sielcken, Calistoga.....	5 00
Best cock (third).....	T. B. C. Sielcken, Calistoga.....	50
Best hen.....	T. B. C. Sielcken, Calistoga.....	1 50
Second best.....	T. B. C. Sielcken, Calistoga.....	1 00
Third best.....	T. B. C. Sielcken, Calistoga.....	50
POLISH.		
Best hen.....	C. T. Burch, Sacramento.....	1 50
SILVER-SPANGLED HAMBURG.		
Best breeding pen.....	C. T. Burch, Sacramento.....	5 00
Best hen.....	C. T. Burch, Sacramento.....	1 50
Second best.....	C. T. Burch, Sacramento.....	1 00
Best cockerel.....	C. T. Burch, Sacramento.....	1 50
Second best.....	C. T. Burch, Sacramento.....	1 00
Third best.....	C. T. Burch, Sacramento.....	50
Best pullet.....	C. T. Burch, Sacramento.....	1 50
Second best.....	C. T. Burch, Sacramento.....	1 00
Third best.....	C. T. Burch, Sacramento.....	50
RED PYLE GAME.		
Best hen.....	T. B. C. Sielcken, Calistoga.....	1 50
BLACK-BREASTED GAME BANTAM.		
Best cock.....	C. T. Burch, Sacramento.....	1 50
Best hen.....	C. T. Burch, Sacramento.....	1 50
Second best.....	C. T. Burch, Sacramento.....	1 00
Best pullet.....	C. T. Burch, Sacramento.....	1 50
Second best.....	C. T. Burch, Sacramento.....	1 00
Third best.....	C. T. Burch, Sacramento.....	50
SILVER DUCKWING GAME BANTAM.		
Best breeding pen.....	C. T. Burch, Sacramento.....	5 00
Best hen.....	C. T. Burch, Sacramento.....	1 50
Second best.....	C. T. Burch, Sacramento.....	1 00
Third best.....	C. T. Burch, Sacramento.....	50
Best cockerel.....	C. T. Burch, Sacramento.....	1 50
Second best.....	C. T. Burch, Sacramento.....	1 00
Best pullet.....	C. T. Burch, Sacramento.....	1 50
Second best.....	C. T. Burch, Sacramento.....	1 00
Third best.....	C. T. Burch, Sacramento.....	50
CORNISH INDIAN GAME.		
Best breeding pen.....	Percy Ward & Sons, Fruitvale.....	5 00
Best cock.....	Percy Ward & Sons, Fruitvale.....	1 50
Best hen.....	Percy Ward & Sons, Fruitvale.....	1 50
Second best.....	Percy Ward & Sons, Fruitvale.....	1 00
Third best.....	Percy Ward & Sons, Fruitvale.....	50
Best cockerel.....	Percy Ward & Sons, Fruitvale.....	1 50
Second best.....	Percy Ward & Sons, Fruitvale.....	1 00
Third best.....	Percy Ward & Sons, Fruitvale.....	50

POULTRY DEPARTMENT—Continued.

Exhibit.	Exhibitor.	Award.
WHITE COCHIN BANTAM.		
Best breeding pen	Santa Teresa Farm, Eden Vale	\$5 00
Second best	George B. Nugent, San José	3 50
Third best	George B. Nugent, San José	1 50
Best cock	George B. Nugent, San José	1 50
Second best	George B. Nugent, San José	1 00
Third best	George B. Nugent, San José	50
Best hen	George B. Nugent, San José	1 50
Second best	George B. Nugent, San José	1 00
Third best	Santa Teresa Farm, Eden Vale	50
Best cockerel	Santa Teresa Farm, Eden Vale	1 50
Second best	C. T. Burch, Sacramento	1 00
Third best	George B. Nugent, San José	50
Best pullet	George B. Nugent, San José	1 50
Second best	C. T. Burch, Sacramento	1 00
Third best	George B. Nugent, San José	50
BLACK COCHIN BANTAM.		
Best breeding pen	George B. Nugent, San José	5 00
Best cock	George B. Nugent, San José	1 50
Second best	George B. Nugent, San José	1 00
Third best	C. T. Burch, Sacramento	50
Best hen	George B. Nugent, San José	1 50
Second best	George B. Nugent, San José	1 00
Third best	George B. Nugent, San José	50
Best pullet	George B. Nugent, San José	1 50
Second best	George B. Nugent, San José	1 00
Third best	George B. Nugent, San José	50
CUCKOO COCHIN.		
Best hen	George B. Nugent, San José	1 50
GOLDEN SEBRIGHT BANTAM.		
Best breeding pen	C. T. Burch, Sacramento	5 00
Second best	George B. Nugent, San José	3 50
Best cock	F. E. Mason, Alameda	1 50
Second best	F. E. Mason, Alameda	1 00
Third best	T. B. C. Sielcken, Calistoga	50
Best hen	F. E. Mason, Alameda	1 50
Second best	F. E. Mason, Alameda	1 00
Third best	T. B. C. Sielcken, Calistoga	50
Best cockerel	C. T. Burch, Sacramento	1 50
Second best	F. E. Mason, Alameda	1 00
Best pullet	C. S. Burch, Sacramento	1 50
SILVER SEBRIGHT BANTAM.		
Best cock	C. T. Burch, Sacramento	1 50
Best hen	C. T. Burch, Sacramento	1 50
Second best	C. T. Burch, Sacramento	1 00
Third best	C. T. Burch, Sacramento	50
Best cockerel	F. E. Mason, Alameda	1 50
Second best	F. E. Mason, Alameda	1 00
Best pullet	F. E. Mason, Alameda	1 50
Second best	F. E. Mason, Alameda	1 00
ROSE COMB WHITE BANTAM.		
Best hen	T. B. C. Sielcken, Calistoga	1 50
ROSE COMB BLACK BANTAM.		
Best hen	T. B. C. Sielcken, Calistoga	1 50
Second best	T. B. C. Sielcken, Calistoga	1 00
LIGHT BRAHMA BANTAM.		
Best breeding pen	C. T. Burch, Sacramento	5 00
Second best	C. T. Burch, Sacramento	3 50
Best cock	T. B. C. Sielcken, Calistoga	1 50
Second best	T. B. C. Sielcken, Calistoga	1 00
Best hen	C. T. Burch, Sacramento	1 50
Second best	T. B. C. Sielcken, Calistoga	1 00
Third best	T. B. C. Sielcken, Calistoga	50

POULTRY DEPARTMENT—Continued.

Exhibit.	Exhibitor.	Award.
LIGHT BRAHMA BANTAM—Continued.		
Best cockerel.....	C. T. Burch, Sacramento.....	\$1 50
Second best.....	C. T. Burch, Sacramento.....	1 00
Best pullet.....	C. T. Burch, Sacramento.....	1 50
Second best.....	C. T. Burch, Sacramento.....	1 00
Third best.....	C. T. Burch, Sacramento.....	50
DARK BRAHMA BANTAM.		
Best hen.....	T. B. C. Sielcken, Calistoga.....	1 50
Second best.....	T. B. C. Sielcken, Calistoga.....	1 00
PARTRIDGE COCHIN BANTAM.		
Best breeding pen.....	C. T. Burch, Sacramento.....	5 00
Best cock.....	T. B. C. Sielcken, Calistoga.....	1 50
Best hen.....	T. B. C. Sielcken, Calistoga.....	1 50
Second best.....	T. B. C. Sielcken, Calistoga.....	1 00
Third best.....	C. T. Burch, Sacramento.....	50
Best cockerel.....	C. T. Burch, Sacramento.....	1 50
Best pullet.....	C. T. Burch, Sacramento.....	1 50
BLACK-TAILED JAPANESE BANTAM.		
Best cock.....	C. T. Burch, Sacramento.....	1 50
Second best.....	T. B. C. Sielcken, Calistoga.....	1 00
Best hen.....	C. T. Burch, Sacramento.....	1 50
WHITE-CRESTED POLISH BANTAM.		
Best cock.....	T. B. C. Sielcken, Calistoga.....	1 50
Best hen.....	T. B. C. Sielcken, Calistoga.....	1 50
Second best.....	T. B. C. Sielcken, Calistoga.....	1 00
BARRED PLYMOUTH ROCK BANTAM.		
Second best cock.....	T. B. C. Sielcken, Calistoga.....	1 00
Second best hen.....	T. B. C. Sielcken, Calistoga.....	1 00
Third best.....	T. B. C. Sielcken, Calistoga.....	50
DOMINIQUE BANTAM.		
Best cock.....	T. B. C. Sielcken, Calistoga.....	1 50
Best hen.....	T. B. C. Sielcken, Calistoga.....	1 50
Second best.....	T. B. C. Sielcken, Calistoga.....	1 00
Third best.....	T. B. C. Sielcken, Calistoga.....	50
CORNISH INDIAN BANTAM.		
Best cock.....	T. B. C. Sielcken, Calistoga.....	1 50
Best hen.....	T. B. C. Sielcken, Calistoga.....	1 50
Second best.....	T. B. C. Sielcken, Calistoga.....	1 00
MUFFED OLD ENGLISH GAME BANTAM.		
Best hen.....	T. B. C. Sielcken, Calistoga.....	1 50
Second best.....	T. B. C. Sielcken, Calistoga.....	1 00
LAKENVELDERS.		
Best cockerel.....	S. A. Hendren, Sacramento.....	1 50
Best pullet.....	S. A. Hendren, Sacramento.....	1 50
SINGLE COMB R. I. RED.		
Best breeding pen.....	J. D. Canney, San José.....	5 00
Second best.....	J. D. Canney, San José.....	3 50
Third best.....	J. D. Canney, San José.....	1 50
Best cock.....	W. E. Ward, San José.....	1 50
Second best.....	J. D. Canney, San José.....	1 00
Best hen.....	W. E. Ward, San José.....	1 50
Second best.....	J. D. Canney, San José.....	1 00
Third best.....	J. D. Canney, San José.....	50
Best cockerel.....	J. D. Canney, San José.....	1 50
Second best.....	J. D. Canney, San José.....	1 00
Third best.....	J. D. Canney, San José.....	50
Best pullet.....	J. D. Canney, San José.....	1 50
Second best.....	J. D. Canney, San José.....	1 00
Third best.....	J. D. Canney, San José.....	50

POULTRY DEPARTMENT—Continued.

Exhibit.	Exhibitor.	Award.
SILKY.		
Best cock.....	C. T. Burch, Sacramento.....	\$1 50
Second best.....	C. T. Burch, Sacramento.....	1 00
Best hen.....	C. T. Burch, Sacramento.....	1 50
Second best.....	C. T. Burch, Sacramento.....	1 00
Best pullet.....	C. T. Burch, Sacramento.....	1 50
BUFF ORPINGTON.		
Best breeding pen.....	W. S. Sullivan, Agnews.....	5 00
Second best.....	W. S. Sullivan, Agnews.....	3 50
Third best.....	W. S. Sullivan, Agnews.....	1 50
Best cock.....	W. S. Sullivan, Agnews.....	1 50
Second best.....	W. S. Sullivan, Agnews.....	1 00
Third best.....	W. S. Sullivan, Agnews.....	50
Best hen.....	W. S. Sullivan, Agnews.....	1 50
Second best.....	W. S. Sullivan, Agnews.....	1 00
Third best.....	T. B. C. Sielcken, Calistoga.....	50
Best cockerel.....	G. W. Millar, Willows.....	1 50
Second best.....	G. W. Millar, Willows.....	1 00
Third best.....	W. S. Sullivan, Agnews.....	50
Best pullet.....	W. S. Sullivan, Agnews.....	1 50
Second best.....	G. W. Millar, Willows.....	1 00
Third best.....	W. S. Sullivan, Agnews.....	50
WHITE ORPINGTON.		
Best cockerel.....	G. W. Millar, Willows.....	1 50
Second best.....	G. W. Millar, Willows.....	1 00
Best pullet.....	G. W. Millar, Willows.....	1 50
Second best.....	G. W. Millar, Willows.....	1 00
Third best.....	G. W. Millar, Willows.....	50
BRONZE TURKEYS.		
Best male.....	T. B. C. Sielcken, Calistoga.....	4 00
Second best.....	T. B. C. Sielcken, Calistoga.....	2 50
Third best.....	T. B. C. Sielcken, Calistoga.....	1 00
Best hen.....	T. B. C. Sielcken, Calistoga.....	4 00
Second best.....	T. B. C. Sielcken, Calistoga.....	2 50
Third best.....	T. B. C. Sielcken, Calistoga.....	1 00
WHITE HOLLAND TURKEYS.		
Best male.....	T. B. C. Sielcken, Calistoga.....	4 00
Second best.....	T. B. C. Sielcken, Calistoga.....	2 50
Best hen.....	T. B. C. Sielcken, Calistoga.....	4 00
Second best.....	T. B. C. Sielcken, Calistoga.....	2 50
Third best.....	T. B. C. Sielcken, Calistoga.....	1 00
PEKIN DUCKS.		
Best pair.....	J. G. Costa, Concord.....	4 00
Second best.....	T. B. C. Sielcken, Calistoga.....	2 00
Best pair under six months.....	J. G. Costa, Concord.....	2 00
Second best.....	J. G. Costa, Concord.....	1 00
Third best.....	J. G. Costa, Concord.....	50
ROUEN DUCKS.		
Best pair.....	T. B. C. Sielcken, Calistoga.....	4 00
Best pair under six months.....	T. B. C. Sielcken, Calistoga.....	2 00
Second best.....	T. B. C. Sielcken, Calistoga.....	1 00
Third best.....	T. B. C. Sielcken, Calistoga.....	50
CAYUGA DUCKS.		
Best pair.....	T. B. C. Sielcken, Calistoga.....	4 00
INDIAN RUNNER DUCKS.		
Best pair.....	M. E. Plaw, Fruitvale.....	4 00
Second best.....	B. A. R. Stocker, Fruitvale.....	2 00
Best pair under six months.....	B. A. R. Stocker, Fruitvale.....	2 00
Second best.....	B. A. R. Stocker, Fruitvale.....	1 00
WHITE MUSCOVY DUCKS.		
Best pair old.....	T. B. C. Sielcken, Calistoga.....	4 00

POULTRY DEPARTMENT—*Continued.*

Exhibit.	Exhibitor.	Award.
COLORED MUSCOVY DUCKS.		
Best pair old	W. S. Childs, Fruitvale	\$4 00
Best pair under six months	W. S. Childs, Fruitvale	2 00
BUFF ORPINGTON DUCKS.		
Best pair	M. E. Plaw, Fruitvale	3 00
TOULOUSE GEESSE.		
Best pair	T. B. C. Sielcken, Calistoga	4 00
Second best	T. B. C. Sielcken, Calistoga	2 00
Third best	T. B. C. Sielcken, Calistoga	1 00
EMBDEN GEESSE.		
Best pair	T. B. C. Sielcken, Calistoga	4 00
Second best	T. B. C. Sielcken, Calistoga	2 00
Third best	T. B. C. Sielcken, Calistoga	1 00
PEA FOWL.		
Pea fowl	T. B. C. Sielcken, Calistoga	---
PEARL GUINEA.		
Best pair	T. B. C. Sielcken, Calistoga	2 00
Second best	T. B. C. Sielcken, Calistoga	1 00

PIGEONS.

BLUE ENGLISH RUNTS.		
Best pair	George B. Nugent, San José	\$1 50
SILVER ENGLISH RUNTS.		
Best pair	George B. Nugent, San José	1 50
Second best	George B. Nugent, San José	1 00
WHITE DUCHESS.		
Best pair	George B. Nugent, San José	1 50
Second best	George B. Nugent, San José	1 00
Third best	George B. Nugent, San José	50
CHECQUER HOMING.		
Best pair	George B. Nugent, San José	1 50
Second best	George B. Nugent, San José	1 00
BLACK PIED HUNGARIAN.		
Best pair	Percy Ward & Sons, Fruitvale	1 50
Second best	Percy Ward & Sons, Fruitvale	1 00
SILVER HOMING.		
Best pair	George B. Nugent, San José	1 50
BLUE HOMING.		
Best pair	George B. Nugent, San José	1 50
BLACK MALTESE.		
Best pair	George B. Nugent, San José	1 50
BLACK HOMING.		
Best pair	George B. Nugent, San José	1 50

POULTRY SWEEPSTAKES AND SPECIALS.

Exhibit.	Exhibitor.	Award.
Best display of single variety	Phil Robinson	\$12 00
	W. S. Childs	3 00
	T. B. C. Sielcken	3 00
	Mrs. Florence Bemis	3 00
American class	T. B. C. Sielcken	12 00
	E. F. Gauger	6 00
	Phil Robinson	3 00
Asiatic class	T. B. C. Sielcken	12 00
	John Russell	6 00
	Santa Teresa Poultry Farm	3 00
Mediterranean class	T. B. C. Sielcken	12 00
	W. S. Childs	4 50
	B. D. Naylor	4 50
Bantam class	C. T. Burch	12 00
	T. B. C. Sielcken	6 00
	George B. Nugent	3 00
Games and Oriental Games	Percy Ward & Sons	12 00
Ducks	T. B. C. Sielcken	12 00
	Miss B. A. R. Stocker	6 00
	J. G. Costa	3 00
Largest and best exhibit	T. B. C. Sielcken	20 00
	C. T. Burch	10 00
POULTRY SUPPLIES.		
Best display of poultry supplies	F. F. Smith, Sacramento	G'd Med
Best display of brooders	F. F. Smith, Sacramento	\$10 00
Best display of poultry fixtures	F. F. Smith, Sacramento	5 00
Best display of incubators and brooders	F. F. Smith, Sacramento	10 00
Incubator hatching greatest number of chicks	John Deere Plow Co., Sacramento	5 00
Poultry supplies (second)	Thomson-Diggs Co., Sacramento	Sil. Med

SPECIAL.

Best industrial, artistic or of economic significance or value	A. S. Hopkins Co., Sacramento	G'd Med
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SECOND DEPARTMENT.

MACHINERY, IMPLEMENTS, ETC.

Exhibit.	Exhibitor.	Award.
CLASS I.		
Best vapor or gas engine	John Deere Plow Co., Sacramento	Sil. Med
Best display pump for orchards	Bean Spray Pump Co., San José	\$20 00
Best apparatus for raising water for mining purposes	G. W. Price Co.	\$20 00
Best apparatus for raising water for irrigating purposes	Sampson Iron Works	20 00
Best well pump (in operation at Park)	Sacramento Well Drilling Co.	Spec. Dip
CLASS II.		
Best cider mill and press	John Deere Plow Co., Sacramento	Diploma
Gopher trap	A. S. Hopkins Co., Sacramento	Diploma
Vegetable cutter	A. S. Hopkins Co., Sacramento	Diploma
Lawn sprinkler	A. S. Hopkins Co., Sacramento	Diploma
Best potato digger	John Deere Plow Co., Sacramento	Diploma
Best dish harrow	John Deere Plow Co., Sacramento	\$2 50
Best cultivator	John Deere Plow Co., Sacramento	2 50
Best double shovel plow	John Deere Plow Co., Sacramento	Diploma

SECOND DEPARTMENT—MACHINERY, IMPLEMENTS, ETC.—*Continued.*

Exhibit.	Exhibitor.	Award.
CLASS IV.		
Best farm gate.....	Cal. Anchor Fence Co., Stockton..	Sil. Med
Best wire park or paddock fence.....	Cal. Anchor Fence Co., Stockton..	Diploma
Best wire stock fence.....	Cal. Anchor Fence Co., Stockton..	Diploma
Best farm gate.....	Cal. Anchor Fence Co., Stockton..	Diploma
Best steel fence post.....	Cal. Anchor Fence Co., Stockton..	Diploma
Best ornamental fence.....	Cal. Anchor Fence Co., Stockton..	Diploma
Best agricultural boiler.....	Thomson-Diggs Co., Sacramento..	Diploma
Best grain-cleaner.....	Thomson-Diggs Co., Sacramento..	\$5 00
CLASS V.		
Best washing machine.....	A. S. Hopkins Co., Sacramento..	Diploma
Best clothes-wringer.....	A. S. Hopkins Co., Sacramento..	Diploma
Best mangle or ironing machine.....	A. S. Hopkins Co., Sacramento..	Diploma
Best clothes horse to occupy least space.....	A. S. Hopkins Co., Sacramento..	Diploma
Best egg carrier.....	A. S. Hopkins Co., Sacramento..	Sil. Med
CLASS VI.		
Best gang plow.....	John Deere Plow Co., Sacramento..	\$2 50
Best sulky plow.....	John Deere Plow Co., Sacramento..	2 50
Best road plow.....	John Deere Plow Co., Sacramento..	2 50
Best sod plow.....	John Deere Plow Co., Sacramento..	2 50
Best two or three horse plow.....	John Deere Plow Co., Sacramento..	2 50
Best side hill plow.....	John Deere Plow Co., Sacramento..	2 50
Best ditching plow.....	John Deere Plow Co., Sacramento..	2 50
Best vineyard plow.....	John Deere Plow Co., Sacramento..	2 50
CLASS VII.		
Best top buggy.....	A. Meister & Sons Co., Sac'to.....	10 00
Best two-seat open wagon.....	A. Meister & Sons Co., Sac'to.....	5 00
Best pleasure cart.....	A. Meister & Sons Co., Sac'to.....	10 00
Best ladies' phaeton or fancy trap.....	A. Meister & Sons Co., Sac'to.....	10 00
Best business wagon.....	A. Meister & Sons Co., Sac'to.....	10 00
Best track sulky.....	O'Brien & Sons, San Francisco..	Sil. Med
Best open buggy.....	O'Brien & Sons, San Francisco..	\$10 00
Best single-seat trotting wagon.....	O'Brien & Sons, San Francisco..	5 00
Best training cart.....	O'Brien & Sons, San Francisco..	Diploma
Best closed family carriage.....	Studebaker Bros., Sacramento..	Sil. Med
Best open family carriage.....	Studebaker Bros., Sacramento..	Sil. Med
CLASS VIII.		
Best power spraying machine.....	Bean Spray Pump Co., San José..	Sil. Med
Display of spray pumps and accessories.....	Bean Spray Pump Co., San José..	Diploma
Irrigating plant to provide water for ranches.....	Sacramento Well-Drilling Co.....	Spec. Dip

THIRD DEPARTMENT.

TEXTILE FABRICS.

Exhibit.	Exhibitor.	Award.
CLASS I—CLOTHING AND KINDRED TEXTURES.		
Best exhibit of carpets and rugs.....	C. M. Campbell, Sacramento.....	\$7 50
Best Turkish rugs.....	C. M. Campbell, Sacramento.....	2 50
CLASS II—NEEDLE AND FANCY WORK AND DECORATIVE PAINTING.		
Best embroidered handkerchief case.....	Mrs. E. Clark, Grass Valley.....	1 00
Best embroidered bedspread.....	Mrs. E. Clark, Grass Valley.....	3 00
Best white cotton embroidery on linen.....	Mrs. E. Clark, Grass Valley.....	5 00
Best display of embroidered picture frames.....	Mrs. E. Clark, Grass Valley.....	5 00

THIRD DEPARTMENT—TEXTILE FABRICS—*Continued.*

Exhibit.	Exhibitor.	Award.
CLASS II—NEEDLE AND FANCY WORK AND DECORATIVE PAINTING—<i>Continued.</i>		
Best delft blue center embroidery.....	Mrs. E. Clark, Grass Valley.....	\$1 50
Best tapestry painting.....	Mrs. J. A. Green, Sacramento.....	10 00
Best tabouret burnt wood etching.....	Mrs. J. A. Green, Sacramento.....	3 00
Best music rack, burnt wood etching.....	Mrs. J. A. Green, Sacramento.....	1 50
Best panel, burnt wood etching.....	Mrs. J. A. Green, Sacramento.....	1 50
Best display of pyrography or burnt wood etching.....	Mrs. J. A. Green, Sacramento.....	10 00
Best single piece of burnt leather work.....	Mrs. J. A. Green, Sacramento.....	3 00
Best display of ladies' underwear.....	Miss E. Walker, Grass Valley.....	10 00
Best embroidered ottoman cover.....	Miss E. Walker, Grass Valley.....	2 00
Best embroidered tea cloth.....	Miss E. Walker, Grass Valley.....	3 00
Best embroidered tray cloth.....	Miss E. Walker, Grass Valley.....	3 00
Largest and finest display of silk embroidery on linen.....	Miss E. Walker, Grass Valley.....	10 00
Best embroidered table cover.....	Mrs. P. Claudius, San Francisco.....	3 00
Best embroidered sideboard cover.....	Mrs. P. Claudius, San Francisco.....	3 00
Best set of embroidered napkins or doylies.....	Mrs. P. Claudius, San Francisco.....	3 00
Best patchwork quilt.....	Miss V. H. Black, Denverton.....	1 50
Best display of knit lace by hand.....	Mrs. J. Sciarini, Collinsville.....	2 50
Best embroidered infant's pillow.....	Mrs. E. Bullard, Sacramento.....	3 00
Best embroidered table scarf.....	Mrs. E. Bullard, Sacramento.....	2 00
Best embroidered piano scarf.....	Mrs. E. Bullard, Sacramento.....	1 00
Best embroidered centerpiece and doylies.....	Mrs. E. Bullard, Sacramento.....	3 00
Best embroidered glove case.....	Mrs. E. Bullard, Sacramento.....	1 00
Best embroidery.....	Mrs. E. Bullard, Sacramento.....	3 00
Best combination tinting and embroidery.....	Mrs. E. Bullard, Sacramento.....	1 50
Best Empire style embroidery.....	Mrs. E. Bullard, Sacramento.....	1 50
Best display of crocheted lace.....	Mrs. E. Bullard, Sacramento.....	1 50
Best Danish drawnwork.....	Mrs. E. Bullard, Sacramento.....	1 50
Second best single piece burnt leather work.....	Mrs. E. Bullard, Sacramento.....	2 00
Best display of children's clothes.....	Miss M. Erhart, Sacramento.....	7 50
Largest and finest display of Turkish emb.....	Miss M. Erhart, Sacramento.....	1 50
Largest and finest display of outline emb.....	Miss M. Erhart, Sacramento.....	1 00
Best embroidered round centerpiece.....	Miss M. Erhart, Sacramento.....	3 00
PROFESSIONALS.		
Best Battenburg centerpiece.....	Miss E. Walker, Grass Valley.....	4 00
Best display of drawnwork.....	Mrs. E. Bullard, Sacramento.....	6 00
Best Battenburg curtains.....	Mrs. E. Bullard, Sacramento.....	7 50
Best display handmade lace handkerchiefs.....	Mrs. E. Bullard, Sacramento.....	3 75
Best, largest, and handsomest display of emb. or hand-painted sofa cushions.....	Mrs. E. Bullard, Sacramento.....	4 00
Best Battenburg bedspread.....	C. M. Campbell, Sacramento.....	3 75
AMATEURS.		
Best handmade lace display Battenburg and Honiton point lace.....	Mrs. E. Clark, Grass Valley.....	10 00
Best display handmade lace handkerchiefs.....	Miss E. Walker, Grass Valley.....	2 50
Best display of drawnwork.....	Miss M. Erhart, Sacramento.....	10 00
Best Battenburg curtains.....	Miss M. Erhart, Sacramento.....	2 50
Best Battenburg centerpiece.....	Mrs. E. Clark, Grass Valley.....	2 00
CLASS III—PRINTING, LITHOGRAPHY, ETC.		
Best general display of stationery.....	A. S. Hopkins Co., Sacramento.....	Sil. Med
Best printing ink.....	A. S. Hopkins Co., Sacramento.....	Sil. Med
CLASS IV—MISCELLANEOUS.		
Best display of eyelet embroidery.....	Miss V. H. Blacklock, Denverton.....	Diploma
Best shell work.....	Miss V. H. Blacklock, Denverton.....	Sil. Med

FOURTH DEPARTMENT.

MECHANICAL PRODUCTS.

Exhibit.	Exhibitor.	Award.
CLASS I.		
Best display of paper, Cal. manufacture.....	A. S. Hopkins Co., Sacramento	Sil. Med
Best display of cordage.....	A. S. Hopkins Co., Sacramento	Sil. Med
CLASS II.		
Best display of gas chandeliers and burners.....	Sacramento Elec., Gas & Ry. Co.	Sil. Med
Best display of kitchen utensils of tin and tinware.....	Chas. M. Campbell, Sacramento	\$2 50
Best display of pocket cutlery.....	A. S. Hopkins Co., Sacramento	2 50
Best display of clocks.....	A. S. Hopkins Co., Sacramento	Diploma
CLASS III.		
Best gas stove.....	Sacramento Elec., Gas & Ry. Co.	\$2 50
Best cooking stove for coal.....	Chas. M. Campbell, Sacramento	2 50
Best cooking stove for wood.....	Chas. M. Campbell, Sacramento	2 50
Best portable range for wood.....	Chas. M. Campbell, Sacramento	2 50
Best portable range for coal.....	Chas. M. Campbell, Sacramento	2 50
Best parlor stove for wood.....	Chas. M. Campbell, Sacramento	2 50
Best parlor stove for coal.....	Chas. M. Campbell, Sacramento	2 50
Best wickless oil cook stove.....	Chas. M. Campbell, Sacramento	2 50
CLASS V.		
Best display of furniture.....	Chas. M. Campbell, Sacramento	Sil. Med. or Diploma
Best drawing-room chairs.....	Chas. M. Campbell, Sacramento	\$10 00
Best set bedroom furniture.....	Chas. M. Campbell, Sacramento	5 00
Best set dining-room furniture.....	Chas. M. Campbell, Sacramento	5 00
Best library furniture.....	Chas. M. Campbell, Sacramento	5 00
Best office furniture.....	Chas. M. Campbell, Sacramento	5 00
Best school furniture.....	Chas. M. Campbell, Sacramento	5 00
Best sofa.....	Chas. M. Campbell, Sacramento	2 50
Best lounge.....	Chas. M. Campbell, Sacramento	2 50
Best davenport.....	Chas. M. Campbell, Sacramento	2 50
Best extension table.....	Chas. M. Campbell, Sacramento	2 50
Best set parlor chairs.....	Chas. M. Campbell, Sacramento	5 00
Best dressing bureau.....	Chas. M. Campbell, Sacramento	5 00
Best center table.....	Chas. M. Campbell, Sacramento	2 50
Best serving table or buffet.....	Chas. M. Campbell, Sacramento	2 50
Best display of upholstery.....	Chas. M. Campbell, Sacramento	5 00
Best spring mattress.....	Chas. M. Campbell, Sacramento	2 50
Best hair mattress.....	Chas. M. Campbell, Sacramento	2 50
Best wool mattress.....	Chas. M. Campbell, Sacramento	1 50
Best couch mattress.....	Chas. M. Campbell, Sacramento	2 50
Best invalid's chair.....	Chas. M. Campbell, Sacramento	2 50
Best display of iron furniture.....	Chas. M. Campbell, Sacramento	5 00
Best display of willow furniture.....	Chas. M. Campbell, Sacramento	5 00
CLASS VI.		
Best display of cedarware.....	A. S. Hopkins Co., Sacramento.....	2 50
Best display of pineware.....	A. S. Hopkins Co., Sacramento.....	2 50
Best display of oakware.....	A. S. Hopkins Co., Sacramento.....	2 50
Best display of willowware.....	A. S. Hopkins Co., Sacramento.....	2 50
Best display of splitwood baskets.....	A. S. Hopkins Co., Sacramento.....	1 50
Best turning lathe work.....	A. S. Hopkins Co., Sacramento.....	2 50
Best display of osier.....	A. S. Hopkins Co., Sacramento.....	2 50
Best display of woodenware other than willow.....	A. S. Hopkins Co., Sacramento.....	2 50
Best display of broomcorn, brooms, and brushes.....	A. S. Hopkins Co., Sacramento.....	2 50
Best display of fancy moldings and scroll sawing.....	A. S. Hopkins Co., Sacramento.....	2 50
Best assortment of cooper wares.....	A. S. Hopkins Co., Sacramento.....	5 00
Best display of matches.....	A. S. Hopkins Co., Sacramento.....	Diploma
CLASS VII.		
Best burglar alarm.....	A. S. Hopkins Co., Sacramento.....	\$2 50
Best balance.....	A. S. Hopkins Co., Sacramento.....	Diploma
Best thermometer.....	A. S. Hopkins Co., Sacramento.....	Diploma
Best barometer.....	A. S. Hopkins Co., Sacramento.....	Diploma

FOURTH DEPARTMENT—MECHANICAL PRODUCTS—Continued.

Exhibit.	Exhibitor.	Award.
CLASS VIII.		
Best stove polish	A. S. Hopkins Co., Sacramento ..	Sil. Med
Best toilet soap	A. S. Hopkins Co., Sacramento ..	Diploma
Best Castile soap	A. S. Hopkins Co., Sacramento ..	Diploma
Best axle grease	A. S. Hopkins Co., Sacramento ..	Diploma
Best display of soap	A. S. Hopkins Co., Sacramento ..	S. M. & \$5
Best disinfectant and antiseptic for live- stock and domestic purposes	J. Wilson, Sacramento ..	Sil. Med
Best stoneware	A. S. Hopkins Co., Sacramento ..	Diploma
Best sewer pipe	Carnegie Brick and Pottery Co., San Francisco ..	\$2 50
Best display of terra cotta	Carnegie Brick and Pottery Co., San Francisco ..	5 00
Best firebrick	Carnegie Brick and Pottery Co., San Francisco ..	1 50
Best pressed brick	Carnegie Brick and Pottery Co., San Francisco ..	Diploma
Best sample drain tile	Carnegie Brick and Pottery Co., San Francisco ..	2 50
Best display of pottery	Carnegie Brick and Pottery Co., San Francisco ..	Sil. Med
CLASS XII.		
Best gas arc lamp	Sac'to Electric, Gas & Ry. Co.	Diploma
Best water heater	Sac'to Electric, Gas & Ry. Co.	Sil. Med
Economy, best fruit jar	A. S. Hopkins Co., Sacramento ..	Diploma
Automatic poultry feeder	Western Manufacturing Agency, San Francisco ..	Diploma
Best water elevator	Western Manufacturing Agency, San Francisco ..	Diploma
Best roofing	National Mastic Roofing Co., Sac. ..	Sil. Med
Method of dress cutting and fitting	Miss Elliott, Sacramento ..	Diploma

FIFTH DEPARTMENT.

DAIRY PRODUCTS AND DAIRY UTENSILS.

Exhibit.	Exhibitor.	Award.
CLASS I—DAIRY PRODUCTS—FRESH BUTTER.		
First prize	Danish Creamery, Fresno, Gold Medal & ..	\$60 00
Second prize	Central Creamery, Ferndale	50 00
Third prize	Oakland Creamery, Oakland	40 00
Fourth prize	Los Banos Creamery, Los Banos ..	30 00
Fifth prize	Capital Creamery, Ferndale	25 00
Sixth prize	Pioneer Creamery, Ferndale	22 50
Seventh prize	Crescent Creamery, Kingsburg ..	20 00
Eighth prize	Point Arena Creamery, Ft. Arena ..	17 50
Ninth prize	Ceres Creamery, Ceres ..	15 00
Tenth prize	Bridgeport Creamery, Miller	14 00
Eleventh prize	"The Creamerie," Sacramento ..	12 50
Twelfth prize	Crystal Cream and Butter Co., Sacramento ..	12 50
Thirteenth prize	Eel River Creamery, Waddington ..	11 00
Fourteenth prize	Stockton Creamery, Stockton	10 00
Fifteenth prize	Modesto Creamery, Modesto	9 00

FIFTH DEPARTMENT—DAIRY PRODUCTS, ETC.—*Continued.*

Exhibit.	Exhibitor.	Award.
CHEESE.		
First prize.....	M. G. Salmina, Gilroy.....	\$15 00
Second prize.....	Bryte & Augustine, Sheldon.....	10 00
Third prize.....	A. Surtman, San Gregorio.....	5 00
CLASS II—DAIRY MACHINERY.		
Best creamery outfit.....	De Laval Dairy Supply Co., San Francisco.....	Gold Med. & Diploma
Best separator.....	De Laval Dairy Supply Co., San Francisco.....	Diploma

SIXTH DEPARTMENT.

HORTICULTURAL PRODUCTS.

Exhibit.	Exhibitor.	Award.
SPECIAL—COUNTY EXHIBITS.		
First.....	San Joaquin County.....	\$500 00
Second.....	Shasta County.....	250 00
Third.....	Placer County.....	150 00
Fourth.....	Napa County.....	100 00
Fifth (one half).....	Yuba County.....	25 00
Fifth (one half).....	Sutter County.....	25 00
CLASS II—OLIVES.		
Most meritorious exhibit.....	Sacramento Olive Co.....	Gold Med
Best exhibit of cured or pickled olives.....	Sacramento Olive Co.....	\$5 00
Best exhibit of pickled olives (green).....	Sacramento Olive Co.....	5 00
CLASS III—VEGETABLE OILS.		
Best exhibit of olive oil, not less than 24 bottles.....	Birdsall Olive Co., Auburn.....	15 00
Second best.....	Fair Oaks Fruit Co.....	10 00
CLASS VIII—HONEY, PRESERVES, PICKLES, ETC.		
Best display of jams and jellies in glass.....	Mrs. C. W. Ilgner, Sacramento.....	10 00
Best display of preserved fruit in glass.....	Mrs. C. W. Ilgner, Sacramento.....	10 00
Best six jars raspberry jelly.....	Mrs. C. W. Ilgner, Sacramento.....	2 00
Best six jars currant jelly.....	Mrs. C. W. Ilgner, Sacramento.....	3 00
Best six jars blackberry jelly.....	Mrs. C. W. Ilgner, Sacramento.....	1 50
Best six jars strawberry jelly.....	Mrs. C. W. Ilgner, Sacramento.....	2 00
Best six jars orange jelly.....	Mrs. C. W. Ilgner, Sacramento.....	3 00
Best six jars lemon jelly.....	Mrs. C. W. Ilgner, Sacramento.....	2 00
Best six jars blackberry jam.....	Mrs. C. W. Ilgner, Sacramento.....	1 50
Best six jars plum jelly.....	Mrs. C. W. Ilgner, Sacramento.....	3 00
Best six jars apricot jelly.....	Mrs. C. W. Ilgner, Sacramento.....	2 00
Best six jars apple jelly.....	Mrs. C. W. Ilgner, Sacramento.....	3 00
Best sweet pickled peaches.....	Mrs. C. W. Ilgner, Sacramento.....	3 00
Best sweet pickled grapes.....	Mrs. C. W. Ilgner, Sacramento.....	3 00
Best six jars raspberry jam.....	Mrs. C. W. Ingler, Sacramento.....	2 00
Best fig marmalade.....	Mrs. C. W. Ingler, Sacramento.....	3 00
Best display of jams and jellies in glass.....	Miss E. Dingle, Woodland.....	15 00
Best display of preserved fruit in glass.....	Miss E. Dingle, Woodland.....	5 00
Best six jars raspberry jelly.....	Miss E. Dingle, Woodland.....	3 00
Best six jars currant jelly.....	Miss E. Dingle, Woodland.....	2 00
Best six jars strawberry jelly.....	Miss E. Dingle, Woodland.....	3 00
Best six jars orange jelly.....	Miss E. Dingle, Woodland.....	2 00
Best six jars lemon jelly.....	Miss E. Dingle, Woodland.....	3 00

SIXTH DEPARTMENT—HORTICULTURAL PRODUCTS—*Continued.*

Exhibit.	Exhibitor.	Award.
CLASS VIII—HONEY, PRESERVES, PICKLES, ETC.— <i>Continued.</i>		
Best six jars plum jelly	Miss E. Dingle, Woodland	\$2 00
Best six jars apricot jelly	Miss E. Dingle, Woodland	3 00
Best six jars apple jelly	Miss E. Dingle, Woodland	2 00
Best sweet pickled peaches	Miss E. Dingle, Woodland	2 00
Best sweet pickled grapes	Miss E. Dingle, Woodland	2 00
Best six jars raspberry jam	Miss E. Dingle, Woodland	3 00
Best fig marmalade	Miss E. Dingle, Woodland	2 00
CLASS X—MISCELLANEOUS.		
Best display of guavas	Mrs. J. Sims, Sacramento	2 50

SEVENTH DEPARTMENT.

Exhibit.	Exhibitor.	Award.
CLASS IX—BEER.		
Best display of lager beer	El Dorado Brewing Co., Stockton ..	G'd Med

EIGHTH DEPARTMENT.

AGRICULTURAL PRODUCTS.

Exhibit.	Exhibitor.	Award.
CLASS I—FARM PRODUCTS.		
Most extensive, perfect, and varied exhibit of farm products grown by one person or farm	F. McMillan, Fair Oaks	\$25 00
CLASS III—FLOUR AND GRAIN.		
Best sample of Russian winter gluten wheat	F. McMillan, Fair Oaks	1 50
Best sample of English gluten wheat	F. McMillan, Fair Oaks	1 50
Best sample of Chilean gluten wheat	F. McMillan, Fair Oaks	1 50
Best sample of Indian Durum wheat	F. McMillan, Fair Oaks	1 50
Best sample of Arabian Durum wheat	F. McMillan, Fair Oaks	1 50
Best sample of Spanish Durum wheat	F. McMillan, Fair Oaks	1 50
Best sample of California starchy wheat	F. McMillan, Fair Oaks	1 50
Best and greatest variety of wheat in ear or head	F. McMillan, Fair Oaks	2 50
Best sample of California barley	F. McMillan, Fair Oaks	3 00
Best sample of Tennessee winter barley	F. McMillan, Fair Oaks	1 50
Best sample of Abrizzes rye	F. McMillan, Fair Oaks	1 50
Best sample of Appler rust-proof oats	F. McMillan, Fair Oaks	1 50
Best sample of Red Russian oats	F. McMillan, Fair Oaks	3 00
Best sample of bluegrass seed	M. H. Ebel, Sacramento	3 00
Best exhibit of white corn	M. H. Ebel, Sacramento	5 00
Best sample of buckwheat	Pacific Seed Co., Sacramento	1 50
Best sample of clover seed	Pacific Seed Co., Sacramento	1 50
Best sample of red-top clover seed	Pacific Seed Co., Sacramento	1 50
Best sample of orchard grass seed	Pacific Seed Co., Sacramento	1 50
Best exhibit of alfalfa seed	Pacific Seed Co., Sacramento	5 00
Best exhibit of yellow corn	Pacific Seed Co., Sacramento	5 00
Best exhibit of sweet corn	Pacific Seed Co., Sacramento	5 00
Best exhibit of garden seeds, California production, not less than twenty-five varieties	Pacific Seed Co., Sacramento	G'd Med
Best sample of family flour	Woodland Milling Co.	Diploma

EIGHTH DEPARTMENT—AGRICULTURAL PRODUCTS—*Continued.*

Exhibit.	Exhibitor.	Award.
CLASS IV—VEGETABLES, ROOTS, ETC.		
Best display of white beans, dried	Pacific Seed Co., Sacramento	\$1 00
Best display of field beans, dried	Pacific Seed Co., Sacramento	1 00
Best display of garden peas, dried	Pacific Seed Co., Sacramento	1 00
Best display and greatest variety of peas, dried	Pacific Seed Co., Sacramento	1 00
CLASS V—FLOWERS.		
Most attractive general exhibit of orna- mental nursery stock	M. H. Ebel, Sacramento	50 00
Best collection of flowering plants in bloom	M. H. Ebel, Sacramento	25 00
Best collection of ornamental foliage plants	M. H. Ebel, Sacramento	5 00
Best collection of new and rare plants	M. H. Ebel, Sacramento	7 50
Best display of coleus, distinct varieties	M. H. Ebel, Sacramento	5 00
Best collection of ferns	M. H. Ebel, Sacramento	10 00
Best collection of plants suitable for green- house, conservatory, and window culture	M. H. Ebel, Sacramento	5 00
Second best and largest collection of flow- ering plants in bloom	G. H. Kunz, Sacramento	15 00
Second best collection of ferns	G. H. Kunz, Sacramento	5 00
CLASS VI—BREAD AND CEREAL FOOD.		
Best display and best biscuit	Mrs. Wilbur Smith, Sacramento	1 00
Best display and best soda biscuit	Mrs. Wilbur Smith, Sacramento	2 50
Best display and best domestic brown bread	Mrs. Wilbur Smith, Sacramento	1 00
Best display and best domestic graham bread	Mrs. Wilbur Smith, Sacramento	1 00
Best display and best domestic wheat bread	Mrs. Wilbur Smith, Sacramento	1 00
Best display and best domestic bread	Mrs. Wilbur Smith, Sacramento	2 50
Best display of cereal food	C. E. Pierce, San Francisco	Sil. Med

NINTH DEPARTMENT.

Exhibit.	Exhibitor.	Award.
BEES.		
Best honey gatherers in observatory hives	Wm. Caswell, Sacramento	G'd Med
HONEY.		
Most attractive display of comb honey	Wm. Caswell, Sacramento	Sil. Med
Most attractive display of extracted honey	Wm. Caswell, Sacramento	Sil. Med
Best process of extracting	Wm. Caswell, Sacramento	Sil. Med
Best extract of hive	Wm. Caswell, Sacramento	4 00
Largest and best display of apiarian imple- ments	Wm. Caswell, Sacramento	G'd Med
Best comb honey hive	Wm. Caswell, Sacramento	4 00
Best brood frame	Wm. Caswell, Sacramento	4 00

TENTH DEPARTMENT.

MISCELLANEOUS.

Exhibit.	Exhibitor.	Award.
Best display of students' work	Intern'nl Correspondence School	Sil. Med
Most meritorious display of penmanship	Howe's Academy, Sacramento	Sil. Med
Beauty preparations	M. Ella Harris & Son Co., San Francisco	Sil. Med
Penmanship, typewriting, bookkeeping	San Francisco Business College	Sil. Med
Grandma's Spanish Pepper	Mrs. M. Burden, Oak Park	Sil. Med

THE CATTLE INDUSTRY OF CALIFORNIA.

By EDWARD W. HOWARD.

There is not a county in California that does not number among its industries cattle-raising in one or more of its branches. In some counties grazing predominates, in others the production of dairy products; in many also are herds of pure-bred cattle, and the number engaging in this branch is greatly on the increase.

The grazing lands or ranges are given over principally to the raising of beef cattle; a very large proportion of the meat consumed is produced almost entirely upon the wild grasses, but little hay being fed, even in the dry season.

Different sections of the State vary greatly in the fattening quality of their grasses; generally speaking, the Central and Southern California coast ranges and interior valleys in an average season produce the primest beef.

It is on the range, too, that one finds the cattle in a fair measure adapted to the uses for which they are intended; they are, for the most part, grade Shorthorns and Herefords, the Shorthorns greatly outnumbering the Herefords. They are all in all a very good class of cattle—far superior to the Arizona and New Mexico cattle annually brought by the trainload to California to be fattened and sold.

Another producer of beef is the “alfalfa farmer”—the man who milks his cows and raises the calves on skimmed milk. In this branch of cattle-raising there is room for great improvement; in fact, it would be a gain to the State, a gain to the farmer himself in many cases, if he were to sell his entire herd to the butcher and make a new start with fewer, but better cattle. And the reason that these cattle are of such a poor class is due to the fact that ninety per cent of the bulls in use in these herds are selected with no other aim than to have the means at hand to freshen the dry cows. The calves from such a mating should never be raised for any purpose, and there is but small profit to the raiser even if sold for veal, at which age they will net more for feed consumed than ever after. Such cattle return nothing for the feed consumed, and the longer they are kept on the farm the greater the loss.

These conditions are the result of a widespread ignorance of even the first principles of breeding, and even greater ignorance of proper methods of feeding and handling.

Starting with inferior stuff of no known breeding and consequently no sure adaptation to the use for which they are intended, the average farmer resorts to one cross after another of mongrel sires reputed to be grades of one breed or another, and failing to work wonders with a mongrel sire reputed to be of one breed he seeks further and fares worse with an equally mongrel individual reputed to be a grade of some other breed.

No man can breed successfully who has not a type in mind. The type is fixed by the use to which the herd is to be put, and to learn the best type one must go to the herds of pure-bred cattle which, for generations by careful selection and untiring inquiry into the ways of nature, have been gradually evolved and adapted to the purpose for which they are intended.

The farmer must, to improve his cattle, not only make a study of types, but he must then procure the best individual his circumstances will allow of the type or breed which he finally selects as best adapted to his uses and to the conditions as they exist on his farm.

The bull is "half the herd," and the first step toward improvement; secondly, no man who aims to improve his cattle can afford to use any but a *pure-bred sire*; for the pure-bred bull has the inherent ability to reproduce himself, which no mixed-bred mongrel ever had, or can ever have, for the very reason that he inherits a mixture of characteristics, and consequently reproduces any one of the types, or characteristics, of his conglomerate antecedents with no regularity or uniformity.

The pure-bred sire is the agent of improvement, and if you are not convinced of this send your sons to, and keep in touch yourself with, the State Farm which is now being established in Yolo County for the very purpose of demonstrating in a practical way to the farmers of California the simple truths of nature, upon the knowledge of which the degree of success that can be attained in any branch of farming depends.

Come to the State Fair and see with your own eyes the results of applying intelligently the laws of nature to farming and stock-raising enterprises.

SWINE AND SHEEP IN CALIFORNIA.

By S. B. WRIGHT.

It is a waste of time and material to breed or feed scrub stock. Not that it is necessary or advisable for the average herdsman to carry a herd or flock of pure-bred animals, but the sires of whatever breed or kind should be full bloods. The breeding of pure-bred animals to be used at large is a business within itself, and one at which many people fail. To produce or perpetuate a good ham, or leg, or head, or depth or width of body, or constitutional vigor is a problem to be worked out with much care and many disappointments. The mating of individuals of really desirable points is often productive of failures, and this suggests the inadvisability of constantly seeking to avoid inbreeding. A desirable type having been found, the way to perpetuate it is to mate members of that family. For example, take the Berkshire boar Longfellow. By breeding him to Lady Lee 7th, the daughter of Longfellow's son Model Duke, Mr. Gentry produced Lady Lee 50th, generally conceded to be the greatest Berkshire sow that ever lived, and the great boars King Lee, King Lee 11th, Baron Lee II, King Lee 7th, Hiawatha, Baron Lee 4th, Baron Lee 6th, and Baron Lee 8th, all full brothers to this sow. Lord Premier—the greatest molder of Berkshire form known in recent years—was sired by Baron Lee 4th, a son of Longfellow. He sired Duchess 222d, and bred to Baron Lee 6th, a full brother to Baron Lee 4th (the sire of Lord Premier), this sow produced Premier Longfellow, the most successful show and breeding boar known to the Berkshire world. Lord Premier sold for \$1,500 cash in 1904, when over six years of age, and Premier Longfellow brought \$2,000, in 1905, when three years old. Premier Longfellow bred to Duchess 232d (she by Lord Premier, the sire of Premier Longfellow's dam, and the dam of Duchess 232d was by Baron Lee 4th, sire of Lord Premier and full brother to the sire of Premier Longfellow) produced Baby Longfellow, the greatest breeding boar that I have ever used in my herd, and the sows of my herd having the most Lord Premier blood in them "nick" the best with this boar.

I take it that undesirable results have been brought about by a lack of judicious selection. For it is certainly a fact that the only right valuable hogs or cattle—those upon which any dependence can be placed to reproduce their kind—are most intensely inbred, and this brings me to the point when the value of a good boar or brood sow should be considered. It is often remarked that "good feed is mighty good breeding." This is true only to the extent that meat can not be produced without feed, and therefore the popular delusion that common stock is as good as fine stock if only fed is hardly worthy of consideration.

Only a few days ago I wrote a friend to bid \$125 for me on any one of several Berkshire sows to be offered at public auction. I was simply

taking a chance, and at the same time wrote my friend that I expected the sows I wanted to bring much more, but that I had a lot of good ones myself and hated to add \$75 expressage to any higher price. I did not get any of those sows—the average for the entire fifty-four head being \$259—and there were several gilts not bred. Now our people on this coast wonder how such prices can obtain, and hesitate to pay \$50 for a fine sow and expect to get bred sows of the best blood for less than \$100. In short, the breeder of high-class hogs on this coast has been expected to do missionary work in the breeding line without having any friend who was willing to “pass around the hat” at meeting. As a matter of fact, any high-class sow that is a prolific breeder should bring \$150 more readily than should any cow or brood mare and a boar that proves himself to be a phenomenal sire should bring from \$500 to \$1,000; not for common herds, of course. Cows and mares and bulls bring these prices, and I submit that, excepting the dairy cow, the brood sow and the herd boar will yield hundreds of dollars in revenue before the cows or mares or bulls show any profit whatever.

People in the corn belt are paying so-called “big prices” for pure-bred breeding hogs, because their experience has taught them the value of such stock, and this is not attributable to corn, as so many would have us believe. California is as able to produce hogs cheaply as any State in the Union. As a grain ration I prefer ground barley to corn, and if we need corn this State will produce it in abundance. Alfalfa furnishes green feed, and where this is not or can not be successfully grown, beets or other root crops can be produced. It is not necessary to be without a succulent ration wherever grain or grass crops are grown. When pigs are young, they and their dams should have a slop of middlings and water to promote the best growth, some salt being added. Of course cow's milk is better than water to use with the middlings, but as the sow will furnish milk if given a succulent ration and plenty of “middling slops” the cow's milk is not at all indispensable. The truth is that too much attention is paid to the raising of horses and cattle (the big animals of the farm), and too little attention to swine and sheep and poultry (the small animals of the farm), the latter being by far the most profitable. The sow will bring some results without any care, but no animal responds more readily in cash returns for good care than does the brood sow. Pigs should be ready to wean at ten weeks old, should be kept growing and can be marketed at eight months old, and should then weigh 200 pounds. It is useless to argue that it will cost too much to push pigs so fast. The fact is that the equivalent of about $3\frac{1}{2}$ pounds of grain per pound of meat would bring the pig to weigh 200 pounds at eight months old, when it would probably require the equivalent of five pounds, or more, per pound of meat to have the same hog weigh 200 pounds at twelve months old or older. Should the animal be pushed along to weigh 200 pounds or more at six months, the cost would be less than the probable cost given above, as the very young animal puts on meat much more cheaply than does the older one, but less rapidly. This season our local butcher shipped hogs to Santa Rosa from Nebraska, paying $5\frac{1}{2}$ cents per pound for them at the point of loading, and laid down here they stood him about $6\frac{1}{2}$ cents. At least this is the statement given me. Now California ought not to depend upon any other State for her pork or mutton.

SHEEP.

Perhaps nothing in the way of livestock production is more attractive to-day than sheep and sheep-raising. Just what has led to this interest in sheep, coupled with their high market value, is possibly more properly a subject of statistical consideration than belongs to this class of article. But that aside from the enormous losses in Australia, there has been a steady increase in the value of sheep for years, consequent upon an increased consumption of mutton, there can be no question. Americans have cultivated a fondness for mutton, and the shepherd has responded to their appetites. Western range conditions have been and still are favorable to the production of the Merino, and in order to have a sheep of profit to the herdsman of the plains and one that will "bunch," something of the Merino instinct must always be retained. I suspect that this inclination to bunch is largely due to timidity, and certainly a flock of Merinos can destroy a lot more feed than any sheep that I have ever handled. Turn such a flock into a field of fine grass and soft ground and watch these simpletons huddle together and travel from one side of the pasture to the other, never stopping until a fence or some impassable barrier is found. Then watch them travel right back over the same ground and eating little or nothing during all this waste of time and feed, even though they may have been penned up for some days. But they do have a lot of wool, and that is one point which makes them desirable to "hold over" as mothers. A strictly mutton sheep usually gets into some corner or good grass plat and fills up right there and lies down. I am therefore partial to the latter's temperament and carcass, and to the former's cash yield in wool and adaptability for herding.

In uniting the Dorset and Merino I have produced a splendid cross-bred sheep—good wool and good mutton. I hope some day to find evolved from the Rambouillet a sheep to meet fairly well the best requirements of both our wool and mutton markets. This can only come, though, from a process of selection and elimination, and in the hands of careful men. Our Rambouillet to-day needs a lot of attention, and I find some trouble in getting sheep with legs set in the "four corners" of the body. Their legs are too close together and crooked as a rule; but the American breeder should be able to correct this before long, and the next point will be the carcass and inclination to put on good meat. They are not easy keepers at present, nor is any Merino when compared with the mutton breeds. Only a few days ago I was looking at a few carloads of mutton that had just arrived from Nevada. These sheep carried a lot of Merino blood. They looked much like the Rambouillet, but were cross-bred sheep and would dress about 55 pounds. They had cost about \$4 per head in the fall and had been fed by our local butcher at Lovelocks, Nev. Their dressed carcass is worth 12 cents per pound, and their pelts bring \$2 each—\$8.60 per sheep. Not many years ago such sheep would have sold for \$3.50 per head at this season. People must have cultivated a "mutton taste," else sheep would have been dropped from the bill of fare in favor of beef at the ruling prices lately.

In November, 1905, or early December, a dealer in sheep advised a friend to buy 2,000 ewes in Contra Costa County at \$3.75, claiming that \$3,000 could be cleared on them by the 1st of June, 1906. I asked when

they would lamb. "They are lambing now," was the reply. As there was no grass then, I imagine that the lambs about all died and many ewes. Certainly no \$3,000 profit will be made on that flock by June 1, 1906.

In my opinion our people in Northern California, or wherever there is a heavy and late rainfall, "lamb" too early. It is difficult to save lambs in wet weather, even though the sheep be housed. However, there are so many points to be considered in the breeding of sheep in Northern California, and such a variety of soil and climatic conditions, that each individual flockmaster must carefully note local peculiarities.

PROGRESS OF POULTRY CULTURE IN CALIFORNIA.

BY HENRY BERRAR.

By the last United States census, that of 1900, and now somewhat out of date, California ranked twenty-third in the list of states, as regards the number of head of poultry produced. There were here then 4,196,268 fowls, of all kinds, while in all the country there were 250,681,593. By the next census there will undoubtedly be over 300,000,000 fowls in the United States, and, if we may judge by present indications, California will be then nearer the head of the list of poultry-producing states than she was in 1900.

North and south, all up and down the State, the report is the same—hundreds and thousands of Eastern people, homeseekers coming in, and it is a singular fact that two thirds of them (more than two thirds by the figures given by the best authorities) intend to embark in poultry-raising, on a more or less extended scale. The reason is not far to seek. Most of these people, whom we are as a State continually inviting to take up a residence with us, are of modest means and they naturally turn to an industry which appeals so strongly to the average home-builder throughout the Union. Added to these newcomers, many of whom have had valuable experience in poultry-raising in the East, and know what they have to contend with, are the many already here who have discovered that poultry pays as no other domestic live stock does, if it is properly managed. Of course, a good large per cent also discover that the *if* is a large one, but in the face of the countless instances all over the State where poultry is, *and has been for years*, the mainstay of a family's support, it is merely advertising one's ignorance of the real conditions to attempt to deny that poultry culture in California is profitable, the aforementioned *if* always to be considered.

We may safely assert, therefore, that the progress of poultry culture in this State during the past few years has not been wholly satisfactory to those who have been trying to develop it, but it would be an easy matter to demonstrate that all the money the State has spent to encourage this most promising industry has been returned to it a thousandfold.

Unlike so many industries in which the small landholder can engage with a view of making both ends meet, there is absolutely no danger of overproduction in poultry. We hear no complaints of high freight rates, low prices, markets glutted, or loss by frosts and freshets. The market for fresh-laid eggs and good fat poultry lies right at our doors; we do not have to go East to find it. On the contrary, the East sends us, and for ten years past has sent us, on the average, *one case out of every fifteen cases of eggs consumed in the State*. It is even worse as regards our market poultry. We do not begin to raise enough to supply our own markets. This is, of course, an old story; we have been crying it from the housetops for years past, and it is true; yet it effectually

disposes of the idea that too many are engaging in poultry culture. Eggs in most of our cities were at the fifty cents per dozen mark this last winter, in spite of the large increase in the number of producers. The fact is that the demand is growing faster than the supply, even at the present rapid progress of the latter.

It is an interesting fact, also, in connection with this growth of poultry culture in our State, to note that it is confined almost wholly to the breeders of pure-blooded stock. It is doubtful if there are as many mongrel fowls raised in California to-day as there were ten years ago. To be successful in his business a man must be interested in it, and there is no denying that while the breeding and care of thoroughbred poultry are most attractive, a flock of mongrels not only are not as profitable as the thoroughbred, but the owner is generally ashamed of them, and will assure the observer that he intends shortly to do away with scrubs and keep nothing but fowls of acknowledged blood purity. As educators of the public along these lines, the poultry shows have been powerful all over the State, and deserve substantial support from all who have an eye to the material welfare of our commonwealth. In such great poultry-producing states as Nebraska, Kansas, and Missouri, the poultry shows are so highly regarded that a substantial sum each year is appropriated for their support. California does much for its mining and other industries deemed worthy of financial aid, but *comparatively* nothing for poultry shows, which, seemingly of little importance, are really stimulants to greater endeavor in a business which, as I have shown, is one that concerns us all.

In other words, while we have, as a State, in past years somewhat neglected one of our most attractive and important resources, thoroughbred poultry culture (and ranked twenty-third in the list of states, where with all of our natural advantages we should have stood far above that in the line), yet we are catching up fast and at the present rate of progress it will not be long before we can at least be self-supporting, so far as the production of enough eggs and poultry for our own eating is concerned.

CONTAGIOUS AND INFECTIOUS DISEASES OF LIVESTOCK.

By CHARLES KEANE.

Many improvements have been accomplished in the past few years with regard to the sanitary conditions of livestock in the State of California. In former years, especially when the individual livestock holdings were extensive, and before the advent of the smaller owner, a certain annual loss from disease was expected. It is also only in the past few years that laws have been enacted and enforced to prevent the spread of contagious diseases of animals. Literature on the subject of animal diseases, issued by the United States Department of Agriculture and the various State Experiment Stations, is eagerly sought for by the progressive stockmen of this State.

Stockmen realize the fact that the proper policing of the State and the adoption of sanitary precautions and other methods as introduced by officials for the control and eradication of communicable diseases of livestock have materially decreased the losses from which in previous years they suffered. However, there is still great room for improvement in this line of work. Greatest of all to be desired is a hearty cooperation between livestock owners and sanitary officers.

The estimated losses from disease in this State during the year ending March 31, 1905, as compiled by the United States Department of Agriculture, are as follows: Cattle, 38,396, or about 2.6 per cent of their total number; sheep, 47,969, or about 1.8 per cent of their total number; hogs, 17,206, or about 3.3 per cent of their total number. A considerable portion of this loss was entirely unnecessary, in view of the improved methods that we have of combating communicable diseases of animals.

The following diseases are responsible for the principal losses: anthrax, Texas (Southern) cattle fever, black leg in calves, hog cholera and swine plague, and scabies in sheep.

Anthrax usually appears during the late summer and early fall on infected lowlying pastures, usually when the feed is becoming short. Many of the stock owners who have suffered severe losses from this disease in former years are now removing their stock from these infected pastures shortly before the time when the disease is likely to make its appearance. This procedure sacrifices very little feed, as in many districts it is practically eaten off at this time; and the great saving of stock from loss by anthrax more than compensates for the small sacrifice of feed occasioned by the removal of the stock to non-infected fields. Where this change of pasture can not be accomplished without a great sacrifice of feed, preventive vaccination is practiced with some success.

Black leg or black quarter is a disease which attacks young cattle, and in former years was the cause of severe losses. Veterinary science has developed a system of preventive vaccination against this disease,

which, if properly and systematically performed, reduces fatalities to a minimum.

A very serious obstacle to the development and prosperity of the cattle industry in the southern section of this State is the presence therein of Texas (Southern) cattle fever infection. The portion of territory quarantined against this disease in California is now located in what is termed as the permanently infected area; that is, the infection is located in an area in which the frosts of winter are not severe enough to destroy the Texas tick (*Boophilis annulatus*), the carrier of Texas fever infection. Consequently other, and more radical, measures are adopted to reclaim infected territory.

In order to prevent the spreading of this infection to points outside of this infected area a rigid quarantine is maintained by the Federal and State governments, and the movements of cattle for purposes other than immediate slaughter are restricted for nine months in the year. This quarantine line fully protects the cattle interests outside of the quarantined district from losses by this disease. In order to coöperate with the State the various counties in the quarantined area have enacted ordinances restricting the movements of tick-infested cattle in their respective territories in order to prevent further spreading of the infection therein. Many infected ranches have been cleaned, and this reclamation work is constantly being prosecuted.

The sheep industry in this State has experienced considerable prosperity during the past two years. Feeding conditions have almost universally been good, with a brisk demand, coupled with good prices for both mutton and wool. Still, the presence of scabies or mange in many of the flocks has reduced the profits which otherwise would have been realized if the sheep were clean. This affection is a serious menace to the sheep industry in this, as well as in many of the other Western States. It is a difficult matter to fatten mutton affected with scab, and when the disease has gained headway in a flock it is at times the occasion of fatalities. It also affects the wool clip in both quantity and quality. The disease is easily eradicated from a flock by thorough and systematic dipping in a disinfecting solution. The sheep inspection law enacted by the Legislature of 1903, for the control and eradication of this disease, has, in some localities, proved to be ineffective. Representative California sheepmen recognize the financial benefits that will accrue from the complete eradication of this disease, but it is only by the enforcement of a good law that good results will follow.

The losses from hog cholera and swine plague have been greatly lessened during the past few years, and this is entirely due to the fact that hog-raisers recognize the infectious character of these diseases, and consequently have adopted the usual sanitary precautions to prevent the introduction of the infection into their herds.

METHODS OF IRRIGATION.

BY WILLIAM E. SMYTHE.

Although irrigation is both ancient and universal, the Anglo-Saxon never dealt with it in a large way until the last half century, when he found it to be the indispensable condition of settlement in large portions of western America, Australia, and South Africa. Through all the centuries of the past the art has been the exclusive possession of Indian, Latin, and Mongolian races. Its earliest modern traces in this country are found in the small gardens of the Mission fathers in Southern California. They brought the method from Mexico and taught it to the Indians. But the real cradle of American irrigation as a practical industry is Utah.

In the hands of the Indians and Mexicans of the southwest irrigation was a stagnant art, but the white population studied it with the same enthusiasm it bestowed upon electricity and new mining processes. The lower races merely knew that if crops were expected to grow on dry land, they must be artificially watered. They proceeded to pour on the water by the rudest method. The Anglo-Saxon demanded to know why crops required water, and how and when it could best be supplied to meet their diverse needs. He has thus approached by gradual steps true scientific methods, which are producing results unknown before in any part of the world.

The earliest method of irrigation is known as "floodings," and is generally applied by means of shallow basins. A plot of ground near the river or ditch from which water is to be drawn is inclosed by low embankments, called checks. These checks are multiplied until the whole field is covered. The water is then drawn into the highest basin, permitted to stand until the ground is thoroughly soaked, and then drawn off by a small gate into the next basin. This process is repeated until the entire field is irrigated. This is the system practiced on the Nile, where the basins sometimes cover several square miles each, while in the west they are often no more than four hundred feet square. There is both a crude and a skillful way to accomplish the operation of flooding, and there is a wide difference in the results obtained by the two methods. The Indian and Mexican irrigators, in their ignorance and laziness, seldom attempt to grade the surface of the ground. They permit water to remain in stagnant pools where there are depressions, while high places stand out as dusty islands for generations. All except very sandy soils bake in the hot sunshine after being flooded, and the crude way to remedy the matter is to turn on more water. Water in excess is an injury, and both the soil and the crops resent this method of treatment.

The skillful irrigator grades the soil to an even slope of about one inch to every hundred inches, filling depressions and leveling high places. He "rushes" the water over the plot as rapidly as possible,

and when the ground has dried sufficiently cultivates the soil thoroughly, thus allowing the air to penetrate it. The best irrigators have abandoned the check system altogether, and have invented better methods of flooding the crops. Cereals and grasses must always be irrigated by flooding, but the check system seems likely to remain only in the land of Spanish speech and tradition, where it was born. In Colorado, wheat and grass are generally irrigated by a system of shallow plow furrows run diagonally across a field. The water is turned from these upon the ground, and permitted to spread out into a hundred small rills, following the contour of the land. Some farmers bestow great pains upon this method, and succeed in wetting the ground very evenly. Another method of flooding fields is now much used in connection with alfalfa, a wonderful forage plant extensively cultivated throughout the arid region. This produces three crops a year in the north and six crops in the south, and is eaten not only by stock, but also by poultry and swine. To find the best method of watering this valuable crop has been the object of careful study and experiment in the West. It is now accomplished by means of shallow indentations or creases, which are not as large as furrows, but accomplish the same purpose. These are made by a simple implement at intervals of about twelve inches. They effect a very thorough and even wetting of the ground.

The scientific side of irrigation is to be studied rather in connection with the culture of fruit and vegetables than with field crops. It is here that the English-speaking irrigators of the West have produced their best results. California has accomplished more than any other locality, but nothing was learned even there until the man from the North had supplanted the Spanish irrigator. The ideal climatic conditions of California attracted both wealth and intelligence into its irrigation industry. Scarcity of water and high land values operated to promote the study of ideal methods. Where water is abundant it is carried in open ditches, and little thought is given to the items of seepage through the soil and loss by evaporation. Under such conditions water is lavishly used, frequently to the injury rather than the benefit of crops. But in Southern California water is as gold, and is sought for in mountain tunnels and in the beds of streams. A thing so dearly obtained is not to be carelessly wasted before it reaches the place of use. Hence, steep and narrow ditches cemented on the bottom, or steel pipes and wooden flumes, are employed.

This precious water is applied to the soil by means of small furrows run between the trees or rows of vegetables. The ground has first been evenly graded on the face of each slope. The aim of the skillful irrigator is to allow the water to saturate the ground evenly in each direction, so as to reach the roots of the tree or plant. The stream is small, and creeps slowly down the furrow to the end of the orchard, where any surplus is absorbed by a strip of alfalfa, which acts like a sponge. The land is kept thoroughly cultivated, and in the best orchards no weed or spear of grass is ever seen; the water is too costly to waste in the nourishment of weeds. Moreover, it is desired to leave the soil open to the action of air and sunshine. Nowhere in the world is so much care given to the aëration of the soil as in the irrigated orchards and gardens of the West. Too much water reduces the temperature of the soil, sometimes develops hardpan, and more frequently brings alkali to

the surface. For these reasons modern science has enforced the economical use of water, reversing the crude Mexican custom of prodigal wastefulness. The success of the furrow method depends somewhat upon the texture of the soil, and there are places where it can not be used at all. Such localities are not considered favorable to fruit culture.

Of late years in California the application of water by furrows has been brought to a marvelous degree of perfection. What is known as the "Redlands system" is the best type of irrigation methods known in the world. Under this system a small wooden flume or box is placed at the head of the orchard. An opening is made opposite each furrow, and through this the water flows in the desired quantity, being operated by a small gate or slide. The aperture regulates the flow of water accurately, and the system is so simple that, after it is once adjusted, its operation is as easy as the turning of a faucet. The farmer who grows his crops on a fertile soil, under almost cloudless skies, with a system controlling the moisture as effective as this, may be said to have mastered the forces of nature. The quality of the fruit has improved immensely since the California methods were perfected. Every fruit-grower realizes that the profit in his business comes mostly from the first grade of fruit. Scientific irrigation makes it possible for him largely to increase the percentage of the best fruit, and the difference which this makes in the earning capacity of his acres is surprising. Other methods of furrow irrigation have been devised which are scarcely less perfect than those used in the California orange districts. One of the best of these is the result of the labors and experiments of Prof. A. E. Blount, of the Agricultural College at Las Cruces, New Mexico. In this case the water is carried in small open ditches, and the furrows are extended in circles around each tree, but the water is never allowed to touch the bark. This method is, perhaps, better adapted to the general needs of the arid region than the more expensive plan of the Californians. It is interesting to note that the modern New Mexico method was developed in the midst of Indian and Spanish settlements, which still pursue the methods of antiquity without the slightest abatement of their evils.

ESTABLISHING CREAMERIES AND MARKETING DAIRY PRODUCTS.

By WM. H. SAYLOR.

The establishing of creameries in California marks a turning point in the history of her dairy industry. With them came a change from the pioneer to more modern and better ways in the business of dairying. Simultaneously with the creamery also came the separating of cream from milk by centrifugal machines and the Babcock test, by means of which the value of milk may be determined in a simple manner. Previously the elaborate methods of the analytical chemist had to be relied upon to determine the commercial value of milk and cream. In fact, until the advent of the Babcock test and the centrifugal separator, the creamery of to-day was an impossibility. It is true that they had before this time the "butter factory" in many parts of the East, which was merely a place where the cream of the farmers and dairymen separated by gravity was collected and churned, but these were not creameries in the present meaning of that term.

In California, prior to the advent of the creamery system, the dairy business was confined to the districts where butter could be made without refrigeration. The territory where this is possible is limited, not so much in area, as in feed-producing capacity. It consists of the pasture lands on the hills and in the valleys of the Coast Range of mountains and to a limited extent in the valleys of the Sierra, although the latter has played but a small part in our dairy development. The early cattlemen and later the miner, who were the first people attracted to the State, dispensed with dairy products in their diet, and hence the business was not important until San Francisco and other towns became established about San Francisco Bay and then began a demand for the food products of an established community. The cattle on the hills and in the valleys of Marin, Sonoma, and San Mateo counties, formerly used for beef, and often only for their hides, were broken to milking. As the population dependent on these cows grew, and with good prices for their product, their numbers increased until these counties were in a few years filled up with cows to their full capacity to sustain them. From these counties the cow-keeping business grew northward along the coast into Oregon and southward to Santa Barbara.

The cows in those days, we are told, were extremely small producers, the increase in dairy output being brought about by increasing the number of cows and spreading over larger territory, both cows—of the kind they had—and land being cheap. The cows of those days, which are the basis of our present bovine population, and still too conspicuously present, originated from the poor class of cattle brought from Mexico by the early padres, or else were driven across the desert. It

goes without saying that the chances of a highly organized dairy cow seeing California in those days were early eliminated. Little improvement was made in the cattle and dairy conditions and methods until the industry spread northward into the cool, but rich pasture country of Humboldt County, although there were now and then importations of improved breeding stock from the East and even from Europe. All of the butter and cheese were made on the dairy farms. Some of it was good, but most of it was poor and all of it was lacking in uniformity. Generally a man, usually a foreigner, employed as a cow-milker, made the butter and there was lacking that cleanliness and taste which are found where women do the dairy work. All of the butter was made during the natural pasture season, which along the coast lasts from five to seven months of the year. The surplus made at this season was "pickled" by packing the prints, or rolls, in barrels of brine for use during the season of scarcity. This crude system of holding has been entirely superseded by cold storage. Transportation facilities were poor in those days and the butter was shipped with great infrequency, which lent to the inferiority of the quality.

This in brief was the condition of dairying when in the eighties it had reached Humboldt County on the north. A number of Danes and Scandinavians had settled in that county and found that clover, rye grass, and other introduced forage crops yielded prodigiously, and they introduced dairying as a means of marketing these crops. These people came from a country where dairying had even then reached a high degree of development. They were not long in the dairy business until they saw the wastes incident to the pioneer system of dairying. Chief among these was through inferior quality and the loss of butterfat in skimming the milk by the old and imperfect way of separating the cream by setting in pans, allowing from ten to twenty-five per cent of the butter in the milk to go to the hogs in the skim-milk. The centrifugal separator reduces this loss to less than three per cent. They found it impossible to secure competent butter-makers who could turn out a good product, and also the lack of large uniform lots so much desired by the trade. They appreciated that the caring for cows and the producing of milk is one line that should occupy the dairyman's attention, while the making of the butter could be left with great advantage to one skilled in that specialty. This was the way the butter industry was tending in their native country. These conditions, coupled with the spirit of coöperation and community of effort, led the dairy-men of the Eel River valley to establish the first creamery in California of any consequence, near Ferndale, in 1889. It was at once a big success. Its butter surpassed anything for both quantity and quality that arrived on the San Francisco market. To it the dairyman delivered his freshly drawn milk, had it skimmed with the creamery separator and returned at once to his dairy with the skim-milk, which is far superior in feeding value to skim-milk produced in the old way. He found plenty of work at home in the way of caring for his herd and growing crops to feed the cows, to which he devoted himself, feeling satisfied that the making of the butter was in expert hands. The Babcock test made it possible to determine accurately the butterfat delivered each day in his milk.

The creamery was built and conducted by a company of local dairy-men, who supplied the necessary capital, and it is still doing business

under the name of the Pioneer Creamery. Its success soon led to other creameries being built in the county, and at the present time over ninety per cent of the nearly five million pounds of butter produced annually in Humboldt County is made in creameries. At one time there were over thirty creameries in the county, but there is more recently a tendency toward consolidation. Humboldt butter, since the introduction of the creamery system, is the most popular grade in the market of California.

The success of the creamery system in Humboldt County was soon followed by establishing creameries in Sonoma, Marin, Mendocino, and other counties, although they have in most cases met with far less success. The only explanation that can be offered for this is the fact that these counties are populated with Italian-Swiss and Portuguese dairymen, who, although they are a very industrious class, are not as a rule so careful in their methods as the Americans and Scandinavians. They have all along failed to appreciate the advantages of the creamery system and unwilling, apparently, to comprehend the system of crediting patrons with milk delivered according to the fat test, they have, as a rule, opposed the creameries and make their butter on their dairy farms. The bulk of the second-grade butter on the markets comes from this source, although many of these foreign dairymen are at last using individual centrifugal separators and are turning out a good quality of butter, especially when the season of the year is favorable.

In the later eighties cow-keeping began to receive attention in Southern California, but the warm climate made dairying in a small way impractical, and as a result this section drew largely on the coast counties for its butter supply. However, in a few years there was considerable interest in dairying, and numerous creameries sprang up in Los Angeles, San Diego, and Riverside counties. A number of these have since disappeared, as a result of the aggressions of several large and well-managed plants, which are operating over larger areas of territory.

Up to 1895 there was nothing in the creamery business in the San Joaquin and Sacramento valleys, with the exception of two or three half-hearted enterprises that met with failure. Neither was there much development of the butter business in these districts, most of the butter consumed coming from the coast dairy districts. By 1895, or thereabout, the farmers of the State had begun to realize the possibilities of alfalfa-growing, and large areas were devoted to this crop. The production soon outgrew the demand, which was confined to fattening beef cattle. Alfalfa became a drug on the market. In 1894 the writer recalls that farmers delivered it from the stack at the end of a seven-mile haul for as low as \$4 a ton. This is what stood in the way of an increase in growing the crop. The warm climate in these districts made butter-making an impossibility without the aid of refrigeration, except for that part of the year when feed was the least plentiful. However, in several districts cheese-making got fairly well started, although the quality was generally poor. But in this way a number of large dairy herds were started in several places in the valleys. One of these sections was along the Sacramento River, in the vicinity of Courtland. Those farmers who hoped that dairy cows and cheese-making would secure better returns for their alfalfa, soon found disappointment in the low prices that followed on cheese, with which the market at times was glutted. It was in order to divert the milk from cheese to butter that

the first successful creamery was started in the interior of the State at Courtland, Sacramento County, in 1895. Its success was at once assured, and a few years found the plant turning out half a million pounds of butter a year, and of a quality far superior to the average dairy-made butter from the coast. A mechanical refrigerating system made the creamery independent of the high temperature of the district. The cheap feed for the dairymen in the form of alfalfa gave dairying in the district a boom, and Sacramento County, inside of ten years, has supported half a dozen creameries doing as large, and, in some cases, a larger volume of business.

What happened in Sacramento County was also taking place in the vicinity of Newman and Crow's Landing, in Stanislaus and Merced counties. That district had a considerable area in alfalfa and a number of herds used for cheese-making. In 1896 a creamery started near Newman. It made less than 150,000 pounds of butter the first year, which was almost the total make for the county. But its success was remarkable, and other creameries in the county soon followed in consequence. In the ten years since the establishing of the first creamery, Stanislaus County's butter output has grown from less than 200,000 pounds a year to 2,006,171 pounds in 1905, and Merced's from about the same amount to 1,786,082 pounds.

The history of the dairy business in Sacramento and Stanislaus counties is similar to that of a number of other counties in the two big valleys of California, and to-day every county from Tehama south to the Tehachapi Mountains, with the exception of Madera and Mariposa, supports from one to half a dozen large public creameries. Ten years ago not one of these counties made over 200,000 pounds of butter a year. How some of them have grown is shown by the following figures, which give the butter production, in pounds, of each of these counties for the year ending October 1, 1905, and for five years ago:

	1900.	1905.
Fresno.....	604,861	2,166,048
Kern.....	129,848	323,363
Kings.....	258,750	1,444,218
Merced.....	623,608	1,786,082
Sacramento	742,443	1,578,751
San Joaquin.....	506,047	1,468,991
Stanislaus.....	423,185	2,006,171
Yolo.....	533,525	1,124,907
Totals.....	3,822,267	11,898,541

Instead of consuming the butter produced in the coast dairy sections, as was the case ten years ago, the counties of the interior valleys not only supply local consumption, but contribute well-nigh half the butter required by the San Francisco and Los Angeles markets.

The volume of business some of these creameries do annually is worthy of mention. There were in the State last year seventeen plants that turned out over 500,000 pounds, and eight that turned out over 750,000 pounds. At the present time the writer knows of several creameries making from 4,000 to 10,000 pounds of butter daily. Ten years ago only 31 per cent of the butter of the State, according to statistics compiled by the State Dairy Bureau, was made in creameries. Last year more than 74 per cent was made in creameries, the remainder on farms. The total production of butter in California for the year ending October 1, 1905, was 41,961,047 pounds.

The multiplication of creameries in the State has not been without opposing tendencies. In the first place, numerous creameries were built at different points, even in dairy districts, where lack of patronage in time compelled them to discontinue business. In other cases, especially in the interior, promoters succeeded in forming stock company concerns in different sections where there were few cows to support a creamery and before any dairy spirit had taken hold of the farmers. The result was that few of these "promoted" creameries succeeded. As a rule the stockholders were defrauded in the deal with the promoter, which brought on a lack of interest and confidence and after a few months the creamery closed down, and after a few years of idleness the cheap machinery put in by the big promoter was disposed of and the plant dismantled. It is in place here, however, to state that in quite a number of places where the "promoted" creamery was a failure a few years ago, to-day successful creameries are being conducted, so that some credit must be given to the creamery promoter for "missionary work" in the dairy line. The strongest feature that is working against an increase in the number of creameries is what is known as the "central" creamery, which is an effort to consolidate the business into fewer and larger concerns, with a view of reducing cost of operating and increasing the profits of the creamery, together with other advantages that are supposed to result when a large business supersedes numerous smaller ones. The centralized creamery had its origin in the Middle West, where several companies make up the butter from cream that is shipped from several states and which measure their daily output by the carload. Naturally the local creameries and the dairymen generally in this State, as elsewhere, oppose the aggressiveness of the central creameries at Los Angeles, San Francisco, and other points, which are invading their territory for patronage, on the ground that it is an effort of the big concerns to secure control of the butter business, and eventually ruin competition among creameries. This aspect of the creamery business is its most conspicuous feature at the present time. A few years ago the dairyman delivered his milk as it came from his cows to the local creamery. This is almost altogether being changed to a system whereby, with many advantages, the dairyman has his own separator and delivers only the cream to the creamery, retaining the large volume of skim-milk on his farm. It is the cream that is separated on the farms that makes the dairyman independent to deal with the local or the centralized creamery at a distance, as it costs little more to ship the cream to the city than the butter from the local creamery.

Much might be said with regard to the building of creameries, which would prolong this paper into monotony. Suffice it to say that expert creamerymen who visit California state that our creameries on the average are superior in construction and equipment to those of other states. However, the State has had its era of cheap creameries, but they have in most cases given way to the well-built competing plant that is equipped with every convenience that will economize in the cost of operating, that will result in the highest quality in the product, and that will attract and command the services of the most skillful operator. A well-equipped creamery under California conditions, including a building well insulated against the prevailing high temperature and with mechanical refrigerating system, represents an investment of not less than \$8,000 and from that to \$20,000, according to

capacity and completeness. It is worthy of note that some of the best plants in the State are owned and operated by companies of dairymen on the coöperative plan.

The introduction of the creamery system here, as elsewhere, has been followed by a most notable advance in dairying, not only in the quantity of production, but also in the application of more intelligence and enterprise upon the part of the dairyman. The creameries brought the patrons together almost daily, and naturally they discussed their business. Each had his daily delivery of milk recorded in pounds on the "milk sheet" on the creamery wall. At the end of a month the total was found, the amount of fat determined, and the check of the creamery given to the patron. Of course, comparisons were in order. How should one patron receive a check twice as big as his neighbor having the same number of cows? Why did the same amount of milk of one patron's cows show a half more, or possibly twice as much fat, as that of another? How did the prosperous patron come by cows that were so much better than one's own, and how were they fed and cared for so as to bring about such superior results? These were questions which the creamery system drove home to the thinking dairyman. He could not afford such a showing. He determined to breed to better stock, locate and "weed out" the poor milkers in his herd, and feed and care better for the good ones. I have mentioned that nearly all of the butter in Humboldt County is produced in creameries. Let it be mentioned in this connection that the average production per cow there, as elsewhere where the creamery system has been in existence, is almost twice what it is in districts where the conservative method of making butter on farms is followed. The creamery has been a school for the dairyman.

The interest being manifested in dairying and the remarkable growth of the butter production has been one of the notable industrial features of California. We have in ten years seen the butter output grow from 28,678,439 to 41,961,047 pounds last year. The latter figure is almost an average of 30 pounds per capita of population, a figure in excess of production, and what to do with the future increase is a question of some concern, in view of the fact that the business is barely started in parts of the State most favorable to dairying. There are still considerable quantities of butter brought into the State from the East, which is dependent upon the relation of the Coast and Eastern markets and the possibility of speculation, as well as to the demand for certain grades not in local supply. This bringing of Eastern butter into the State has led to the erroneous observation that we do not yet produce the butter consumed in the State, without taking into consideration the fact that large quantities are shipped out of the State each year and that the amount is increasing.

The markets that take our surplus at the present time are chiefly the cities in Oregon and Washington and the intermountain states, together with Hawaii and Alaska. California has also in recent years sent considerable quantities of butter to the Eastern States. Each year during the months of February, March, April, and into May, a surplus of butter usually puts in its appearance in this State. This is several months before the pasture butter season opens in the Eastern States, and it gives California an opportunity to work off a large amount of butter in numerous markets with little interference from the Eastern product. In fact, the Eastern consumer will be, and I may say is

already, looking to California for fresh-grass butter during the late winter and early spring months in preference to the cold-storage article, or that made from stable-fed cows with which the East is supplied at that season.

But there is room for a large increase in our make of butter without relying on the extreme East. Our own State is rapidly growing in population, which increase is becoming more of a non-agricultural class, as indicated by the growth of our cities. The mining industry in the states and territories between the Rocky Mountains and the coast is developing a large non-agricultural population that is already drawing heavily upon California for dairy products. Utah is her principal competitor for this trade. In Oregon and Washington, while dairying has assumed some importance, it does not supply the demand for its products in those states, and they are California's best customers.

The export trade in dairy products holds out little promise. The people of the South American and Asiatic countries are not by nature consumers of dairy products, while Australasia and Siberia, which is now an important exporter of these products, offer inducements for the trade of the few Europeans in the Orient that Americans with their good home markets do not care to compete for. A few years ago British Columbia was a heavy buyer of California butter, but eastern Canada and Australia and New Zealand are now taking care of her demand.

Summing up the present situation and the future of the markets for California butter, there is no cause for apprehension. Her adaptability to produce dairy products from green pasture at a season when the herds in other states are closely stabled, eating dry fodder, is her chief dairy asset.

A word with regard to the butter consumption in this State. The large per capita consumption is frequently commented upon by those conversant with the butter industry. The cause for this, the writer believes, is easy to explain in the fact that the average quality of California butter is above that of other states, although it may be true that our best butter is not as good as the best in other states. In the East a large proportion of the butter is still made on farms by imperfect methods and poor utensils. Even if good when made, it is marketed at the small country stores, generally by trading for wares needed by the farmer's family. For want of a ready demand at the season when it is most freely produced, it generally accumulates in the hands of the country merchant, and deteriorates, often until it is inedible from rankness, thus becoming what is known as "packing stock," that is, butter bought up by the renovating factories, which by various processes remove the rank flavors and make a passing good article out of it.

Although California, as I have already mentioned, still makes much of what may be termed second-grade butter, she makes little that is inferior to this grade, which is not an objectionable quality of butter. Practically all of her butter is made in creameries or on farms where dairying is made a specialty, and naturally more attention is paid to the making and marketing than is the case back East, where a few cows are kept on each farm to make a little butter of indifferent quality, as a "side issue." In fact, of the butter that is brought into the State, the bulk of it is low-grade stock used for cooking and baking, as the State does not produce sufficient of this class of butter to supply the

demand. A renovating factory in the State would be an impossibility were it to rely on the local source for its raw material. It is the absence of this low-grade goods from the markets of California that has helped to keep the big average production of nearly thirty pounds per capita out of the way of lower prices. The further improvement of the average quality of our dairy products will work still further in this direction. Good butter is the most pleasing article in our diet. Inferior butter is eaten only of necessity.

San Francisco, March 16, 1906.

THE SILK INDUSTRY IN CALIFORNIA, AND ITS FUTURE.

By HERMANN FASCHER, OF SAN DIEGO.

The silk industry in California is certainly largely, if not entirely, in the future. In fact, it is "*non est inventus*" as far as any commercial value is concerned. And why is this? There is no doubt that silkworms and cocoons can be produced almost throughout the length and breadth of the State of California, and of the very best quality, if it is done under competent supervision, or by people who have been properly instructed. It is true that near the coast line and in very closely settled towns the conditions for the successful rearing of silkworms are rendered more difficult, especially during the wet seasons, because of an excess of moisture, which enhances the liability to disease and failure. And one such failure generally acts as an effectual stop to all future attempts. And well it may. For the successful rearing of silkworms should be attended by a great deal of care and ceaseless watchfulness, which, if rendered useless by disease which could not be prevented, is very discouraging. This discouragement is further enhanced by the fact that, in a place or house where disease has once made its appearance, it is very difficult to raise future crops of worms in good health, because of the well-nigh impossible extermination of *all* the disease germs which found their way into the house. In order to accomplish this, the walls and ceiling must either be thoroughly covered with two coats of lime or whitewash, or else they must be scrubbed and washed with strongly disinfected or carbolized water, and the whole house should be thoroughly fumigated by burning sulphur for several days at a time. Every tray and rack, screen and nettings and the floor must be washed with carbolized water; nettings should be boiled therein; in short, every possible precaution must be taken to kill out the germs of disease. Even the clothes of the attendants and others in the house should be fumigated. In fact, it is necessary to do this, at least at the beginning of every season, even if no disease has been present. Eternal vigilance is the price of success in this case. But farther inland, away from the coast-line towns, and in the country, where there is plenty of pure air circulating around and through the house, the liability to disease is much lessened, success is surer, and the work is easier and more pleasant. Wherever the mulberry tree grows—and it grows all over California, except perhaps on mountain peaks—silkworms can be raised successfully, and if systematically done, is as remunerative as any other employment on the farm.

In Utah, the industry is much further advanced than in California. There the Governor appoints a silk commission, with powers to appoint teachers and send them out into the towns among the people to instruct them in the raising of worms and in caring for the cocoons. This having been done for a good many years, and the State paying a bonus or bounty of 25 cents per pound for all cocoons raised, a great many

people raise worms and cocoons for the bounty only, and they find that even at 25 cents per pound it is better to have their children usefully employed than to have them roam around idle and get into mischief. For the raising of worms is largely children's work. Children of almost all ages can take part therein and have lots of fun, while doing useful work. The gathering of leaves, as well as the feeding and cleaning, can be easily and playfully done by children of both sexes, under the supervision of one older person to see that all is done properly.

But even in Utah the output has been rather spasmodic and scant, because until lately there never was any commercial market for the cocoons, and hence they would lie around in attics and cellars until the mice or moths would eat them through and spoil them. But now a small factory in Salt Lake City buys up a quantity of cocoons to be made into cloth for temple garments, which are sold at a special high price.

Nowhere in the United States, so far as the writer is aware, have home-grown cocoons been converted into commercial silk goods, capable of being sold at the ordinary market price at a profit. And this brings us to the cause of the failure to establish and put upon a commercial basis the silk industry in the United States, and incidentally in California. This cause is very easy to discover.

The present process of silk-reeling, as performed in Japan, consists of softening the cocoon fibers, and the gum which adheres to them, by throwing them into almost boiling water—the older the cocoons the hotter the water must be—and then by girls, skilled in this work, the identical end of the cocoon fiber is found which was used by the worm to start its cocoon. A certain number of these ends are gathered together and by a continuous rolling motion rolled into one single thread, which is wound upon a bobbin, about six inches square with round corners and free space between the corners. When the bobbin is full, it is rewound upon another much larger reel, upon which the silk forms a skein, which skein is then ready for shipment. At the factory these skeins are wound upon small spools. In a doubling machine, a number of such spools are wound simultaneously upon other spools—two, three, four or more threads side by side upon the same spool, according to the weight of thread desired. Each spool is then twisted in one general direction, and the twisted thread wound upon another spool. Two of such twisted threads are then taken to another machine and twisted in the opposite direction around each other so as to form a single thread. This thread is then used for either organzine (warp) or tram (filling) for weaving cloth.

Here, then, we have six distinct operations and handlings which the silk must go through between the cocoon and the loom, if it is desired to weave in the raw.

The greatest trouble comes right in the start when the thread from the reel bobbin is to be wound upon the skeiner. The silk, in drying on the bobbin, contracts and pulls the threads together at the corners, where they become glued and wedged together. In order to unwind them, they must be constantly moistened or steamed to soften the gum again. But, nevertheless, the thread breaks numberless times during the process of rewinding. When it breaks, it is always at one of the corners, and in order to continue the work the right end must be found, which sometimes takes considerable time—from a few moments to

several minutes being thus lost in hunting for the right end. Thus it comes that the process of rewinding requires several times as much time as the reeling, although a larger number of bobbins may be kept going in one machine as long as the thread does not break. This eternal hunting for ends at once struck the writer as being entirely out of the question in America and at the American rate of wages. It seemed to him that if a reel could be made which would take the fibers from the cocoons, dry the same and then wind them directly upon such spools as would fit the twisting machines, and if a twisting machine could be constructed which would perform the double operation of twisting each spool in one direction, while revolving both spools around each other in the opposite direction, four of the above mentioned six operations could profitably be eliminated, and the silk would be better and more perfect, because of less handling. This he has accomplished. And the result is a combination reel, drier, measurer and spooler, and a compound twister head which performs three operations in one. Thus with these two machines there are left only two operations between the cocoon and the loom—no breaking of threads, no rewinding, no skeins whatever. More than two thirds of the labor now required being thus dispensed with, the American silk manufacturer is at once enabled to produce his own tram and organzine at the same or a lower price than he can from imported skeins; for the imported skeins, when unwound at the factory to be spooled, cause considerable trouble by tangling and breakages—all of which is avoided in the new process of manufacture direct from home-raised cocoons.

Southern California capital, under the leadership of San Diego's most enterprising businessman, Mr. Louis J. Wilde, is taking hold of this matter, and, it is to be hoped, will carry it through to a successful conclusion; thus establishing the silk industry, not only in California, but all over the United States, and putting the same upon a practical commercial basis.

And California, more than any other State, should reap the benefit of the establishment of this industry. Why? Because in California silkworms can be raised successfully during from five to seven months of the year, and in favorable seasons even longer, while everywhere else only about two months are available for this purpose, excepting perhaps some parts of the Southern States, where conditions are almost as favorable as in California. Thus, where in other countries only one crop of silkworms can be raised, in California six to seven or even eight crops could be obtained. For the trees, if judiciously handled, may be picked repeatedly during one season.

And now, since there will soon be a permanent market for cocoons, as the factory which is now in embryo will buy all the cocoons the people can raise, the State ought to encourage the silk industry by authorizing the Governor to appoint a silk commission, whose duty it should be to engage and send teachers into the different counties of the State wherever the people may ask for them, to teach them the art of raising worms and caring for the cocoons.

The factory here will probably establish a central cocoonery for the purpose of raising their own cocoons as far as possible, and to educate any young people who may apply for instruction. These then could become teachers at large, and thus this important industry could be established within a very few years all over the State.

Mulberry trees three years old will give a good supply of leaves.

In addition to this State work and as an important auxiliary thereto, the State Fair Association should offer adequate prizes for the best cocoons, reeled silk, sewing silk, cloth, dress goods and new processes of manufacture. All goods to be strictly home products, which should not have left the State during any stage of their production.

This would stimulate the people and induce them to exert themselves to attain the best results.

HOPS.

By DANIEL FLINT.

There is nothing, so far as my knowledge goes, that grows from the ground that is subject to such extreme fluctuations in regard to price and quality as the hop. Under some conditions the vine is a very tender plant; at other times, when fairly fixed in the soil it is hard to eradicate. In botanical parlance the hop vine is called staminate and pistillate, the former the male and the latter the female. If the male vine is not present there will be no seeds in the hop. The plant is called diœcious; that is, the different sexes grow on different vines. The staminate vine bears the fine white dust (pollen) or flower that fertilizes the pistillate and causes the hop cone to contain seeds. This dust or pollen can only be seen in the morning, when the rays of the sun shine down through the foliage of the vine.

The virtue, strength, or value of a hop consists of the yellow, gummy substance, very bitter in taste, called lupulin. This lupulin, with the seed, is deposited at the foot of each leaf on the cone. It is tenacious in its color and stains everything in contact, and the usual remedy for removing these stains from the hands is fig leaves and water.

There are many curious things about a hop that would make very interesting reading, but I fear they would take up too much space in an article of this kind.

To many persons the culture of hops seems a simple calling. For nearly fifty years I have followed hop culture through its ups and downs, and put in the very best talent that I could personally command, and I can see that I am not near the top of the ladder. I would not advise people to go into hop culture unless they own the land and have a bank account upon which to draw during low prices.

In 1882, when hops went up to such a fictitious price, professional men as well as farmers were tempted to try the methods held out to them to get "rich quick." A number of those who so engaged in hop culture could not stand prosperity, and the consequence was that some of the most productive farms on the Pacific Coast were confiscated.

Hop culture is an expensive business, and three or four years of low prices (below the cost of production) are enough to break most growers.

In 1903-04 hops paid handsomely, and as usual it encouraged a good many to try hop culture, with large expectations. In 1905 there was a large crop, especially in England (where the standard price is made), and down goes the price on this coast, to the great loss of thousands of growers and dealers. I look for low prices for the next two years.

The three Pacific States have soil and climate to furnish hops for the world. We can produce them cheaper, and more to the acre, than any other country, and can get a good crop the first year they are planted. One of the drawbacks is the excessive freight—about two cents a pound.

But when the Panama canal is finished we hope to place bales of hops in vessels and send direct to Europe for one half that rate. In the Eastern States and in Europe, from long-continued cropping, the land has become so exhausted of the materials which go to make up a hop crop, that costly fertilizers have to be used very liberally or a small crop will be the result.

In excessively moist countries like Oregon, Washington and Europe, vermin propagate rapidly, and to the great destruction of quantity and quality of the hop. The vermin can only be kept down at great expense by spraying. In California, on account of lack of rain and moisture during the growing season, and because of the warm climate, we are not troubled with vermin.

A fair yield of hops in California is from 1,800 to 2,500 pounds per acre. Cost of picking is from 80 to 90 cents per hundred pounds of green hops. It takes from $3\frac{1}{2}$ to 4 pounds of green to make one pound of dry. It costs from 8 to 9 cents to grow hops, depending on quantity per acre, and a good growing year.

Formerly, it was customary to train the growing hop vines on poles about 3 inches in diameter and from 16 to 18 feet long. As the yards increased the poles became exhausted, and other methods had to be adopted. Most all yards now use wire trellises, consisting of wires stretched at right angles on top of stationary poles, from 16 to 18 feet long. Strings are tied to these wires above and to pegs in the ground, for the vines to climb upon.

One male root should be planted for every one hundred hills. The male root is easily detected; it is darker and the buds are more pointed and red on the end, while the female root is gray, and the ends more blunt.

The hop has two kinds of roots, or, more properly speaking, a lower root and a runner. The runner is pruned every year and is used to set out new yards.

The yards are usually plowed and pruned in February and March, and the vines trained about the first of May.

Picking begins the last of August, and continues for from three to four weeks.

When we consider the amount of help required to gather the hop crop, we hardly know how we could get along without the aid of the Chinese and Japanese as pickers. Including helpers and teamsters, it will take 1,100 persons in the hop fields on the Cosumnes River, 1,300 in those on the American River, and 400 in those on the Sacramento River, in Sacramento County.

Hops are baled in heavy burlap, weighing 24 ounces to the yard. A bale weighs from 180 to 200 pounds.

The principal use of the hop is in the manufacture of beer. In 1882, when the price was so high, the brewers employed the best chemists they could find to produce a substitute for hops. In their research and experiments they found several that would give good results with about one half of the amount of hops per barrel that were used before 1882. So, with the annual increase of the production of beer, the consumption of hops has not increased in like proportion.

After all the bitter and preservative quality of the hop has been secured by steeping, it is put into a powerful hydraulic press, and the last particle of moisture is secured.

When the price of hops is less than the cost of production, large quantities are sent to factories, where a liquid called "Extract of hops" is made. This extract has not become very popular, except in years when the brewers think the price of hops is too high for their large profits.

It takes about twelve hours to dry a batch of hops, and they should lay in the cooling or store room three or four days before baling. After hops come out of the kiln they are put through a sweating process, which prevents them from breaking up so badly while being baled.

CALIFORNIA STATISTICS.

By EDWARD F. ADAMS.

In responding to a request to furnish, for this publication, a brief paper on "Statistics," I can only begin by confessing my incompetence to adequately discuss the subject. As a science I have never mastered it. As an art I have never practiced it. Nevertheless, as a journalist, and occasionally a student, I know what kind of statistics I find useful, and also, alas! what kind I find useless. What I say, therefore, will be from the standpoint, not of the producer, but of the consumer.

A paragraph in the general appropriation bill covering the present and the next fiscal year reads as follows:

For aid to the State Agricultural Society (*provided*, that the State Agricultural Society create and maintain a statistical department for the annual collection, compilation, and distribution of statistics relating to the products and resources of the State), thirty thousand dollars.

It is well to note, in this connection, that the Century Dictionary defines "department" as "A division of official duties or functions; a distinct part of a governmental organization." A "Statistical Department," therefore, of the State Agricultural Society must be a "distinct," that is, separate and complete, organism, within the Society, and forming a part of it, yet having functions and duties quite its own and not concerned with duties not germane to its purpose. This appropriation of "fifteen thousand dollars a year for aid to the State Agricultural Society" has been regularly made for a good many years, always subject to a proviso substantially like that in the Act of 1905. The amounts expended for the maintenance of the "Statistical Department" have never been segregated in the published financial statements of the Society. Probably it would put the "Statistical Department" on a more desirable basis if the Legislature should itself do the "creating" by designating the number of persons to be included in it, defining their duties and fixing their salaries by a permanent law, instead of providing for the "department" in the General Appropriation Act which expires by limitation in two years.

An Act approved March 20, 1905, reads as follows:

It shall be the duty of the Board of Supervisors in each county, on or before the first day of November of each year, to supply the Secretary of the State Agricultural Society, upon blanks furnished by him, for that purpose, statistics showing the products grown, produced, or manufactured in said county, for the year preceding, and the expense thereof shall be a county charge, to be paid as other charges against the county.

The purpose of this law is a wise one, but if it had been drawn by any one who had ever attempted to collect statistics it would have read "on or before the first day of February," instead of "the first day of November," and also read, not for "the preceding year," but "so far as possible, the preceding calendar year." Manufacturing and commercial records are almost universally kept by calendar years, and it is virtually impossible to get figures even approaching accuracy except for

years ending December 31st. For one thing, commercial and manufacturing firms can not, and will not, take time in the busiest season to make "estimates," which can be little more than guesswork, of the output of the current year. Obviously, however, it is absurd to publish statistics which are a year out of date when first printed, and we can have no other, if they are approximately correct, under the law of 1905. The coming Legislature, if asked, will doubtless remedy this defect in the law. While statistical years must correspond, in the main, with calendar years, yet there will always be exceptions. In California the "citrus year" ends with October 1st. The commercial "cereal year" ends with June 30th, although, of course, the "cereal crop year" corresponds with the calendar year. The beet sugar "campaign" usually extends into the new year. Municipalities and other public authorities usually keep their records by fiscal years, ending June 30th. For this reason the law should give the statistical department of the State Agricultural Society the discretion implied in the phrase, "So far as possible the preceding calendar year." But whenever there is a variation from the calendar year it should be noted. Among the kinds of statistics which I find useless for practical work are those which do not show where they begin or where they end. Exactness, or the nearest possible approximation to it, is of the essence of statistics. Exactness of facts is often, perhaps usually, impossible. Exactness of form is always possible, and should certainly be found in official statistics. Where that is lacking no experienced person will have confidence in the accuracy of any part of the work, because that lack is evidence of the unskillfulness in the collector.

We have now before us the law of California for the collection, compilation, and distribution of the statistics of the State. The County Boards of Supervisors are to furnish the Secretary of the State Agricultural Society—presumably to be turned over to the Statistical Department of the Society—with the statistics which they have caused to be collected. The Statistical Department is to do the rest. One evident duty is to compile the statistics supplied by the Supervisors. But the Statistical Department has also independent authority to "collect" on its own account. This independent authority, conferred by the Appropriation Act, it will inevitably be found necessary to exercise. Some statistics gathered from official records can be most economically collected by the central office. There will always be gaps to fill. There will always be errors to correct, and contradictory reports to reconcile. The functions of a Statistical Department in the State Agricultural Society are far more than clerical. It is the Statistical Department, and not the Boards of Supervisors, which the public will hold responsible for the accuracy of the whole work. But I shall have more to say about this a little later. Just now we shall do best to see exactly what is meant by "statistics" and what, therefore, under the statutes quoted, the Boards of Supervisors have the authority to collect, and the Statistical Department authority to compile and distribute—at public expense. The Century Dictionary defines "statistics" as follows: "A systematic collection of numbers relating to the enumeration of great classes, or to ratios of quantities connected with such classes, and ascertained by direct enumeration." In the absence of definition in the statute the foregoing must be accepted as an authoritative description of the matter which the quoted statutes authorize the Supervisors to

collect and supply and the Statistical Department of the State Agricultural Society to compile, publish, and distribute at public expense. Obviously the definition excludes all descriptive or other matter not immediately connected with the statistical tables, and necessary or convenient for readily understanding them. It excludes all such papers as this, however useful or entertaining. None of those things are "statistics," and authority for paying for their printing and distribution from the State treasury must be sought for in some other provision of law. Probably the State Agricultural Society may print them as part of its "report," but the point which I wish to emphasize is that description and discussion, however well fortified with definite figures, are not "statistics." Statistics are exclusively numerical, and are usually, and preferably, printed in tables, properly classified and arranged for easy reference. And in that form their value can hardly be overrated. Without them it is literally impossible to write or speak accurately about anything. They represent the bookkeeping of the State. They are as essential to any correct knowledge of the resources, conditions, and material progress of the State as are the ledger and the cash book to a merchant or manufacturer. The public never reads them. Those who write or speak about the State continually refer to them. It is one of the important duties of a State government to provide for collecting and distributing the statistics of the State, and to the best of its ability to make them accurate. And they can not be made accurate without substantial expenditure. Nothing is more costly than the exact truth. It is so costly that no State attempts to get it. What progressive States do, and what California, I hope, is about to undertake, is to get such a reasonable approximation to truth as will be sufficient for most purposes, and as can be attained with reasonable expense.

It is of the essence of statistics that they be expressed, not in description, but in definite numerical terms. The original collector will seldom be called upon for any comment whatever. The comment, if any, is the work of the central compiler. Of course, judicious comment of a collector is often helpful, and will be made use of by the statistician who makes the final arrangement, but it can not be too strongly impressed on the county collectors that the law asks nothing whatever from them but tables of numbers or ratios, because nothing else is "statistics."

One thing, however, is absolutely essential. If the statistics furnished are to have much of any value in the minds of those accustomed to refer to statistical tables, it must be stated precisely how they were obtained. It is that knowledge, with the intelligence and honesty of the collecting official—which will be assumed—which gives statistical tables their value. Experience shows that those who have the industry to pursue the elusive fact to its actual source will be proud of it, and make it known in their letters of transmission. When I see statistical tables published with no statement of the manner in which they were obtained, I consider them as probably guesswork. I suppose all experienced persons do the same. No numerical statement is of value unless it is made valuable by the sanction of some responsible person who is evidently in a position to authenticate it. The necessity for this authentication is at once apparent when we reflect on the varying degrees of difficulty in obtaining correct figures in the different subjects of statistical

treatment. In some industries precise figures can be obtained if those in a position to give them will do so. In others, pretty close approximations can be made, with reasonable industry on the part of the collector. In still others, the greatest care and effort are likely to leave a large margin of error. Those having occasion to use statistical tables need to have, and in official tables have the right to expect, such information as will enable them to form their own judgment as to their probable margin of error. For example, manufacturers of beet sugar can, if they will, state precisely the quantity of beets sliced and the quantity of sugar produced from them. If the figures are stated to be the official statements obtained direct from the factories every one will accept them as accurate. If they will not give them, and the enumerator has to get his information in other ways, we want to know how he goes about it. The lima bean industry and the raisin industry are very important in this State, but the production of the commercial crops is confined to a few localities, and the products pass from first hands into the control of a comparatively few establishments, so that the records are quite easily accessible, and with ordinary effort the enumerator can ascertain the size of the crop with sufficient approach to accuracy to answer all practical purposes. His report, however, should bear evidence that he has made the proper effort. But when we undertake to ascertain the crop of beans other than limas we have a very different proposition. They are produced in large quantities in many parts of the State and reach market through a multitude of small channels. Whatever the care taken to ascertain the size of the crop, there will be a wide margin of probable error, and in such cases it is doubly important that the methods used in obtaining the figures should be known to those who use the tables.

From the foregoing it is evident that the value of the statistics published by the State will depend mainly on the care exercised by the Boards of Supervisors in selecting the county enumerators. As I have seen none of the reports furnished under the law of 1905, I can only say what faults I should expect to find in the first lot supplied. As to these I should say that accuracy would be too much to expect from the first attempts of new men. It will not be expected. All that can be asked is for the honest to do the best they can, according to their lights, and I do not doubt that we shall get that. I do not believe that the figures will be authenticated in the way which I have indicated, because I do not believe the necessity of it will have occurred to the majority of the enumerators. But I think the fundamental causes of the defects of the reports as they come to the Secretary of the State Agricultural Society will be imperfect conception of the nature of statistics, leading to the introduction of descriptive matter; a desire to "boom" their own counties, leading to looseness of statement and too ready acceptance of extravagant statements or estimates; and inadequate compensation allowed, making it economically impossible for the enumerators to take the time necessary to do their work well. If I am mistaken in my prediction, the reports published herewith will show it, and none will be more delighted than myself to see my pessimism thus effectively rebuked.

But while it would be unfair to expect too much of the first year's work, a very few years should show a very different state of things. Under the law as it stands, with the amendments which I have suggested, within four or five years the official California statistics ought

to be the best of their kind on this continent. They will be so if the Supervisors are careful in the choice of their enumerators, and keep good men, when found, permanently in their positions. In the course of a few years a county enumerator will have found out all about the resources and industry of his county, get in touch with all who are in a position to give him the definite figures which he requires, and be able to make each year's report an improvement on the preceding, until the highest possible approach toward perfection is achieved. One experienced enumerator is worth ten without experience. If, however, Boards of Supervisors treat the position of enumerator as a political job to be awarded to the person with the strongest "pull" in any given year, our tables of "statistics" will be merely tabulated lies. In most counties the expense of the enumeration need not be large, for after the first year the actual time spent need not be great. In San Francisco there is work for a good man the year round.

It remains to say something about the duties of the Statistical Department in the State Board of Agriculture, which I must assume will consist of an educated statistician, preferably a graduate in economics from some university, with, if possible, some statistical training, with such clerical assistance—probably a stenographer may be sufficient—as experience proves necessary. No man can do the work which needs to be done, if we are to have reliable statistics, without devoting to the work every working day in the year. We shall perhaps better comprehend the necessity of this by considering the definition of the word "statistics" in another sense from that hitherto used, as given by the Century Dictionary, as follows:

"STATISTICS—The study of any subject, especially sociology, by means of extensive enumerations; the science of human society as deduced from enumerations."

That definition indicates the intellectual equipment of a competent statistician. Statistics are the data of the science of human society which has for its purpose the promotion of human welfare. One or two generations of students have been earnestly engaged in accumulating and classifying definite information, numerically expressed, in respect to the economic and social condition of mankind, and the data thus obtained form the basis of the twin sciences of economics and sociology. Every addition to those data is—or should be—a contribution to the foundations of those sciences. Obviously no man should undertake to deal with such data and arrange them for publication who has not a fair knowledge of the sciences for whose benefit they are collected and, therefore, of the character of the information most needed, and of the forms in which it can be most usefully presented. The best training for statistical service is that given in the economic and sociological courses of our universities, and no man is competent to be the head of the Department of Statistics contemplated by law to be in the State Agricultural Society, who has not received the equivalent of that training.

That, however, is not enough. The most learned economist or sociologist in the world might be totally unfit to be charged with the duties assigned by law to the Department of Statistics; for lack of certain mental endowments which we speak of as gifts of nature. The successful practical statistician is as much born as made. The qualities of tact, patience, ingenuity, and constructiveness which are essential to

the discharge of the duties of a State Statistician, if they exist in a man, are inherent in him. He can not acquire them at any university. The useful statistician is one who, as it is sometimes expressed, can "make figures talk." The mechanism by which that is accomplished lies in the form and arrangement of the tables and the illuminating footnotes which accompany them. Some men can do it, and others never can learn. The experienced student, with sufficient effort, can discover what almost any tables teach, or fail to teach, but a public document intended for free distribution for the information of the general public should do far more than that. It should make its statistical tables easily understood by the average intelligent citizen. "Statistics" is an art as well as a science.

The laws of this State do not permit the Department of Statistics to select its own agents for the collection of data. It must work with such men as the County Supervisors provide. Some will be good; some will be inefficient. There is where tact and patience will come in. Scolding will do no good at all. Supervisors can not be driven to appoint good enumerators. The enumerators can not be driven to do good work. Coaxing will usually be successful in both cases. The law, however, requires some amendment. The head of the Department of Statistics in the State Agricultural Society should have the same relation to the County Enumerators that the Commissioner, or Deputy Commissioner, of Horticulture has to the County Horticultural Commissioners, with the additional authority to send back faulty reports for correction or compilation. He must also be allowed traveling expenses to enable him to visit the counties, instruct and work with the enumerators, confer with Supervisors and with the other State and local officials charged with the duty of collecting industrial, commercial and sociological data. Within four or five years a skillful man can create an *esprit de corps* which would wonderfully improve our statistical service. There will always, also, be important information which a State official can get, in confidence, aggregates, or averages only to be published, which would never be given, in detail, to county enumerators. But it must be sought in personal interviews. Writing will seldom get it. In that work, in traveling among the counties, in the office correspondence, and in the preparation of his annual report, there is work for a competent and energetic person the year round.

When I was asked to write under the general title of "Statistics" I understood that I was invited to prepare whatever, germane to that subject, I should deem most useful. It has seemed to me the most useful to state, from the standpoint of the habitual user of statistics, what seemed to me essential to getting any reliable statistics of California at all. It would have been easy to write about the subjects which ought to be covered, and the best method of doing the field work and the work of the central office. A good statistician, however, would know more about such things than I know, and without a good statistician at the head there can be no statistical work of any interest to me. Hence I have written about what seems to be the first essentials. The subjects to be covered is a matter of legislative discretion, and should be fixed by law, for the greater the number of subjects covered the greater will be the expense which the Legislature should control. The organization which I have outlined may seem expensive, but is not particularly so. A salary of \$2,500 a year for the State office with

reasonable probability of permanence in position would be very attractive to a young man, and would probably keep him as he grows older, unless he should develop extraordinary ability, when it would not. There should be a stenographer competent to attend to routine business in the absence of the head of the office, and there should be traveling expenses allowed. The cost of the county work is already obligatory on the counties, and, except in the very largest counties, which can afford it, that need not be large, because, while it would be on the mind of the enumerator the year round, the actual time required would be but little. He is not required to comment on the facts, but merely to report them in numerical form. The positions, however, would be desirable, because they would bring other work if it were desired, from private corporations and from the United States Government, which is constantly extending its statistical service. At any rate the law now requires the information from the counties. The question as to whether or not the crude information thus collected shall be worked over and put into forms useful to the public will be answered when it is settled whether there shall or shall not be a competent supervising State head to the service, permanently installed in the State Agricultural Society, or somewhere else, in accordance with the letter and spirit of the language of the above quoted paragraph on the General Appropriation Act of 1905.

RESOURCES

OF THE

STATE OF CALIFORNIA.

(BY COUNTIES.)

ALAMEDA COUNTY.

Alameda County fronts the bay of San Francisco for a distance of 38 miles, with an average width of 25 miles, extending to and beyond the summit of the Contra Costa hills, comprising numerous beautiful valleys, besides the broad Alameda Valley, which last is bounded by the waters of the bay on the one side and the Contra Costa hills on the other, and is one of the richest and most fertile valleys in the State.

The principal stream is Alameda Creek. There are other creeks crossing the county and emptying into the bay, two of which furnish water for the city of Oakland. The country around Hayward is one of the great fruit-raising regions, many millions of pounds being shipped annually.

The soils immediately along the bay in Alameda Valley and the marshes formed by the overflow are heavy, but very fertile when reclaimed. Then comes a broad belt of rich, black adobe that is crossed by deposits of alluvium made by shifting channels of streams running down from the Coast Range. In the Niles region are lighter loams. About Livermore are uplands, bench and valley lands. Between the latter two classes the variation in potash, lime, and phosphoric acid accounts for difference in grape crop. Mission San José is characterized by gravelly, upland, adobe soil, and was evidently chosen by the padres of the old Spanish mission for its exemption from frost, caused by its slight elevation above the surrounding valleys. The Pleasanton section consists of agricultural and grazing lands. The soil is a very rich sediment, producing hay, grain, potatoes, hops, and beets in abundance. At Alvarado the surrounding country is a fine farming and fruit region, and gardening and dairying are largely carried on. The fertile, alluvial soil is finely adapted to fruit-growing.

The average rainfall of the county is about 30 inches.

Alameda County was among the first to begin the planting of orchards and vineyards. This county is divisible into three sections—the cherry district, the apricot district, and the vineyard district.

From Oakland to Hayward is the home of the cherry, and in an ordinary year this crop is good for a profit of a quarter of a million dollars.

The apricot section includes all the region east and south of Hayward, but the center is at Niles. The Alameda apricot is high colored and the flavor exquisite. One of the most popular varieties, the Alameda Hems-kirk, was originated here. The other varieties preferred are the Blenheim and the Moorpark. A first-class apricot orchard is easily worth \$500 per acre, and some could not be bought for \$750 or \$800. Apricot trees yield from twelve to twenty tons an acre, worth from \$20 to \$30 a ton. Thousands of carloads of apricots are shipped annually from this county.

While cherries and apricots are the king and the queen of fruits, there are others which do well, among them being the Bartlett pear. The plum is another fruit which thrives, and the smaller fruits and berries are profitably grown.

In Alameda County are the largest currant patches in the United States. The size of an average currant farm varies from twenty to forty acres. Local canneries pack a great number of cases of this fruit, and thousands of chests of currants are shipped away each year.

Almonds, chestnuts, English walnuts, pecans, beechnuts, and hazelnuts are extensively cultivated.

Alameda is par excellence a vegetable-producing county. It has led in this industry for a long time, and the area devoted to vegetables has been increasing at a rapid rate, since the profit in peas, potatoes, tomatoes, rhubarb, asparagus, and several other vegetables is large enough to tempt the owners of the best soil to go into the business.

There are 8,000 acres devoted to vegetables in the county, not including sugar-beets, which would add 4,000 or 5,000 acres more.

Many acres in this county are planted to tomatoes, which prove to be a most profitable crop. It is not unusual to find 100 acres of tomatoes growing upon a single farm.

The potato crop is of increasing importance, since it has been found that there is good money in the big Burbank potatoes and other commercial varieties. The best soil will produce from 75 to 80 sacks to the acre, although record yields of 150 sacks have been produced.

The growing of peas for canning has assumed importance. The output of the San Leandro cannery, located in this county, has reached as high as 1,200 cases per day, and $3\frac{1}{2}$ tons of peas have been grown upon a single acre. These peas are sold for \$30 per ton.

One of the prosperous agricultural industries is the growing of rhubarb for the California and Eastern markets.

The hop industry is chiefly located near Pleasanton, and during the picking season employment is given to some 2,000 pickers. The Pleasanton yards are the largest hop yards under one wire in the world. Over sixteen million pounds of cable and of trellis wire are used for the network that spans the twenty-foot poles to sustain the weight of the full-grown vines.

California was the first State in the Union to manufacture beet-sugar on a commercial scale. In Alameda County it has been manufactured for the past thirty-three years. Within her borders is located not only the pioneer beet-sugar factory of this country, but also one of the largest factories in the world. The annual production of beet-sugar in California exceeds that of any other State. Last year the factories produced 100,000 tons of sugar. The product of the land used for this industry is annually worth \$10,000,000. In this State are eight factories engaged in the industry. The amount invested in these factories, including working capital, is \$20,000,000. Beets in Alameda County average over 14 per cent sugar of 88 per cent purity, and they yield an average of $15\frac{1}{2}$ tons to the acre. The planting season extends from the first of February to the middle of May. This provides a long period of activity for the factory, which begins operations in August, and has continuously maturing crops of beets to handle. Last year there were in Alameda County over 3,041 acres planted to beets. This land produced 43,203 tons of beets, the value of which was \$216,015.

The average annual output of salt recovered from San Francisco Bay, in Alameda County, is 100,000 tons, including both coarse and fine salt.

Oakland is the county seat, located on the bay opposite San Francisco, and has for its immediate neighbors the cities of Berkeley and

Alameda. These three cities are very prosperous and have a rapidly increasing population.

The University of California is located near the city of Berkeley, and has an average attendance of 3,500 students.

STATISTICS OF ALAMEDA COUNTY FOR 1905.

The county has an area of 840 square miles, or 537,600 acres. It has 2,482 farms, comprising 443,046 acres. The value of its country real estate, as shown by the assessment roll, is \$14,263,100; and of improvements thereon, \$5,781,725. The value of its city and town lots is \$44,549,876, and of improvements thereon, \$33,152,640. The assessed personal property amounts to \$17,339,815. Its total assessment roll amounts to \$115,087,206, showing it to be not only one of the rich counties of California, but one of the big counties of the United States.

There are 824 miles of public roads in Alameda County, and the amount expended on them aggregates \$375,018, and the amount on bridges \$93,237. In the towns and cities there are 439 miles of streets. The road tax levy for 1905 was 40 cents on the \$100.

The county buildings are valued at \$825,000.

Of railroads in the county, there are 139.90 miles of steam, assessed at \$2,071,751.27; and 158 miles of electric, assessed at \$4,446,400.

There are five electric power plants, assessed at \$339,425; and 60 miles of electric power lines, assessed at \$46,800.

Cereal Products and Hay.

	Acres.	Tons.	Value.		Acres.	Tons.	Value.
Wheat	4,776	2,833	\$79,324	Corn	1,331	722	18,772
Barley	16,535	11,445	274,680	Alfalfa hay	729	2,426	14,556
Oats	8,189	4,176	125,280	Grain hay	59,604	79,777	655,644

Its total cereal acreage was 91,164, the crop from which in 1905 was worth \$1,168,256.

The total grain crop was 19,176 tons, and the total hay crop 82,203 tons.

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.		Bearing.	Non-Bearing.
Apple	33,670	95	Plum	26,910	4,140
Apricot	273,690	63,180	Prune	149,580	35,010
Cherry	100,980	19,600	Almond	47,970	3,960
Olive	2,700	—	Walnut	2,550	2,320
Peach	21,870	2,340			
Pear	58,520	9,870	Totals	718,440	147,070

Grand total, 865,510.

Of table grapes the county has 138 acres, and 4,023 acres of wine grapes, all in bearing; a total of 4,161 acres of grapes.

Of berries the acreage is: blackberries, 7; currants, 261; gooseberries, 21; raspberries, 11; and strawberries, 6. A total of 306 acres of berries of all kinds.

Fruit, Vegetables, Nuts, Etc.

<i>Green.</i>	Amount.	Value.	<i>Green—Continued.</i>	Amount.	Value.
Almonds (pounds)	651,425	\$71,656	Raspberries (crates)	1,095	\$5,475
Apples (boxes)	43,268	25,924	Strawberries (crates) ..	629	1,887
Apricots (pounds)	17,295,550	138,369	Tomatoes (tons)	19,170	143,775
Asparagus (pounds)	1,490,000	59,600	Walnuts (pounds)	140,000	17,500
Blackberries (crates)	1,754	4,375	Rhubarb, 640 acres (lbs.) ..	3,800,000	58,000
Beans, String (pounds)	332,000	4,980			
Beets, Table (pounds)	540,500	4,850	Total		\$958,506
Cabbage (pounds)	1,597,500	8,987			
Celery (pounds)	30,000	600			
Corn, Table (pounds)	2,575,000	25,750	<i>Dried.</i>	Pounds.	Value.
Currants (pounds)	700,400	7,004	Apples	53,900	\$2,156
Cherries (pounds)	1,625,250	56,873	Apricots	134,900	107,272
Gooseberries (pounds)	54,000	1,620	Beans, String	322,500	9,657
Grapes, Wine (tons)	5,522	124,250	Cherries	28,000	2,000
Grapes, Table (tons)	261	7,800	Onions	825,000	8,200
Onions (pounds)	40,000	750	Pears	206,000	16,496
Pears (pounds)	4,984,900	74,778	Peaches	16,200	810
Peaches (pounds)	784,675	11,770	Peas	224,000	2,240
Peas (pounds)	15,350,500	9,800	Plums	2,300	115
Plums (pounds)	923,000	9,230	Prunes	450,150	18,006
Potatoes, Irish (pounds) ..	8,935,900	80,406			
Potatoes, Sweet (lbs.)	37,375	374	<i>Canned.</i>	Cases.	Value.
Prunes (pounds)	2,387,225	11,936	Fruits and vegetables of		
Quinces (pounds)	18,705	187	all kinds	587,000	\$1,340,750

Wines, Brandies, Etc.

Number of wineries				20	
Number of breweries				8	
	Gallons.	Value.		Gallons.	Value.
Wine—Burgundy	22,500	\$4,440	Wine—Sauterne	144,000	\$51,450
Cabernet	17,000	4,065	Zinfandel	119,000	21,460
Burger	4,500	1,015	Other wine	68,000	17,000
Folle Blanche	4,500	1,015			
Château Iquem	1,000	600		1,001,500	\$210,345
Claret	581,500	100,230			
Hock	20,500	4,870	Beer (barrels)	73,355	331,900
Golden Chasselas	2,000	500	Brandy (gallons)	9,500	4,650
Riesling	17,000	3,700			

Livestock Industry.

	Number.	Value.		Number.	Value.
Cattle—Beef	4,518	\$129,445	Horses—Thoroughbred	423	\$171,115
Stock	13,541	295,039	Common	15,418	1,390,502
Thoroughbred	282	11,810	Colts	1,052	47,025
Dairy Cows—Graded	9,548	290,104	Sheep—Common	6,806	21,657
Guernsey	1		Lambs	4,391	11,621
Herefords	21		Goats—Angora	37	123
Holsteins	115		Common	40	127
Jersey	93		Wool, from herds (lbs.)	41,500	
Polled Angus	1		Wool, from hides (lbs.)	350,000	76,902
Red Polled	25		Mules	266	25,360
Shorthorns	26				
Calves	5,768	46,662	Total value		\$2,555,870
Swine	6,316	38,378			

Note.—It was difficult to get an appraisalment on the thoroughbred cattle.

Poultry and Eggs.

	Dozen.	Value.
Chickens	17,958	\$84,891
Ducks	756½	3,609
Geese	111½	1,376
Turkeys (pounds)	28,509	5,609
Eggs	1,116,307	274,710
Total value		\$370,195

Dairy Industry.

Of dairies Alameda has 87 and 17 creameries. The output of butter is 2,400,969 pounds, worth \$612,770. In addition to this output of butter the county produced 3,634,770 gallons of milk, worth \$605,791, making the total value of her dairy output \$1,218,561.

Manufactories.

Of manufactories the county has 4 that work wood, employ 75 people and turn out \$137,600 worth of finished products per annum.

It has 14 boat-building establishments that employ 316 people, with an annual output worth \$527,000.

In the making of brooms 83 people are employed, who turn out 10,450 dozen brooms per annum, worth \$21,100.

There are 24 cigar factories that employ 82 people, who make annually 3,572,000 cigars, worth \$147,320.

There are 8 clothing manufactories that employ 146 people and turn out annually \$156,656 worth of finished product.

Eleven chemical establishments employ 70 people and have an annual output worth \$206,532.

The cotton, silk, hemp, and jute mills employ 681 people and put out annually material worth \$1,231,200.

There are 19 confectionery establishments that employ 165 people and turn out 1,201,400 pounds of material, worth \$166,589.

Nine cracker factories turn out \$9,320 worth of crackers per year.

Flouring-mills are credited with 25 employes, and an annual output of 24,442 barrels, worth \$98,190.

There are prepared cereal foods manufactured to the value of \$1,960 annually.

There are 29 people employed in mills that grind grain for stock; these turn out 15,429 tons per annum, worth \$415,000.

Seventeen crushed-rock yards employ 378 people and turn out annually 372,987 cubic yards, worth \$327,477.

Farm implement establishments employ 61 people, with a yearly product worth \$150,550.

The largest furniture factory refused to report, but those that did employ 48 people, with an annual output worth \$138,025.

Leather-goods factories employ 125 people; output, \$195,844.

Job printing establishments number 45, with 355 employes; output, \$550,998.

Iron works, foundries, machine shops, and wire works employ 825 people, with an annual output of \$1,682,566.

Pickle and vinegar factories, 122 employes; material used annually, 3,655,900 pounds; output worth \$304,035. Other kinds, such as sauces, etc., use 96,870 pounds of material and make it into a product worth \$24,660.

Sash and door factories and planing mills, 35; employes, 983; output, \$2,383,838.

Potteries, 6; employes, 225; output, \$461,440 (incomplete).

Salt works, 10; employes, 222; output 74,000 tons coarse salt, worth \$74,000; 20,000 tons refined salt, worth \$70,000.

Soap and starch factories employ 65 people, with an output worth \$206,500.

One beet-sugar factory employs 40 people (150 extra men during operating season), and makes 4,726 tons of sugar, worth \$375,000.

Tanneries employ 50 people; output, \$205,000.

Tin and galvanized iron works, 10; employ 58 people; output, \$93,100.

Paints, oils, building, and prepared roofing establishments employ 188 people, and have an output of \$1,442,950.

Wood-turning and carving establishments, 5, which employ 33 people, and have an output of \$51,500.

Yeast works produce 74,100 pounds, worth \$11,115.

Wagon and carriage factories work 113 people, output worth \$114,134.

Coal, glass, clay, and magnesite works employ 116 people, and have an output worth \$304,477.

Unsegregated factories employ 170 people; output, \$490,300. These include carbonated drinks, flavoring extracts, rice, nectar, matches, artificial limbs, trusses, medical belts, medals, fuse, electroplating, caskets, art glass, frames, trunks, gas mantels, etc.

Total manufactures of the county	\$13,285,197
Total agriculture	8,596,133
Grand total	<u>\$21,881,330</u>

AMADOR COUNTY.

Amador County is located between the Cosumnes and Mokelumne rivers, and extends from the San Joaquin and Sacramento valleys on the west to the summit of the Sierra Nevada Mountains on the east—a distance of more than 75 miles. Its altitude ranges from 300 feet above sea-level in the western portion to something over 9,000 feet in the eastern end.

The resources of the county are numerous and varied. For many years it stood among the leading gold-producing counties, and at present has perhaps the greatest number of dividend-paying mines (quartz mining being specially referred to). Gold production in 1904 was \$2,060,573. Copper is mined in considerable quantities. The western portion is underlaid with immense beds of soft or fuel coal. Many thousands of tons are shipped to different parts of the State. Alongside of the railroads are unlimited beds of the finest potter's clay. There are many other sources of wealth, such as fine building-stone, roofing slate, and beautiful marble.

The western portion is composed of rolling hills, interspersed with beautiful little valleys, the land of which is adapted to all kinds of agricultural products—wheat, barley, oats, corn, potatoes, broomcorn, and alfalfa. All kinds of vegetables grow in profusion. The rolling lands, which constitute the greater portion of the county, are composed principally of a gravelly, or red loam, soil, and covered more or less with oak timber and an undergrowth of brush and wild grasses, which makes them well adapted for the raising of stock—one of the leading industries of the county. Horses, mules, sheep, hogs, and cattle are raised in considerable numbers, especially cattle, of which many fine herds are owned in the western portion of the county, where they are kept during the fall, winter, and spring without other feed than the natural products of the soil. In the summer they are driven up near the summit of the Sierra Nevadas, to graze along the mountain sides, just below the rim of the melting snow.

The production of hay, grain, alfalfa, and vegetables is limited to the demands of home consumption. Where suitable soils are selected the yield is large.

Dairying is another important industry. Ione, in the western part of the county, and at the railroad terminus, has the leading creamery in this part of the State. It also has the leading flouring-mill, furnishing a home market for grain.

Poultry-raising is an industry that is carried on to a considerable extent, and at remunerative prices.

Fruit-growing is carried on in all its branches. While there are yet but few large orchards and vineyards, the climate and soil of Amador County are equal to any in the State for the growing of apples, peaches, pears, plums, prunes, quinces, berries in great variety, and grapes in

particular. Oranges grow to perfection. The olive has been experimented with in the foothills to a sufficient degree to prove its success.

The central portion of the county is covered with great forests of pine, spruce, fir, and hemlock, in which are located some extensive mills that employ scores of laborers in the cutting and hauling of lumber to supply the mines that are situated twenty-five miles below.

One other valuable enterprise is the plant of the Standard Electric Power Company. It is located about seven miles east of the town of Jackson, and furnishes power and light not only for Amador County, but also for outside points. The plant is run by water power, the supply coming from the never-ceasing streams and melting snowbanks up near the summit of the Sierra Nevada Mountains, the water being caught and retained in immense reservoirs.

Amador County has an ample rainfall, the average precipitation being about 23 inches. The farmers have not found it necessary to adopt a general system of irrigation, although the supply of water is ample, and to spare, if properly husbanded in large reservoirs, for which there are many available sites.

Prices of land have a wide range, governed by quality of soil and location, and by the amount and character of the improvements.

Area, 568 square miles, or 363,520 acres.

ALPINE COUNTY.

Alpine is one of the mountain counties, and its principal industries are mining and lumbering. It has but a small population, the last census placing it at 509. Its cultivated lands will reach 10,000 acres.

The county is a succession of mountain ranges, with high and precipitous peaks. Silver Mountain is one of the highest peaks, having an altitude of 10,000 feet. There are numerous small lakes, the waters of which are clear and cold; many of them contain mountain trout. The county is bountifully supplied with brooks, creeks, rivulets, and rivers. The Carson River heads in the southern part and flows from south to north through the county.

Among the mountains are numerous valleys. The largest and most noted are Diamond, Hermit, Pleasant, Hope, Faith and Charity. The valleys are inhabited only during the summer, and then by stockraisers and dairymen. The dairy interest in these valleys is of considerable importance. The nutritious bunch grass, which grows so luxuriantly in these mountainous regions, is of excellent quality, and stock fattens rapidly upon it.

The entire western section is a wild mountainous region, whose grandeur of scenery vies with the Alpine regions of Europe. From November until late in June the region is wrapped in a mantle of snow, varying in depth from two to fifty feet; during the remainder of the year it forms a vast mountain pasture for thousands of sheep and cattle that are driven there from the lowlands of the State to feed during summer and fall. The greater part of the surface of this mountainous region, as well as the lower and eastern section, is covered with forests of heavy and valuable timber. All the coniferous trees common to the western slope grow to a large size on the mountainsides.

In the northeastern part farming is carried on to a considerable extent. In the elevated valleys among the mountains, summer dairying is an important industry. Carson Valley, extending into the northern part of the county, contains some of the most productive and valuable agricultural lands in the State.

The many beautiful lakes high up among the mountains are favorite summer resorts. The Blue Lakes, especially, are a famous rendezvous for summer pleasure-seekers. In many parts of the county are mineral springs, both hot and cold.

In the valleys the soil is a heavy alluvium, rich and fertile and yielding bountiful crops where cultivated. Some very excellent apples, pears, and small fruits are produced.

Markleeville, the county seat, is located on the west bank of Carson River, and is reached by stage via Carson City.

There are at least sixty irrigation ditches in operation. The Blue Lakes Water Company has four large reservoirs in the western part of the county. These are of great value and constitute an important part

of the plant of the Standard Electric Company. The Union Water Company has two large valuable reservoirs in the southern part of the county, from which the Utica Mining Company, at Angels, Calaveras County, gets its water. Two companies of Carson Valley farmers own and control at least twenty valuable reservoir sites in the central part of the county, upon eleven of which more or less work has been done in the construction of dams and in which water has been stored and utilized.

The mining industry, so long dormant, is giving promise of large results.

Area, 575 square miles, or 368,000 acres.

BUTTE COUNTY.

Butte County occupies a position in the northeast portion of the Sacramento Valley. One half of the area may be termed foothill lands, and of the remainder one fifth may be denominated as mountainous, leaving about one third of the entire area as fertile valley lands. The mountains are heavily timbered, giving place to important lumbering interests; the foothills are covered with oak and smaller growth, while the valley lands have, with the exception of the adobe soil, splendid growths of mammoth oaks. The Government Experiment Station is located in this county.

The Sacramento River, along the county's western boundary, affords communication by water for vessels at all times of the year, while the California & Oregon Railroad traverses the center of the county its entire length; a branch of the same line extends to Oroville from Marysville, and the Western Pacific is coming into the State through this county; a number of electric roads are also being constructed or projected. All the more important parts of the county have ready communication with the markets of the coast and the seaport at San Francisco.

Chico is the metropolis, and is on the California & Oregon Railroad, in a rich agricultural and horticultural section. It is an incorporated city, and is the educational center of the northern half of the State, being the location of a State Normal School. This institution has a wide and favorable reputation among the educators of the West. There are between four and five hundred pupils in regular attendance. Chico has wide, tree-lined avenues, and a complete sewer system. Nine or ten religious denominations are represented.

Oroville, the county seat, is situated at the terminus of the Northern California Railroad, running from Marysville, 28 miles distant. It is a prosperous, growing place of 3,500 people. It has excellent schools. Oroville is the center of the orange and olive growing district. The largest olive-pickling plant in the State is located here, and the olive oil manufactured in this section is of high grade. Three gold medals were awarded for purity and excellence, to as many different manufacturers, at the St. Louis Exposition. Soil and climate are especially well adapted to the production of figs, which are grown with much profit. Deciduous fruits and grapes do exceedingly well on the foothill lands east of Oroville. Mining is a very important industry, and the largest gold-dredging field in the United States is here.

Oroville will be a very important point on the Western Pacific Railway. This company has purchased a large tract of land at the edge of town for a yard and depot site, and has acquired rights of way for thirty or forty miles through the mountains northeast.

Biggs and Gridley are on the California & Oregon Railroad in the valley proper, and in the midst of fertile farms and great orchards.

Both have excellent public school facilities, and the latter a union high school. The building of the Butte County Canal to irrigate lands in the vicinity of these towns, means much for their welfare and insures their growth.

The climate of the county is similar to that of all the interior parts of California, with the exception that proximity to the Sierra Nevada Mountains induces a more abundant rainfall than have many of the other interior counties, thus rendering a failure of crops practically unknown. In the foothills the climate is more delightful; no snow falls and frost comes but seldom. The rainfall is abundant and a "dry" year is unknown.

Irrigation is not generally practiced except for citrus fruits. The Sacramento River runs along its western boundary, the Feather River bisects the county, Butte Creek runs through its center, while Big Chico, Pine, Mud, and numerous smaller but never-failing creeks run through thousands of acres of most fertile lands. In the eastern section of the county, where the growing of oranges and olives has assumed great proportions, irrigation is generally practiced, and a shortage of water supply is never known.

The soil of the county varies with location. In the hill section it is mostly of a red, gravelly quality, which experience has shown is best adapted to citrus fruits and olives; in the valley proper it is divided into three qualities: adobe, which is devoted solely to grain, and which in favorable seasons produces immense crops; the bottom lands along the creeks and rivers, where vegetables and fruit and grain do well; and the black loam lands which prevail about Chico, unequaled for fruit and grain. In the mountains are many little valleys where hay and grain, and fruit and stock, provide plentiful livings for families.

The products of Butte County are many and varied, ranging from the orange, lemon, and olive of the semi-tropics, to the apple and fruit and grain of more northern climes. To these direct products of the soil must be added the great stock interests, also the mills which convert the timber of the hills into lumber. In the valley portions grain has been one of the chief, and for many years was almost the sole, product grown. Tens of thousands of acres are yet devoted to this industry. The vast expanse of country reaching from Chico on the north to the county line on the south, and from the edge of the foothills on the east to the Sacramento River on the west, is as fertile and beautiful a body of land as the sun shines on, capable of supporting ten times its present population. This is the great grain-growing section of the county, though much of its territory has in later years been turned from wheat fields into orchards.

Butte County in fruit production has reached that stage where it is to be classed among the first in the State. There are more than a million bearing fruit trees within the county, besides probably a third more to be classed as non-bearing.

The natural home of the peach is in the rich valley lands. The Rancho Chico orchards at Chico and the immense orchards at Rio Bonito and elsewhere along the Feather River constitute the largest single holdings devoted to this fruit in the county, and at least two of these plantings rank among the largest in the world.

In orange-growing, Butte occupies a unique position among the counties. Geographically it is classed as one of the northern, and yet

climatic conditions are such that it has forged to the front as one of the chief of the orange-growing counties. Butte County annually sends large quantities of oranges to the southern counties, for the reason that the fruit here ripens earlier than in the south, and before the holiday season it is practically all disposed of, thus being first on the local and Eastern markets and netting shippers high prices. The fruit is clean, free from smut or rust, and there is a never-failing supply of water for irrigation. There are large packing-houses at Oroville, Palermo, and Thermalito. Most of the fruit goes East. Planting is going steadily on.

Olive-growing is among the county's first industries. The olive seems to do equally well in almost all parts of the county. Pure olive oil and pickled olives, manufactured from fruit grown in the county, are shipped all over the United States.

Prune-packing from the large orchards in the vicinity of the line of railroad, and especially at Chico, Durham, Biggs, and Gridley, has assumed mammoth proportions. There is a coöperative prune warehouse at Chico, where is stored and from whence is shipped the principal product. The fruit is heavy in sugar, and of the best marketable size.

Mention should be made of the excellent apples produced in the foothills and mountains; the several thousand fig trees, which find a natural home here; and the great yearly output of apricots, cherries, pears, and almond and other nut crops.

There are several hundred carloads of green fruits packed at the local canneries. These canneries are important factors in the county's prosperity, affording a home market, and giving employment to many hundred men, women, and girls during the summer months. The mining camps in Butte and adjacent counties are an important market also, and large quantities of fresh and dried fruits are consumed by them.

Numerous private dairies in various parts of the county attest the value of the dairy herd, and with the cutting up of the larger ranches there will be more attention paid to this industry. Alfalfa is grown with great success, and many are turning their attention to this crop.

Many land-owners have turned their attention to the raising of chickens, turkeys, and ducks, principally the former. The climate, soil, and feed conditions are such that the greatest inducements exist for the further development of this industry.

The raising of cattle, sheep, and hogs has ever been an important occupation in Butte County. The foothills and mountains afford, during the summer season, abundant grazing grounds, while in the other seasons the lowlands and stubble fields of the valley fatten for the market cattle and sheep. Stockmen are gradually improving their breeds by the introduction of better stock.

The lumbering interests of the county are in a prosperous condition. The mountains of the county abound in fine timber, much of it being sugar-pine of the best grade. The Diamond Match Company, the largest concern of its kind in the world, looking west for new timber land, located about 15,000 acres of valuable forests in Butte County. It has built a railroad from Chico to tap its holdings, and is now engaged in taking out the timber. This company manufactures not only matches, but all kinds of building material. The Sierra Lumber Company is also a large concern, with headquarters at Chico. The most of

its lumber is floated by means of V flumes many miles in length to Chico; from whence it finds rail transportation to market, and is also converted into boxes and building material at its large factory. Lumbering will continue to be for many years one of the most valued of the county's resources.

There are many companies in the Oroville district operating gold dredges. The operations are on the Feather River. The gold yield from the dredges operated in the district in 1903 was \$1,329,998. The gold is comparatively fine, easily amalgamates, and runs about \$18.50 per ounce. Electric power is used and water is abundant. The Feather River Exploration Company installed the first successful dredge ever operated in California, and began work in March, 1898.

The county offers unexcelled chances for the man of small means with a family to acquire land in small tracts, and, while his plantings are in the non-productive stage, there is work for him and his family, either for others or in the production of poultry and small fruits and berries, sufficient to afford a handsome livelihood.

STATISTICS OF BUTTE COUNTY FOR 1905.

General.

Area, 1,720 square miles, or 1,100,800 acres	Value of county buildings-----	\$147,000
Number of farms ----- 1,517	Irrigating ditches—miles, 401;	
Number of acres assessed----- 870,039	cost -----	\$1,058,640
Value of country real estate ----- \$11,558,177	Railroads, Steam—miles, 91; as-	
Of improvements thereon ----- \$1,851,433	essed value -----	\$1,237,038
Of city and town lots ----- \$2,200,413	Electric—miles, 4.61; assessed	
Of improvements thereon ----- \$2,441,600	value -----	\$13,725
Of personal property ----- \$3,596,723	Electric power plants, 2; assessed	
Total value of all property ----- \$24,755,312	value -----	\$72,450
Amount expended on roads ----- \$22,968	Electric power lines—miles, 97;	
Amount expended for bridges ----- \$104,652	assessed value -----	\$23,250
Number of miles of public roads ----- 1,549	Number of acres irrigated -----	7,774
Road levy per \$100, 1905 ----- 40 cts.		

Cereal Products and Hay.

	Acres.	Tons.	Value.		Acres.	Tons.	Value
Wheat -----	32,931	14,158	\$353,950	Alfalfa hay ----	3,850	12,317	\$49,800
Barley -----	26,981	13,344	266,880	Grain hay -----	103,051	108,296	758,072
Oats -----	4,039	1,600	40,785	Egyptian corn ..	52	60	1,240
Corn -----	523	529	14,756				

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.		Bearing.	Non-Bearing.	Total.
Apple -----	20,000	6,584	26,584	Pomegranates ..	2,391	-----	2,391
Apricot -----	13,276	533	13,809	Nuts—Almond ..	88,322	3,038	91,360
Cherry -----	6,335	656	7,011	Chestnut.	263	33	296
Fig -----	11,980	342	12,322	Pecan -----	45	9	54
Lemon -----	678	309	987	Walnut -----	8,223	2,528	10,751
Nectarine -----	417	43	460	Persimmons -----	80	4	84
Olive -----	64,781	16,451	81,232	Grapes (acres) ..	522	148	770
Orange -----	159,080	45,255	204,335	Raisin (acres) ..	36	-----	36
Peach -----	374,785	34,174	408,959	Table (acres) ..	115	88	203
Pear -----	32,846	5,291	38,137	Wine (acres) ..	371	60	431
Plum -----	3,137	205	3,342	Blackberries ..	86	-----	86
Prune—French ..	159,918	3,000	162,918	Currants -----	6	-----	6
Other kinds ..	2,193	930	3,123	Gooseberries ..	13	-----	13
Quince -----	885	63	948	Raspberries ..	15	-----	15
Pawpaws -----	6	-----	6	Strawberries ..	66	32	98
Grape-fruit	1,280	-----	1,280	Loganberries ..	21	18	39

Fruit, Vegetables, Nuts, Etc.

<i>Green.</i>	Pounds.	Value.	<i>Green—Continued.</i>	Pounds.	Value.
Apples.....	1,295,875	\$17,022	Prunes—French.....	121,600	\$2,207
Apricots.....	263,120	4,423	Quinces.....	20,540	409
Asparagus.....	13,850	772	Raspberries.....	17,300	1,133
Blackberries.....	104,330	5,073	Raisins.....	25,000	1,250
Beans.....	60,380	1,913	Loganberries.....	9,350	935
Beets.....	130,500	2,052	Strawberries.....	16,600	1,645
Cabbage.....	143,290	2,687	Tomatoes.....	226,975	3,450
Celery.....	3,960	119	Walnuts.....	24,325	2,842
Chestnuts.....	6,720	696	Pomegranates (boxes).....	1,721	3,402
Corn.....	11,735	1,173			
Currants.....	3,975	241			
Cherries.....	116,850	3,697	<i>Dried.</i>	Pounds.	Value.
Figs.....	120,650	4,225	Almonds.....	700,982	\$84,102
Gooseberries.....	12,850	643	Apples.....	16,600	832
Grapes.....	692,850	10,430	Apricots.....	65,185	21,902
Carrots.....	112,500	1,125	Beans.....	3,805	164
Watermelons (doz.).....	3,918	3,764	Figs.....	291,420	10,194
Grape-fruit (boxes).....	1,700	4,675	Nectarines.....	600	40
Lenions (boxes).....	1,397	2,788	Pears.....	316,795	30,095
Nectarines.....	22,900	352	Peaches.....	3,751,086	273,179
Onions.....	177,080	2,790	Plums.....	18,865	1,320
Oranges (boxes).....	455,192	455,192	Prunes—French.....	3,499,592	222,475
Pears.....	331,392	6,452			
Peaches.....	5,771,008	55,427	<i>Canned.</i>	Cases.	Value.
Peas.....	58,400	2,598	Blackberries.....	105	\$506
Persimmons.....	5,735	159	Currants.....	22	137
Plums.....	144,920	2,273	Peaches.....	63,324	175,977
Potatoes—Irish.....	743,300	11,033	Raspberries.....	40	182
Sweet.....	131,000	1,957	Loganberries.....	35	235
			Tomatoes.....	685	2,060

Livestock Industry.

	Number.	Value.		Number.	Value.
Cattle—Beef.....	8,843	\$284,763	Swine.....	16,387	\$63,260
Stock.....	20,838	409,182	Horses—Thoroughbred.....	39	11,080
Dairy Cows—Graded.....	959	40,052	Standard-bred.....	212	30,600
Devon.....	5	250	Common.....	7,601	513,432
Guernsey.....	2	370	Colts.....	713	22,831
Herefords.....	43	2,077	Sheep—Imported or fine.....	2,907	12,410
Holsteins.....	64	2,650	Common.....	64,917	183,592
Jersey.....	91	4,920	Lambs.....	8,375	13,930
Polled Angus.....	4	200	Goats—Angora.....	1,941	5,923
Red Polled.....	130	6,500	Common.....	110	205
Shorthorns.....	535	20,170	Wool (pounds).....	444,180	88,750
Calves.....	5,703	44,915	Mules.....	699	65,805

Poultry and Eggs.

Number of poultry farms, 7.

	Dozen.	Value.		Dozen.	Value.
Chickens.....	6,822	\$32,035	Turkeys.....	1,691	\$35,711
Ducks.....	227	1,335	Eggs.....	184,733	40,473
Geese.....	53	424			

Forest Products.

	Amount.	Value.		Amount.	Value.
Area of timber lands (acres).....	350,000	---	Lumber—Cedar (feet).....	92,000	\$1,380
Cedar (acres).....	35,000	---	Fir (feet).....	8,830,100	105,960
Fir (acres).....	175,000	---	Sugar pine (feet).....	5,005,000	40,840
Sugar pine (acres).....	52,500	---	Yellow pine (feet).....	10,450,000	125,400
Yellow pine (acres).....	87,500	---	Pickets (pieces).....	3,200	65
Sawmills (number).....	13	\$155,500	Posts (pieces).....	50,275	2,545
Fuel, wood (cords).....	10,608	45,082	Railroad ties (pieces).....	49,000	41,160
Laths (thousand).....	1,000,000	35,000	Shakes (thousand).....	482,400	3,859
			Shingles (thousand).....	250,000	750

Dairy Industry.

Butte County has 21 dairies, valued at \$17,965. The output of butter is 58,502 pounds, worth \$13,456; cheese, 2,010 pounds, worth \$3,335; cream, 1,250 gallons, worth \$1,562; and 200,000 gallons of milk, worth \$40,000.

Fish Industry—Power Plants.

The salmon catch amounted to 163,527 pounds, valued at \$8,776.
There are 13 power plants—7 steam, 3 electrical, and 3 water.

Honey—Hops.

In the county are 1,315 bee hives, worth \$2,630. There was a yield of 955 pounds of beeswax, worth \$240, and 57,945 pounds of honey, worth \$4,045.
There are 272 acres of one-year-old hops; product, 10,000 pounds, worth \$1,200.

Manufactories.

There are 2 wood manufactories that employ 19 people and turn out products worth \$359,000.

One cigar factory, with 6 employés; output, 50,000 cigars, worth \$1,500.

Two confectionery establishments, 4 employés, produce 19,000 pounds, worth \$1,600.

Two flouring-mills, 11 employés, produce 12,830 barrels of flour, etc., worth \$54,160.

One leather goods factory employs 2 people; output, \$8,640.

Seven machinery establishments employ 136 people; output, \$608,000.

Seven meat establishments employ 36 people, and turn out 2,159,936 pounds of dressed meat, worth \$203,133; hides, 86,300 pounds, worth \$13,665; lard, 64,203 pounds, worth \$7,062; packed meat, 47 tons, worth \$7,596; and tallow, 380 barrels, worth \$7,600.

Seven olive oil mills employ 27 people, make 110,902 gallons of oil, worth \$223,000, and put up 101,400 gallons of pickled olives, worth \$40,560.

One granite quarry in the county with 4 men has an output worth \$6,500, and one marble quarry an output worth \$5,000.

Exports.

The county exported during the year 607 tons of barley, 1,250 tons of rolled barley, 10,554 tons of hay, 320 tons of oats, and 17,625 tons of wheat.

During the year it also exported 677,718 pounds of almonds, 2,108 boxes of apples, 26,800 boxes of apricots, 905 cases of blackberries, 680 boxes of cherries, 395 boxes of currants, 266,384 pounds of figs, 1,500 boxes of grape-fruit (pomeloes), 133,600 pounds of grapes, 325 boxes of lemons, 25,210 pounds of olives, 299,300 boxes of oranges, 242,712 boxes of peaches, 7,313 boxes of pears, 11,000 boxes of plums, 1,412,998 pounds of prunes, 2,800 pounds of quinces, 16,000 pounds of raisins, 1,500 pounds of raspberries, 1,800 pounds of strawberries, 1,275 pounds of walnuts, 1,473 boxes of pomegranates, 517 dozen chickens, 24,500 pounds of turkeys, 24,400 dozen eggs, 11,750 pounds of beans, 2,340 pounds of beets, 121 sacks of cabbage, 250 dozen heads of celery, 15,000 pounds of honey, 10,000 pounds of hops, 20 sacks of green corn, 700 pounds of green peas, 468 sacks of Irish potatoes, and 5,603 boxes of tomatoes.

During the year the county also exported 5,498 head of cattle, 86,300 pounds of hides, 339 horses, 149,870 pounds of packed meats and by-products, 3,047 sheep, 4,439 swine, and 144,180 pounds of wool.

It shipped 1,938,956 feet of lumber, 157,528 pounds of fish, 4,330 barrels of flour, 80,800 gallons of olive oil, and 64,800 gallons of pickled olives.

CALAVERAS COUNTY.

Calaveras County is almost directly east from San Francisco, and distant about 130 miles. It is triangular, its longest side being 54 miles, and its base 32 miles.

The western part of the county consists of rolling hills and small valleys, the hills being covered with a sparsely scattered growth of oak or pine timber. The eastern portion is mountainous, and contains magnificent forests of sugar and yellow pine, spruce, fir, and cedar. In this section are found the *Sequoia gigantea*, or Big Trees. These trees are the largest and most noted in the world, being classed as one of the seven natural wonders.

The Mokelumne River extends along the northern boundary of the county, and tributary to this is the South Fork of the Mokelumne, with numerous branches. Extending along the southern boundary is the Stanislaus River, with numerous small tributaries. Running through the county midway between the boundary streams is the Calaveras River, with its tributaries. These streams and their branches are tapped at various points, and their waters distributed through 600 miles of ditches to different parts of the county. Springs abound in all sections.

The rainfall is ample to insure good crops, the annual average being about 20 inches.

Calaveras is strictly a mining county. The great Mother Lode of the State runs through the county. West of the Mother Lode is the copper belt. Still west of the copper belt a lead of quartz runs from Knight's Ferry to a point below Campo Seco; this lead has been prospected with excellent results. There is also what is called the "East Belt," extending from West Point to Murphys. The mining towns furnish an excellent market for the farmers.

There are many varieties of soil. All, however, are impregnated to a greater or less extent with granite, slate, limestone particles, volcanic ash, and iron sulphide. In the northeastern part is a granite soil; following this comes the red loam of the foothills, then the sandy alluvial soil of the plains, next the black sandy loam of the bottom lands. In the granite belt the vine and the more hardy fruits, such as the apple, pear, and plum, thrive; while on the red loamy hillsides is found excellent land for fruit and vine culture. The plains are largely given to grain and orchards. The rich river bottoms grow, without irrigation, fruits of all descriptions, together with large tracts of corn, beans, and melons.

The county is well furnished with electric power; that of the Standard Electrical Company on the north and west, and the Utica Electrical Company on the east and south. Many quartz mills are run by electrical power.

Calaveras produces both citrus and deciduous fruits. In the citrus belt, which embraces the western part of the county, the orange, lemon, citron, and olive thrive in places with great luxuriance. Citrus fruits are not grown extensively, but where grown are a success. At Campo

Seco are orange trees over thirty-five years old, and which continue to bear remunerative crops annually.

Olives do well without irrigation, there being several large orchards in full bearing in the western part of the county.

In the eastern part, where the rainfall is greater and the summers cooler, fine apples and potatoes are grown. This district is known as the "apple and potato belt," and large crops of excellent quality are produced, selling at good prices. Deciduous fruits, such as the apple, pear, peach, nectarine, apricot, cherry, plum, and prune, are grown in all parts of the county. In over one half of the county the fig crop is certain and abundant every year.

For nut-bearing trees, Calaveras has congenial surroundings. In certain localities the English walnut is grown to perfection. In the western part there are several large almond orchards, and these nuts also grow to perfection.

The local markets consume most of the fruit. The remainder, both dried and green, is shipped outside. Small fruits do well, but all raised are sold in local markets.

Grapes of excellent quality are grown, except in the extreme eastern part. Most of the crop is made into wine.

A greater part of the grain sown is cut for hay and sold locally; but considerable quantities are allowed to mature into wheat, corn, oats, and barley.

Garden truck is raised in large quantities for home consumption. The mining towns furnish an excellent market for all that is produced.

The increase in the value of cattle has stimulated the livestock industry. In the summer cattle are driven to pastures in the high Sierras.

Some attention has been given to dairy products, and among the herds may be found some of the finest cattle in the State.

The increasing demand for horses has stimulated this industry. Fine blooded horses are reared in several parts.

Hogs are raised in large numbers.

The sheep industry is doing well. Calaveras wool always brings the top figure.

Angora goats are raised in several portions of the county. They are hardy, increase rapidly, and are excellent food.

There are several sawmills; two near West Point, one north of El Dorado, and two near the Big Trees. These mills furnish nearly all of the lumber used.

In the northwestern part is the farm where the pyrethrum plant is grown and buhach manufactured therefrom.

The price of land varies in the different localities, ranging from \$5 to \$50 per acre.

STATISTICS OF CALAVERAS COUNTY FOR 1905.

General.

Area, 990 square miles, or 633,600 acres	Number of miles of public roads.	400
Number of farms.....	Road levy per \$100, 1905	31½ cts.
Number of acres assessed..... 467,960	Value of county buildings	\$50,000
Value of country real estate \$3,220,640	Irrigating ditches—miles 750;	
Of improvements thereon..... \$1,237,925	cost.....	\$750,000
Of city and town lots..... \$188,620	Railroads, steam—miles, 20.11;	
Of improvements thereon..... \$641,615	assessed value.....	\$209,975
Of personal property..... \$930,195	Electric power plants, 1; assessed	
Total value of all property..... \$6,048,495	value.....	\$50,000
Amount expended on roads..... \$27,051	Electric power lines—miles, 102;	
Amount expended for bridges.... \$1,357	assessed value.....	\$51,000

Cereal Products and Hay.

	Acres.	Tons.	Value.		Acres.	Tons.	Value.
Wheat.....	1,500	560	10,500	Corn.....	100	85	\$2,348
Barley.....	1,500	950	15,000	Alfalfa hay....	1,570	14,130	141,300
Oats.....	1,000	438	11,320	Grain hay.....	50,000	90,500	1,086,000

In this county there are about 100,000 acres of grazing land.

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.		Bearing.	Non-Bearing.	Total.
Apple.....	46,000	2,530	48,530	Quince.....	534	---	534
Apricot.....	1,530	200	1,730	Nuts—Almond.....	1,576	---	1,576
Cherry.....	1,675	200	1,875	Chestnut.....	300	100	400
Fig.....	2,410	---	2,410	Walnut.....	1,840	290	2,130
Lemon.....	200	50	250	Grapes.....	1,450	1,150	2,600
Nectarine.....	100	---	100	Raisin.....	105	---	105
Olive.....	34	---	34	Table.....	300	---	300
Orange.....	533	500	1,033	Wine.....	1,045	---	1,045
Peach.....	11,500	525	12,025	Blackberries.....	32	---	32
Pear.....	3,780	200	3,980	Currants.....	5	---	5
Plum.....	3,960	---	3,960	Gooseberries.....	5	---	5
Prune—French.....	1,500	500	2,000	Raspberries.....	30	---	30
Other kinds.....	850	---	850	Strawberries.....	20	---	20

Fruit, Vegetables, Nuts, Etc.

<i>Green.</i>	Pounds.	Value.	<i>Green.</i>	Pounds.	Value.
Almonds.....	78,800	\$7,880	Oranges (boxes).....	600	\$900
Apples.....	18,400,000	368,000	Pears.....	72,000	1,440
Apricots.....	2,295,007	4,590	Peaches.....	100,000	2,000
Blackberries.....	32,000	2,000	Peas.....	1,500	220
Beans.....	10,000	300	Plums.....	40,000	400
Cabbage.....	40,000	800	Potatoes—Irish.....	600,000	9,000
Celery.....	5,000	150	Prunes—French.....	33,000	850
Chestnuts.....	45,000	2,250	Strawberries.....	10,000	1,500
Corn.....	336,000	3,000	Tomatoes.....	40,000	800
Currants.....	5,000	1,000	Walnuts.....	147,200	14,720
Cherries.....	167,500	6,700			
Figs.....	241,000	4,820	<i>Dried.</i>		
Gooseberries.....	6,000	1,100	Apples.....	200,000	\$12,000
Grapes.....	20,000,000	400,000	Figs.....	2,000	200
Lemons (boxes).....	300	300	Prunes—French.....	18,000	900
Onions.....	3,000	325	Raisins.....	14,000	560

Wines, Brandies, Etc. .

In Calaveras County are 57 wineries, 5 distilleries, and 4 breweries.

The wineries turn out 161,000 gallons of claret, worth \$64,400; 600 gallons of port, worth \$450; 600 gallons of sherry, worth \$450; and 2,000 gallons of zinfandel, worth \$1,200

The distilleries turn out 800 gallons of brandy, worth \$1,600.

The breweries turn out 10,000 barrels of beer, worth \$50,000.

There are 2,000 gallons of cider made in the county, worth \$500.

Livestock Industry.

	Number.	Value.		Number.	Value.
Cattle—Beef.....	4,150	\$124,500	Colts.....	260	\$8,600
Stock.....	35,000	1,400,000	Sheep—Imported.....	10	100
Cows.....	700	28,000	Common.....	21,250	61,250
Holsteins.....	27	1,080	Lambs.....	1,200	1,200
Calves.....	6,000	60,000	Goats—Angora.....	2,200	6,600
Horses—Thoroughbred.....	2	300	Common.....	100	200
Standard-bred.....	390	53,000	Swine.....	6,000	24,000
Common.....	1,850	92,500	Wool (pounds).....	141,960	21,294

Poultry and Eggs.

Number of poultry farms, 61.

	Dozen.	Value.		Dozen.	Value.
Chickens.....	4,140	\$20,700	Turkeys.....	1,200	\$14,400
Ducks.....	112	560	Eggs.....	400,000	80,000
Geese.....	105	525			

Dairy Industry.

The county has 7 dairies and 2 creameries. These turn out 10,000 gallons of cream, worth \$3,000, and 20,000 pounds of butter, worth \$6,000.

Forest Products.

The area of timber lands is 160,000 acres, and the timber is valued at \$1,000,000. These figures include cedar, yellow pine, and sugar pine. There are 7 sawmills, the output of which is worth \$96,000; the charcoal output is 25,000 sacks, worth \$6,250; the fuel wood, 20,000 cords, worth \$80,000; the output of sugar pine lumber is 40,000 feet, worth \$16,000, and yellow pine lumber, 5,500,000 feet, worth \$80,000; pickets, 8,000, worth \$120; posts, 21,000, worth \$1,150; shakes, 250,000, worth \$1,450.

Steam power is used in the mills.

Honey.

The county has 425 bee hives, worth \$1,300; and produces 12,100 pounds of honey, worth \$605.

Manufactories.

There is 1 cigar factory that employs 2 people; 1 foundry, number of employes not given; 2 flouring-mills, number of employes not given; and 1 marble works, with 2 employes.

Exports.

Of fruit the county exports 3,200 pounds of almonds, 480 boxes of apples, 500 boxes of apricots, 3,000 pounds of figs, 100,000 pounds of grapes, 16,000 pounds of olives, 400 boxes of pears, 300 boxes of plums, 16,000 pounds of prunes, 6,000 pounds of raisins, 1,000 pounds of walnuts, 550 dozen chickens, 18,800 pounds of turkeys, 10,000 dozen eggs, 1,000 pounds of honey, 300 sacks of dried onions, 500 boxes of tomatoes, 1,750 hides, 100 horses, and 141,960 pounds of wool.

Calaveras County makes 300 gallons of olive oil.

Mineral Output—1904.

From report of State Mineralogist.

	Quantity.	Value.		Quantity.	Value.
Chrome.....	25 tons	\$375	Mineral Paints	70 tons	\$385
Clay	100 tons	100	Silver		65,611
Copper.....	2,592,124 lbs.	414,399			
Gold		1,789,184	Total mineral output.....		\$2,275,554
Lime.....	3,550 bbls.	5,550			

COLUSA COUNTY.

Of the entire area of Colusa County, approximately one half is of the Sacramento Valley, one third is arable hills, one tenth interior valleys, and the balance mountainous. A range of hills runs north and south through the county, parallel with the Coast Range, which forms the western boundary. Between these is a series of smaller valleys.

Along the river bordering the hills, and in many of the smaller valleys, the soil is a loose, rich, sandy loam, easily worked, retaining moisture and very fertile. The foothill soil is rich, mellow, easily worked, and possesses every element of adaptation to the production of all fruits known to temperate or semi-tropic countries. That of the main valley is alluvium, and has given Colusa the distinction of being for years one of the banner wheat counties.

The main part of the valley is devoted to wheat production. Before the segregation of Glenn County on the north, Colusa in one year produced 7,250,000 bushels of wheat for export. Grain farming is conducted on a colossal scale. Combined harvesters, drawn by traction engines, cut a swath of forty feet; the grain, in sacks, being thrown off at the rear. The same engines, in plowing season, drag twenty-four ten-inch plows, doing in twelve hours the work of one hundred mules for the same time.

The Sacramento River carries sufficient water (and it can be used) to irrigate the whole Sacramento Valley. With irrigation, more than one crop of vegetables or hay can be grown in one season.

All the temperate and semi-tropic fruits grow successfully side by side. There is a wide range of adaptability in the soil and climate. Prunes are a favorite crop; next peaches, pears, and apricots; also cherries, plums, nectarines, almonds, walnuts, and other nuts, olives, grapes for raisins, for table use, and for wine, and apples in the higher altitudes. Citrus fruits are also successfully grown. The fruits are marketed by green shipments to Sacramento and the East, and at the local canneries. Much of it is dried.

Dairying and poultry-raising are profitable and there are several up-to-date creameries with skimming stations.

The cattle, horses, and sheep are of fine grades. The hog product is quite large.

The scattering oak along the streams and in the foothills is used for fuel. The pine, spruce, and cedar in the mountains are not so readily accessible as in other districts, nor so valuable, and have not, therefore, been much encroached upon.

In the Coast Range there are deposits of gold, cinnabar, copper, and chromic iron. A good quality of sandstone is found, and a fine cement in unlimited quantities. In the southwestern part are surface indications of oil and natural gas, and near Sites salt springs are found.

Colusa is the county seat. Other growing towns are Maxwell, Will-

iams, Arbuckle, College City, and Sites. Near the last-named place are located the sandstone quarries which furnished the stone used in building the new ferry building and hall of justice in San Francisco; this stone is of a very superior quality.

STATISTICS OF COLUSA COUNTY FOR 1905.

General.

Area, 1,080 square miles, or 691,200 acres		Number of miles of public roads	1,140
Number of farms	680	Road levy per \$100, 1905	35 cts.
Number of acres assessed	603,178	Value of county buildings	\$100,000
Value of country real estate	\$8,698,915	Irrigating ditches—miles, 6; cost	\$1,700
Of improvements thereon	\$558,555	Railroads, steam—miles, 55.97; assessed value	\$554,230
Of city and town lots	\$286,525	Electric power plants, 1; assessed value	\$3,500
Of improvements thereon	\$658,240	Electric power lines—miles, 16; assessed value	\$1,280
Of personal property	\$1,561,025	Number of acres irrigated	500
Total value of all property	\$11,663,260		
Amount expended on roads	\$37,008		
Amount expended for bridges	not given		

Cereal Products and Hay.

	Tons.	Value.		Tons.	Value.
Wheat	8,821	\$220,525	Buckwheat	3	\$90
Barley	37,106	742,120	Alfalfa hay	1,520	9,120
Corn	1,235	24,700	Grain hay	20,400	163,200

Owing to excessive rainfall and floods, crops of all kinds only about half an average.

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.		Bearing.	Non-Bearing.	Total.
Apple	5,820	1,990	7,710	Almond	17,320	11,120	28,440
Apricot	17,000	3,900	20,900	Walnut	1,500	1,850	3,350
Cherry	850	550	1,400	Raisin Grapes			
Fig	3,575	2,375	5,950	(acres)	350	---	---
Lemon	350	400	750	Table Grapes			
Olive	3,500	2,895	6,395	(acres)	40	---	---
Orange	3,700	3,125	6,825	Wine Grapes			
Peach	12,100	5,745	17,845	(acres)	50	---	---
Pear	3,100	8,740	11,840	Blackberries			
Prune—French	73,000	8,081	81,081	(acres)	20	---	---

Fruits, Vegetables, Nuts, Etc.

Green.	Pounds.	Value.	Dried.	Pounds.	Value.
Asparagus	65,000	\$3,250	Almonds	52,000	\$5,700
Blackberries	8,000	400	Apricots	2,500	125
Beets	6,000	120	Beans	1,704,000	32,222
Cabbage	400,000	6,000	Figs	38,000	855
Celery	30,000	900	Onions	220,000	2,420
Corn	28,000	350	Pears	3,000	120
Grapes	4,028,000	22,154	Peaches	6,000	300
Oranges (boxes)	1,250	2,500	Peanuts	2,500	75
Persimmons	26,000	1,040	Prunes—French	1,448,919	50,712
Irish Potatoes	103,600	1,036	Raisins	340,000	17,000
Sweet Potatoes	24,500	367	Walnuts	6,000	600
Tomatoes	122,000	1,830			

Livestock Industry.

	Number.	Value.		Number.	Value.
Cattle—Beef	1,515	\$45,450	Colts	1,023	20,460
Stock	22,500	360,000	Sheep—Imported	67,060	134,120
Dairy Cows—Graded	2,500	75,000	Lambs	30,000	30,000
Calves	3,816	58,160	Angora Goats	5,000	10,000
Swine	21,875	65,625	Wool (pounds)	469,420	37,553
Horses—Common	3,800	114,000	Mules	4,526	22,630

Poultry and Eggs.

	Dozen.	Value.
Chickens	1,625	\$8,125
Turkeys	600	9,000
Eggs	208,986	17,817

Dairy Industry.

The dairy industry of Colusa County supports 3 regular milk dairies and 1 creamery. The output is 233,150 pounds of butter, worth \$58,030.

Fuel—Honey—Alfalfa Seed.

There are 1,194 cords of fuel wood, reported worth \$3,582.

There are 903 bee hives, worth \$903. These produce 22,575 pounds of honey, worth \$1,806.

The product of alfalfa seed is 50,000 pounds, worth \$4,000.

Manufactories.

The manufactories of Colusa consist of one brickyard, 6 employés; output 300,000, worth \$1,800.

Two cigar factories, 4 employés; output 210,000, worth \$10,500.

One flouring-mill, 6 employés; output 15,000 barrels, worth \$60,000.

One lime kiln; output 200 barrels, worth \$450.

The county turns out 2,550 hides, worth \$10,200; lard, 62,400 pounds, worth \$6,240; tallow, 400 barrels, worth \$4,900; salt, 18 tons, worth \$180; sandstone, 197,172 cubic feet, worth \$571,798; and 1,950 tons of rubble, worth \$1,950.

Exports.

The county exports 29,685 tons of barley whole, and 500 tons of barley rolled, 1,235 tons of corn, 310,000 pounds of broomcorn, 500 tons of hay, 7,841 tons of wheat, 52,000 pounds of almonds, 38,000 pounds of figs, 4,028,000 pounds of grapes, 34,000 pounds of raisins, 2,468 dozen chickens, 815,032 pounds of turkeys, 97,800 pounds of wild game, 167,189 dozen eggs, 1,704,000 pounds of beans, 3,750 cattle, 2,550 hides, 16,765 sheep, 17,500 swine, 469,420 pounds of wool, 157,150 pounds of butter, 7,500 barrels of flour, and 500 tons of rolled barley.

CONTRA COSTA COUNTY.

Contra Costa is one of the central counties, its shore line being within 14 miles of San Francisco. It possesses unusually good traveling facilities, both by rail and by steamer. The county has 70 miles of water-front, nearly all of which is upon deep water, navigable by all vessels engaged in commerce. Over three fourths of its area is cultivated, the balance being used for grazing. The only mountain of any size is Mount Diablo, which is 3,896 feet in height and almost in the geographical center of the county.

About two thirds of the area is rolling and hilly. Lying between the hills are some of the most fertile and beautiful valleys in the State, which are drained and watered by many streams, the banks of which are bordered by oak, sycamore, laurel, willow, etc., while the hills are dotted with oaks, many of which are of large size.

The farming lands in the eastern section are between the foothills and the San Joaquin River. The soil is of a rich alluvial nature, and produces wheat, barley, alfalfa, fruit, and vines. To the northward and between the uplands and the San Joaquin River is a body of tule lands, a large portion of which has been reclaimed, and is some of the most productive land in the State, being a rich deposit of sediment and decomposed vegetation. Alfalfa, asparagus, potatoes, beans, etc., are produced on the largest scale on such lands, the asparagus being shipped East by the carload during the early spring.

The average rainfall is from 18 to 23 inches, which is ample for all purposes of agriculture, horticulture, etc.

In depth, the soil throughout the county shows a remarkable continuity of rich alluvial deposits underlaid by limestone or clay. There is an occasional change to a coarse sandy and gravelly heavy loam of black or brown tint. It has great power for enduring drought, and is easy to work, giving large returns. The soil in the uplands is in character similar to that of the lowlands, and being drier, is for some purposes even better.

Irrigation is not required to insure crops; the abundant rainfall, the absence of evaporating heat, and the moisture-laden breezes from the ocean furnish abundant humidity for all forms of vegetable life without recourse to artificial irrigation.

The many beautiful valleys and the rolling hills are strikingly similar in general characteristics to the gentle slopes of sunny France. Scattered in all directions are numerous small vineyards and orchards that produce rich results. Fruit-growing has proved successful and remunerative.

Grain-raising is very prominent in this county. A very large acreage is planted to wheat, oats, barley, and hay.

The raising of sugar-beets is a growing industry.

Vegetables of all kinds are raised very profitably and on an extensive scale; one very large tract of land is used entirely for the production

of asparagus for early Eastern shipment. Potatoes, beans, etc., are also a prolific and profitable crop, especially in the central portion.

Natural feed is abundant, both on the hillsides and at a higher elevation.

Stock-raising is a leading industry, as the reclaimed lowlands for summer grazing and the rolling hills for winter, close together, create conditions whereby a failure is impossible. The stock farms have produced some of the most famous trotting and pacing horses. In addition to the raising of horses, much attention is given to blooded cattle, sheep, and hogs.

Large dairies are conducted, and in the western end the product mostly shipped to the cities is milk, while in the central and eastern parts butter is the main production. Low freight and express rates give unusual advantages.

Contra Costa County is well adapted to poultry-raising. Feed can be obtained cheaper than in other sections where the industry is thriving. The central part of the county is only a few hours' drive from Oakland and suburbs. The demand for eggs is always greater than the supply.

The only important mining industry is the coal mines of Mount Diablo, although some little mining for precious metals has been done.

The terminus of the Santa Fé railroad is located at Point Richmond, and many substantial improvements in the way of wharves, etc., on a very extensive plan, have been constructed.

Port Costa, the shipping point for the bulk of the grain raised in California, has extensive warehouses.

At Pinole are located large stockyards; near Vallejo Junction is the largest smelting works in the State; at Vallona are extensive lumber yards, where ships from Oregon and Puget Sound discharge. At Crockett are flouring-mills; also agricultural works.

Area, 750 square miles, or 480,000 acres.

DEL NORTE COUNTY.

Del Norte, as its name implies, is at the far north. It is situated in the northwest corner of the State. A county of scenery unsurpassed in its grandeur, its vast redwood forests, its clear winding streams, its green fertile fields, its giant redwoods, its mountains laden with precious ores, and its rich dairy lands make it one of the most desirable places for the homeseeker.

Chief among Del Norte's industries are the dairying interests. Scattered throughout the coast portion are modern, well-equipped creameries where the product of thousands of cows is turned into butter. This industry, with the coming of better facilities for shipment, will place Del Norte in the foremost rank as a butter-producing county. Farming is carried on to a considerable extent. A large portion of the soil is especially adapted to the culture of the apple, there being a total absence of the codling-moth pest. Pears, plums, cherries, and small fruits and berries of every description bear luxuriantly. On the Klamath River, in the southern part of the county, as well as on the Smith River, in the northern part, large, well-equipped salmon canneries are operated with great success. The center of trade lies in Crescent City, the county seat, nestled on a crescent-shaped beach, where the products of the county come for shipment, generally finding their market in San Francisco, the products in the main being lumber, butter, and from the farm.

Smith River is a small town in the center of the beautiful valley of the Smith River, where such business is carried on as is usually conducted in a farm and dairy district.

Requa, a small town near the mouth of the Klamath River, is a trading post for that district.

The arable portion of the county is confined generally to the coast portion, commencing at its northern boundary and extending through its entire length, excepting a few miles to the southward of Crescent City. The arable land may be divided into three classes: First, that formed by the disintegration of sands, which with the aid of fertilization and rotation produces good crops, and is especially adapted to the growth of apples, an industry as yet in its infancy. Second, those lands formed by the constant washing of rich vegetable matter and the detritus carried by streams from the mountainsides and distributed in the valleys to a great depth, known as sediment lands. Third, marsh or lake lands, a large area of which borders on Lake Earl, at times partly inundated by the overflow of the lake, but which by a system of reclamation will constitute the most valuable land in the county for dairying purposes.

The redwood timber belt, comprising 200,000 acres, commences at the north boundary line and extends in an unbroken forest to the southern

boundary of the county. It can be reasonably said that no grander or finer forest exists in the world. Its immensity can be better imagined when it is stated that a single tree yields sufficient clear lumber to build a modern cottage and finish it from cellar to garret, or more particularly, when it is stated that from a tract consisting of 160 acres there have been taken 27,802,121 feet, or an average of 173,763 feet per acre, and this is an average of the whole tract. East of the redwood belt are large tracts of sugar pine and fir.

Deposits of valuable ore lie in the hills of Del Norte, but not until recent years have those with means to develop mines turned their attention to this county. Modern appliances for carrying on development work have proven that great quantities of gold, copper, chrome, and cinnabar exist.

Covering the entire expanse of coast line from Humboldt Bay to the Columbia River, the roadstead at Crescent City is the only point affording opportunity for a haven of refuge, and with assistance from the United States Government in the construction of a seawall from the United States lighthouse, to the westward of Crescent City, to an outlying rock, a distance of 2,000 feet, Crescent City harbor will be made a safe and secure refuge for the innumerable water-craft now plying along the coast. The present shipping is carried on over a wharf or pier, built on wooden piles, extending out to a depth of sixteen feet at low water.

Few counties on the Pacific Coast afford a more varied opportunity for the pleasure-seeker, or those in quest of rest and recreation. This point may be reached from Grant's Pass in Oregon, the nearest railroad point, thence by stage road over mountain and through dale, the entire journey replete with grand scenery.

Del Norte County is almost devoid of railroad facilities, there being but fifteen miles in operation. However, the wonderful resources of the county have attracted the attention of the railroad corporations, and they have made a survey from the Southern Pacific system in Grant's Pass, Oregon, to Crescent City, this being the only natural pass from the great valleys of the interior to the coast.

STATISTICS OF DEL NORTE COUNTY FOR 1905.

General.

Area, 1,546 square miles, or 989,000 acres	Amount expended on roads	\$9,500	
Number of farms	145	Amount expended for bridges	\$3,080
Number of acres assessed	\$213,420	Number of miles of public roads	135
Value of country real estate	\$2,576,071	Road levy per \$100, 1905	35 cts.
Of improvements thereon	\$124,930	Value of county buildings	\$21,000
Of city and town lots	\$63,565	Railroads—Steam	20 miles
Of improvements thereon	\$144,335	Electric power plants, 1; assessed	
Of personal property	\$299,256	value	5,000
Total value of all property	\$3,208,714		

Cereal Products and Hay.

	Acres.	Tons.	Value.		Acres.	Tons.	Value.
Wheat	200	150	\$3,000	Rye	50	31	\$750
Barley	300	225	5,000	Corn	400		15,000
Oats	1,500	675	10,175	Grain hay	1,000	2,000	20,000

All grain raised is consumed in the county.

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.		Bearing.	Non-Bearing.	Total.
Apple.....	3,000	500	3,500	Prune—French	250	----	250
Cherry.....	200	----	200	Other kinds..	150	----	150
Fig.....	1	----	1	Grapes (acres).....	2	----	2
Lemon.....	1	----	1	Blackberries, } acres	3,000	----	3,000
Nectarine.....	1	----	1	wild	2	----	2
Peach.....	250	----	250	Raspberries.....	7	----	7
Pear.....	300	----	300	Strawberries.....	7	----	7
Plum.....	500	----	500				

The county makes little attempt to raise fruit except for local consumption.

The county produced 70,000 pounds of apples, worth \$1,500; strawberries 6,000 pounds, worth \$720; Irish potatoes 270,000 pounds, worth \$5,400.

Livestock Industry.

	Number.	Value.		Number.	Value.
Cattle—Beef.....	500	\$1,250	Colts.....	50	\$500
Stock.....	750	6,750	Swine.....	750	3,000
Thoroughbred.....	100	5,000	Common sheep.....	1,500	3,500
Dairy Cows—Graded.....	3,500	70,000	Lambs.....	500	750
Calves.....	600	3,600	Angora goats.....	200	1,000
Horses—Thoroughbred.....	5	1,000	Common goats.....	150	150
Standard-bred.....	10	2,000	Wool (pounds).....	20,000	5,000
Common.....	350	17,000			

Poultry and Eggs.

	Dozen.	Value.		Dozen.	Value.
Chickens.....	450	\$1,800	Turkeys.....	12	\$200
Ducks.....	1	4	Eggs.....	27,000	6,750

Dairy Industry.

There are 135 dairies, 9 creameries, and 1 skimming station.

The production of butter is 700,000 pounds, worth \$140,000.

Fish Industry.

	Pounds.	Value.
Salmon.....	150,000	\$3,750
Other kinds (barrels).....	350	3,500
Salmon, canned.....	144,000	15,000

Forest Products.

	Amount.	Value.		Amount.	Value.
Area of timber lands (acres).....	146,000	----	Lumber—Cedar (feet).....	200,000	\$2,000
Cedar (acres).....	5,000	----	Fir (feet).....	1,000,000	10,000
Fir (acres).....	25,000	----	Redwood (feet).....	24,000,000	360,000
Oak (acres).....	2,000	----	Spruce (feet).....	2,000,000	20,000
Sugar pine (acres).....	3,000	----	Pickets (pieces).....	250,000	2,500
Yellow pine (acres).....	1,000	----	Posts (pieces).....	6,000	600
Redwood (acres).....	90,000	----	Railroad ties (pieces).....	4,000	1,000
Spruce (acres).....	20,000	----	Shakes (thousand).....	50,000	4,000
Sawmills (number).....	2	\$300,000	Shingles (thousand).....	20,000	5,000
Piles.....	250	1,250	Boxes.....	750,000	9,375

Manufactories.

In Del Norte County there is one brickyard which employs 4 people, and makes 150,000 brick, worth \$3,500.

The slaughter-houses turn out 30 tons of fresh meat, worth \$4,800; 37½ tons of hides, worth \$5,800; 7½ tons of lard, worth \$1,050; 16 tons of veal, worth \$1,920, and pack 100 tons of cured meat, worth \$24,000.

Exports.

Apples are shipped to the amount of 750 boxes. The other exports consist of cattle, 1,000; hides, 1,200; packed meats, 175 tons; wool, 2,000 pounds; butter, 700,000 pounds; lumber, 27,200,000 feet; pickets, 250,000; shingles and shakes, 2,050,000; boxes, 750,000; canned salmon, 361,500 pounds.

The manufacture of brick was 150,000.

EL DORADO COUNTY.

El Dorado County, the old "Empire County," is situated about the middle of the eastern tier of counties. It is a county of hills and valleys, extending from the low foothills in the west to the summit of the Sierras in the east. There are no broad tracts of prairie land, nor great plateaus. The soil is fertile, and supports a large variety of agricultural and horticultural products.

Large forests of the finest sugar and yellow pine, fir, and spruce cover the mountains.

Fruit-raising, lumbering, stock-raising, dairying, poultry-raising, bee-culture, farming, slate-quarrying, mining for base and precious metals, and the manufacture of wines and brandy are among the industries.

That famous summer resort, Lake Tahoe, is partly included within the boundaries of the county, and a number of other summer resorts have their quota of pleasure-seekers every summer. Tourists and campers find the mountains of this county an ideal place to spend their time.

Placerville, the "Hangtown" of early days, is the county seat. It is on the western slope of the Sierra Nevadas, at an altitude of about 1,800 feet, and was, till a short time ago, the terminus of a branch of the Southern Pacific system. It has a good grammar school, and a new county high school. Religious denominations are well represented. Business and residence places are lighted by electricity from the American River Electric Power Company, whose plant is on the South Fork of the American River, about four miles from town.

Fruit-growing is one of the oldest industries, and as it has been systematized during late years, promises to be of more importance in the future. Apples, peaches, pears, plums, prunes, and grapes are grown, and owing to their superior flavor and splendid shipping qualities find a ready market in the East. With the climate, soil and irrigating facilities, this industry will become one of El Dorado's best.

The water supply is sufficient for all needs. There are several ditch systems that bring water from the snows of the Sierras. Besides these there are many smaller systems, that distribute water to all parts of the county.

The Sacramento and Placerville Railroad has been extended by the El Dorado Lumber Company to the new town of Camino, where there is located a box factory and the company's planing mill, lumber yards and dry kiln. From this point the company's narrow-gauge road runs into the timber belt. The Calder and Diamond Railroad is a lumber road, and runs from Diamond Springs into the timber belt.

It was at Coloma that James W. Marshall, in January, 1848, made his famous discovery of gold. Since then mining has been one of the leading of El Dorado's industries.

Cinnabar and copper are found in several localities, and in several places prospects of the latter metal are being developed.

Slate-quarrying is an important and rapidly growing industry. The manufacture of slate for roofing and other purposes is conducted on a large scale. The quarries at Slatington are being extended, as the

capacity of the plant is not equal to the demand. The quality of the slate is equal to the best produced in the East.

Limestone and marble of good quality are found, and a large quantity of lime is manufactured.

The ranges of the mountains are ideal pastures, and thousands of cattle spend the summer there, migrating in the winter to the lower country till the snows of the high altitudes have melted and the feed started again. Dairy men go with their herds, and all summer the dairy products are sent out of the hills.

With the abundant rainfall irrigation is not necessary in most sections, though irrigation increases the productive capacity of the land.

STATISTICS OF EL DORADO COUNTY FOR 1905.

General.

Area, 1,796 square miles, or 1,049,440 acres	Road levy per \$100, 1905.....	35 cts.
Number of farms.....	Value of county buildings.....	\$90,000
Number of acres assessed.....	Irrigating ditches—miles, —;	
Value of country real estate.....	cost.....	\$66,300
Of improvements thereon.....	Railroads, Steam—miles, 100; as-	
Of city and town lots.....	essed value.....	\$135,455
Of improvements thereon.....	Electric power plants, 1; assessed	
Of personal property.....	value.....	\$22,250
Total value of all property.....	Electric power lines—miles, 80;	
Amount expended on roads.....	assessed value.....	\$2,700
Amount expended for bridges.....	Number of acres irrigated.....	20,000
Number of miles of public roads.....		

Cereal Products and Hay.

	Acres.	Tons.	Value.		Acres.	Tons.	Value.
Wheat.....	5,000	10,000	\$200,000	Corn.....	50	50	\$2,000
Barley.....	1,400	2,000	40,000	Alfalfa hay.....	100	200	2,000
Oats.....	4,000	12,000	180,000	Grain hay.....	Not given.		
Rye.....	25	50	1,000				

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.		Bearing.	Non-Bearing.	Total.
Apple.....	5,500	4,000	9,500	Nuts—Almond.....	2,000	500	2,500
Apricot.....	1,800	500	2,300	Chestnut.....	100	---	100
Cherry.....	3,200	500	3,700	Walnut.....	500	---	500
Fig.....	1,500	---	1,500	Other nuts.....	50	---	50
Lemon.....	150	---	150	Grapes.....	2,510	620	3,130
Nectarine.....	200	---	200	Raisin.....	100	10	110
Olive.....	3,000	1,600	4,600	Table.....	360	50	410
Orange.....	1,260	---	1,260	Wine.....	2,050	560	2,610
Peach.....	115,000	15,000	130,000	Blackberries.....	10	2	12
Pear.....	6,900	30,900	37,800	Currants.....	1	---	1
Plum.....	200	50	250	Gooseberries.....	1	---	1
Prune—French.....	15,040	22,500	37,540	Raspberries.....	5	2	7
Other kinds.....	17,500	2,600	20,100	Strawberries.....	5	1	6
Quince.....	100	---	100				

Fruits, Vegetables, Nuts, Etc.

Green.	Pounds.	Value.	Green—Continued.	Pounds.	Value.
Almonds.....	4,000	\$400	Pears.....	345,000	\$7,000
Apples.....	275,000	4,000	Peaches.....	1,050,000	24,000
Apricots.....	18,000	360	Peas.....	2,000	100
Blackberries.....	2,000	180	Plums.....	12,000	240
Beans.....	3,000	150	Potatoes—Irish.....	1,000,000	15,000
Beets.....	1,500	40	Prunes—French.....	400,000	6,000
Cabbage.....	10,000	200	Raspberries.....	10,000	500
Chestnuts.....	1,000	50	Strawberries.....	10,000	500
Corn.....	15,000	300	Tomatoes.....	50,000	100
Currants.....	2,000	200	Walnuts.....	5,000	500
Cherries.....	32,000	1,600			
Figs.....	15,000	450			
Grapes.....	300,000	4,500	Dried.	Pounds.	Value.
Onions.....	40,000	800	Apples.....	5,000	---
			Apricots.....	1,500	\$90

10,000 cases of apricots were canned.

Wine and Beer.

The wine output is estimated at 5,000 gallons. The beer made in the county at 10,000 barrels.

Livestock Industry.

	Number.	Value.		Number.	Value
Cattle—Stock	5,148	\$102,960	Common Sheep	2,000	\$6,000
Calves	2,564	25,640	Goats—Angora	2,500	7,000
Swine	700	2,800	Common	200	300
Horses—Standard-bred	1,509	44,390	Wool (pounds)	5,000	1,000
Common	68	6,000	Mules	60	6,000
Colts	239	4,095			

Poultry Industry.

In the county are 800 dozen chickens, valued at \$4,800. The output of eggs is 15,000 dozen, valued at \$3,000.

Dairy Industry.

There are 20 dairies and 1 creamery. The output is 20,000 pounds of butter, valued at \$4,000.

Forest Products.

The area of timber land in the county is 500,000 acres, worth \$2,500,000. There are 10 sawmills, output worth \$175,000; fuel wood, 5,000 cords, worth \$25,000; pickets, 10,000, worth \$1,000; posts, 50,000, worth \$5,000; railroad ties, 100,000, worth \$25,000; shakes, 2,000,000, worth \$20,000; shingles, 100,000, worth \$25,000.

Bee Hives—Plants.

There are 1,000 bee hives worth \$5,000, and \$5,000 worth of flowering plants.

Manufactories.

There are two factories that turn out wood work, worth \$8,200.

One confectionery establishment employs 5 people and turns out 12,000 pounds, worth \$3,600.

Two foundries employ 25 people; output, 80 tons, worth \$3,200.

Two barrel factories employ 18 people; output, 12,864 barrels, worth \$7,075.

Eight meat shops employ 15 people; output, 2,400 beeves, worth \$80,000; hides, 3,000, worth \$5,000.

The output of olive oil is \$1,000.

Seven planing mills employ 200 people; consume 5,000,000 feet of lumber; product, \$100,000.

Exports.

The county exports 5,000 boxes of apples, 700,000 pounds of grapes, 30,000 boxes of peaches, 7,000 boxes of pears, 600 boxes of plums, 400,000 pounds of prunes, 50 dozen chickens, 100 dozen eggs, 1,000 head of cattle, 3,000 hides, 100 swine, 5,000 pounds of wool, 10,000 pounds of butter, 8,000,000 feet of lumber, 2,000 cords of wood.

It makes 500 gallons of olive oil, and puts up 100 gallons of pickled olives.

Mineral Industry.

The mining output of the county for 1904 was 16 tons of asbestos, worth \$162; lime, 12,864 barrels, worth \$7,075; slate, 6,000 squares, worth \$50,000; gold, \$474,994.

FRESNO COUNTY.

Fresno extends across from the high Sierras to the mountains of the Coast Range, and in this center of the valley every form of industry in any of the counties that make the watershed of the San Joaquin is found in a greater or less degree.

Its mountains contain lumber and minerals and fine scenery; its level plains grow cereals and fruits, and vines and vegetables; it raises cattle, and its western borders overflow with petroleum. But in addition to this diversity of interests, it has, as a great mainstay, the raisin industry, with Spain as its only competitor.

The average rainfall is 10 inches. Fresno is a wonderful example of what irrigation has done and can do. The San Joaquin River forms the northern and eastern boundary line, but the stream is not so well located for irrigation purposes as is Kings River, which, rising in the Sierras, passes south, and then west and north, in a wide curve, through the center of the farming district, carrying through the summer a volume of water equal to 8,500 cubic feet per second.

The region is a network of streams of water, that is drawn off on the vineyards, deciduous or citrus fruit orchards, or alfalfa fields. The cost of water is low. The perpetual water right, included with the purchase price of the land, is about \$6.25 per acre.

Though great as the raisin and fruit industry is, wheat is grown on vast areas, the ranches running in the thousands of acres and the product in good years amounting to millions of bushels, a considerable portion being worked into flour in Fresno. Barley is grown in large quantities and so is alfalfa. There are creameries and skimming stations, and butter and cheese are exported. An unlimited market for dairy products, with the fact that one acre of alfalfa will keep one cow in green feed, offers the farmer of limited means an opening for immediate and profitable returns. Sheep by the thousands roam over the foothills.

Deciduous fruit shipments, green and dried, represent several million dollars. Citrus fruit growing is a developing industry. Watermelons are exported in hundreds of carloads. The vineyards cover thousands of acres, most of which are in raisin grapes, and the remainder in wine or table varieties. There are many large wineries. Excellent port, brandy, sherry, and angelica are made, as well as other varieties.

At the head of the long list of valuable products stands the raisin. When a vineyard is in full bearing it produces about 4,000 pounds of green grapes to the acre, which will dry to over one ton of raisins. The average product of five-year-old vineyards is a ton of raisins to the acre. The California raisin has possession of the American market, and is extensively shipped abroad.

The growing of nursery stock is a remunerative occupation. Honey is produced in considerable quantity, and more so with the increased

production of alfalfa. Alfalfa honey equals in quality clover honey of the East. Gold is mined in the mountains, and millions of feet of lumber cut annually, most of which is floated down in flumes. There are large planing mills and many lumber yards in the city of Fresno.

The growth of the dairy business dates back less than six years, when smaller interests merged and became what may be properly called a large clearing-house for butter-fat. Before this, dairying was conducted in a desultory way by ranchmen who gave their time to grain, vineyards, or other possessions, and, these permitting, the cows received attention later on. Now the farmers find it advisable to attend to their cows.

The calves and hogs fed on the skimmed milk are as much a part of the dairy product as the cream itself. These calves and hogs as by-products of the dairy average in value \$19.35 to each cow.

Along the river bottoms of the Kings and San Joaquin sheep-raising flourishes. Here, between October and April, scores of bands of sheep are herded every year. The section is fertile and rich in herbage, upon which the animals thrive until the dry season sets in, when they are driven into the mountains.

The raising of hogs, cattle, horses, and mules has advanced both as to numbers and as to quality in breeding. Large numbers of cattle are being received continually from Arizona, to be fattened and either slaughtered here or reshipped to San Francisco and elsewhere,

Thoroughbred, standard-bred, and high-class draft stallions have been brought into the county, and great interest is manifested among horsemen in raising the grade of the runner, the trotter, and the work horse. Some of the best roadsters in the State are in Fresno, and very promising youngsters in the running line are also attracting attention, while the production of the heavier breeds has met with equal success.

In a general mention of the varied resources there must be consideration of the mule. In this valley he finds an environment peculiarly adapted to his exacting requirements, and speedily attains the highest degree of mulish perfection.

STATISTICS OF FRESNO COUNTY FOR 1905.

General.

Area, 5,606 square miles, or 3,587,840 acres	Irrigating ditches—miles, 2,500;	
Number of farms	cost	\$2,500,000
Number of acres assessed.....	Railroads, Steam—miles 261 ⁸² / ₁₀₀ ;	
Value of country real estate.....	assessed value	\$3,811,675
Of improvements thereon.....	Electric—miles, 16 ¹ / ₂ ; assessed	
Of city and town lots.....	value	\$31,750
Of improvements thereon.....	Electric power plants, 1; as-	
Of personal property.....	sessed value	\$14,500
Total value of all property.....	Electric power line — assessed	
Amount expended on roads.....	value	\$9,000
Amount expended for bridges....	Number of acres irrigated.....	27,400
Number of miles of public roads..	Number of acres under irriga-	
Road levy per \$100, 1905.....	ting systems	709,920
Value of county buildings		
\$500,000		

Cereal Products and Hay.

	Acres.	Tons.	Value.		Acres.	Tons.	Value.
Wheat	55,785	15,670	\$454,415	Corn	4,082	3,805	\$9,525
Barley	18,680	7,417	159,946	Alfalfa hay	63,959	2,237,276	8,449,104
Oats	2	30	900	Grain hay	30,680	32,124	321,240

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.		Bearing.	Non-Bearing.	Total.
Apple.....	3,149	2,252	5,401	Almond.....	4,030	366	4,396
Apricot.....	113,414	14,986	128,400	Walnut.....	212	27	239
Fig.....	72,278	45,388	117,666	Grapes—			
Lemon.....	5,324	4,174	9,418	Raisin.....	40,503	10,639	51,142
Nectarine.....	14,716	39,360	54,076	Table.....	2,840	823	3,663
Olive.....	26,923	6,630	33,613	Wine.....	39,400	10,651	40,051
Orange.....	55,442	15,990	71,432	Blackberries.....	27	-----	27
Peach.....	1,091,156	818,336	1,909,492	Raspberries.....	20	-----	20
Pear.....	13,050	4,145	17,195	Strawberries.....	67	-----	67
Plum.....	3,655	34	3,689	Watermelon.....	290	-----	290
Prune—French	9,286	8,843	18,129				

Fruits, Vegetables, Nuts, Etc.

<i>Green.</i>	Pounds.	Value.	<i>Green—Continued.</i>	Pounds.	Value.
Almonds.....	14,290	\$1,431	Raisins (tons).....	31,158	\$1,869,480
Apples.....	296,440	6,475	Strawberries.....	67,000	2,075
Apricots.....	142,600	2,874	Walnuts.....	4,370	480
Blackberries.....	67,000	4,683			
Beans.....	1,612,000	4,836			
Nectarines.....	43,740	624	<i>Dried.</i>	Pounds.	Value.
Oranges (boxes).....	45,360	37,276	Apples.....	5,600	\$580
Pears.....	109,200	2,172	Apricots.....	1,842,686	94,107
Peaches.....	5,588,039	73,765	Figs.....	1,759,245	40,944
Plums.....	96,800	1,301	Nectarines.....	147,126	7,367
Irish potatoes.....	2,280,000	66,615	Pears.....	55,763	4,110
Sweet potatoes.....	490,000	13,105	Peaches.....	15,183,220	1,121,816
Prunes—French.....	408,989	11,706	Peas.....	4,930	147
Raspberries.....	39,400	2,784	Plums.....	31,000	984

Wines, Brandies, Etc.

There are 15 wineries in the county and one brewery.

The wine output is 6,116,870 gallons, worth \$1,292,970; the brandy output is 676,915 gallons, worth \$252,766.

Livestock Industry.

	Number.	Value.		Number.	Value.
Cattle—Beef.....	8,500	\$242,563	Colts.....	1,730	\$76,620
Stock.....	60,530	758,356	Common sheep.....	131,309	419,234
Thoroughbred.....	54	4,675	Lambs.....	2,579	5,164
Dairy Cows—Graded.....	22,875	614,603	Angora goats.....	234	916
Thoroughbred.....	173	21,810	Swine.....	20,000	88,949
Calves.....	8,580	70,140	Wool (pounds).....	1,375,000	206,250
Horses—Thoroughbred.....	62	3,850	Hides (pounds).....	20,281	2,000
Standard-bred.....	63	16,700	Mules.....	2,665	269,625
Common.....	13,116	1,053,138			

Poultry and Eggs.

	Dozen.	Value.		Dozen.	Value.
Chickens.....	30,269	\$150,000	Turkeys.....	1,431	\$35,423
Ducks.....	290	1,759	Eggs.....	1,048,111	266,747
Geese.....	65	658			

Dairy Industry.

Fresno County produces 2,006,063 pounds of butter, worth \$508,549; cheese 200 pounds, worth \$1,040; cream, 100,130 gallons, worth \$10,013.

Forest Products.

There are 6 sawmills, worth \$500,000; fuel wood, 200 cords, worth \$900; sugar and yellow pine lumber, 70,000,000 feet, worth \$1,400,000.

Honey, Etc.—Alfalfa Seed.

The miscellaneous products are 9,542 bee hives, worth \$36,495; beeswax, 6,452 pounds, worth \$1,806; honey, 643,272 pounds, worth \$25,970; alfalfa seed, 159,600 pounds, worth \$16,185.

Manufactories.

The manufactories are bookbinderies, 2; employés, 6; output worth \$15,060.
 Brickyards, 2; output, common brick, 6,900,000, worth \$51,750; pressed brick, 250,000, worth \$5,000.
 Cigar factories, 4; employés, 8; produce 643,550 cigars, worth \$33,504.
 Flouring-mills, 2; output, 404,000 barrels, worth \$202,000.
 Foundries, 3; employés 62; output worth \$117,000.
 Olive-oil mills, 8; output 15,000 gallons, worth \$30,000, and pickled olives, 40,000 gallons, worth \$20,000.
 Planing mills, 6; employés, 300; value of output, \$856,450.
 Stone quarries, 1; employés, 4; output, 15 tons, worth \$1,500.
 Petroleum output, 8,514,882 barrels, worth \$1,933,604.

Exports.

The exports from the county are 5,000 tons of dried apricots, worth \$800,000; dried figs, 2,750 tons, worth \$275,000; oranges, 150 cars, worth \$100,000; dried nectarines, 1,000 tons, worth \$100,000; dried peaches, 9,000 tons, worth \$1,260,000; dried pears, 1,000 tons, worth \$100,000; dried plums, 1,500 tons, worth \$13,500; raisins, 42,500 tons, worth \$2,555,000; dried grapes, 300 tons, worth \$18,000; green fruit, 1,760 tons, worth \$704,000; chickens, 30,369 dozen, worth \$151,345; turkeys, 206,208 pounds, worth \$34,363; ducks, 290 dozen, worth \$2,784; eggs, 1,000,000 dozen, worth \$200,000; canned fruit, 140,000 cases, worth \$350,000; alfalfa, 918 tons, worth \$100,000; soap, 300 tons, worth \$30,000; butter, 1,480 tons, worth \$740,000; cheese, 75 tons, worth \$22,500; nursery stock, 180 cars; brandy, 500,000 gallons, worth \$500,000; sweet wine, 16,000,000 gallons, worth \$2,000,000.

There are manufactured \$3,000,000 worth of brick, and 40,000 gallons of pickled olives, worth \$31,300.

GLENN COUNTY.

Glenn is one of the Sacramento Valley counties, located on the eastern slope of the Coast Range, on the western side of the valley, and extends from the summit of the Coast Range to the Sacramento River.

Between the Sacramento River and the first low hills on the west are more than 300,000 acres of level land. Just west of this is a belt of low, rolling hills, a large portion of which is in cultivation. The steeper hills are principally used for grazing. The hills protect many rich valleys which yield abundantly. In the narrow valley of Stony Creek are 50,000 acres of farming land, with about an equal amount of grazing land between the valley and the mountains proper. The higher mountains are by no means a wilderness, but abound in cozy homes of hardy mountaineers and pleasant summer residences of dwellers of the plain, drawn thither in pursuit of deer and trout.

There is not a foot of desert land, nor an acre of submerged land in the county, if we except the beds of the running streams. Every part is fertile and productive. Stony Creek is the last stream on the west side of the valley. Those north of it have not sufficient volume to build up the valley as fast as the river does, consequently the river is flowing on a slight elevation, or ridge, the land sloping gently down to the west for a few miles to the bottom of the "trough," and from there gradually rising to the base of the western hills. This "trough" has its beginning about half way between the north and south boundaries of Glenn County. Before the days of the levees, the overflow from the river at flood times used to rush back to this "trough" and on to the south, adding fertility to the soil and building up the land by depositing its sediment. Consequently the land between the river and the bottom of this depression is known as river land and is the richest to be found. All the land east of the river and on the west side is of this character. The country between this depression and the hills is known as plains land, and is also very fertile. Back among the hills are many small valleys containing several hundred acres with soil similar to the best along the western rim of the plain.

Many acres of land are irrigated by ditches from Stony Creek, by pumping from the Sacramento River, and from wells. About one third of the deciduous fruit orchards are irrigated, and all the orange and lemon. To him who does not find a canal ready to deliver water to his land, or who wishes to be complete master of the source of his supply, the water beneath the soil is an easy solution of the problem of irrigation. There are several well-defined strata of water-bearing gravel beneath every bit of the valley lands. The water is reached at a depth of from 12 to 30 feet, and the flow is abundant. To raise the water windmill, horse-power, or gasoline engines are employed.

Farming and stock-raising are the principal industries. There are some extensive stock ranges in the hills, where the land has never been

disturbed by the plow. In these ranges are many fertile valleys that could be converted into homes.

All fruits grow to perfection. Peaches, pears, and prunes yield from \$200 to \$300 per acre, and begin bearing the third and fourth year. No other fresh fruit is so easily handled as Bartlett pears, nor any other so easily dried as prunes. All the finest canned peaches in the world's market come from the Sacramento Valley. Here one can have a home of his own, with his cows and pigs and chickens furnishing him with fresh milk, butter, meat and eggs, and in his own back yard in proper season can gather apples, apricots, almonds, cherries, figs, plums, prunes, pomegranates, grapefruit, grapes, lemons, limes, loquats, oranges, olives, peaches, pears, persimmons, quinces, walnuts, blackberries, and strawberries.

Many persons derive a handsome living from poultry. Flocks of 500 to 600 turkeys are not uncommon. Chickens are the money-makers all over the county. Eggs always bring a fair price. Chickens, turkeys, ducks, and geese bring good prices.

Cattle, sheep, and hogs are the chief revenue-producers. The high prices prevailing for the past three years have placed stockmen in an enviable position.

Between the north fork of Stony Creek and the south fork of Elder Creek there are more than 15,000 Angora goats. The Angora is by nature fitted to climb over rocks and in brush and rough mountainous localities to procure food where other domestic animals would not succeed in living. The long silky mohair is valuable for various purposes, and is coming into use more and more each year. It is the practice of the Angora owners to keep them on the foothills for about eight months—from October to June—then move them to the summit of the mountains for about four months, during the hot season.

The schools of Glenn County are up to the high standard. The rights of children are well protected. As soon as fifteen of school age are brought together in a new locality a school is equipped for their instruction. There are more than a dozen fine church buildings in the county.

Willows, the county seat and principal town, is located on the railroad a little south of the center of the county. The county buildings, consisting of a splendid, modern courthouse and a jail and hospital, are located here. It has a grammar school building and a fine high school building. The town is lighted by electricity, and has splendid water works. A creamery, centrally located and fitted with up-to-date machinery, is one of the industries. The streets are graded, graveled and oiled, and lined on either side with shade trees. The sidewalks in the residence portion of the town are graveled with fine gravel, and in the business portion are paved with concrete. Willows is governed economically, there being no town debt.

Transportation facilities are excellent. The main line of railroad passes through the county from north to south, with a branch extending to Fruto. Steamboats ply regularly to all points on the river, and with their barges in tow furnish cheap transportation for the immense crops of wheat, barley, and other produce raised on contiguous lands. The wagon roads are unsurpassed, and are never muddy in the winter and seldom dusty in summer. All streams and waterways are crossed by substantial bridges.

Area, 1,400 square miles, or 896,000 acres.

HUMBOLDT COUNTY.

Humboldt County is, with the exception of Del Norte, the most northerly county of California. The sinuosities of the Pacific coast-line extend some 175 miles. From north to south the county extends 108 miles, while in width it averages about 40 miles.

The topographical features of Humboldt are varied and picturesque. The surface is extremely rugged, numerous spurs of the Coast Range intersecting the county in all directions, rising in many places to absolute grandeur.

Besides a number of smaller streams, the county is drained by two rivers of importance—the Klamath and the Eel.

The soil of the bottom lands and on the hills next the coast is black; that on the bottoms is of a sedimentary composition and somewhat argillaceous, while that on the hills is more of a sandy loam. The soil on the interior hills is composed of disintegrated rock, mixed with organic matter and decayed vegetation.

Humboldt needs no irrigation. The annual rainfall averages 46 inches, and crops have never been known to fail for want of moisture.

Fruit of all kinds does well, particularly apples, pears, prunes, peaches, cherries, apricots, and berries. Strawberries and raspberries grow in abundance, and a small area of land in these fruits, well cultivated, brings a generous return. Raspberries, cherries, strawberries, etc., ripen later than in the warmer sections of the State, thus giving the Humboldt product an advantage in the market.

The yield of all kinds of fruit is generous, and in many instances prodigious, particularly that of apple, plum, and prune trees. Eel River Valley is one of the finest sections on the coast for the production of apples of the most delicate flavor and juiciness. The climate, neither too hot nor too cold, has doubtless much to do with the result.

In the Klamath River country climate and soil are well adapted to horticultural pursuits. Peaches are grown as large as a teacup, and of most luscious flavor. The grapes grown here are of fine flavor and firm flesh. The varieties for table use are particularly good.

Dairying has made remarkable advances in the last two decades. Prior to 1880 it was mainly dependent upon the native grasses of the seaward slope, but with the introduction of clover as the staple food for the herds, a complete revolution occurred, and the establishment of creameries with their improved machinery for handling the milk completed the transformation. There has been great improvement in the herds, which now include the best milk and butter breeds. The output of cheese is nearly all consumed locally. The shipments of condensed milk and cream amount to more than 1,000,000 pounds annually and butter to half a million pounds. By reason of having green feed at all times, the shipments are continuous throughout the year, thus enabling butter producers to reap the advantage of high prices at times when

other sections are non-productive. And the cool, equable climate being ideal for butter-making, the quality of the product is superior, and it commands top prices.

Stock-raising is an important industry, as the excellent pasturage furnishes the most favorable conditions. The large ranges in the eastern portion are dotted with countless herds of sheep and cattle, and every farm and dairy in the region nearer the coast adds its quota. Hogs are raised in large numbers, and each creamery has a drove of them being fattened on the skim milk and other waste products.

The wool industry is a very important one. The total shipments of wool for the twelve years ending December 31, 1904, aggregated nearly 10,000,000 pounds, or an average of over 800,000 pounds annually. In quality Humboldt wool is the choicest on the coast. The stock is good and the wool clean.

Humboldt has the banner record for the production per acre of oats and corn, according to the United States census reports. At the Chicago World's Fair, wheat grown "on the hills" of Humboldt took first prize, and showed the record yield per acre—from 60 to 100 bushels for various samples. All the other crops of temperate climes grow in like proportion. As a rule, any vegetable product that is suitable for cultivation here, will grow thriftier, larger, and more to the acre than in almost any other locality. The principal agricultural crops are hay, oats, potatoes, peas, barley, wheat, corn, lentils, seeds, etc. Oat hay is grown universally throughout the county, and is mostly used for local consumption. Oats is the principal grain product. Potatoes are produced largely, and figure among the exports at from 3,000,000 to 5,000,000 pounds annually. Field peas, dried, are an important product. Barley, wheat, corn, lentils, and seeds are regular elements in the products, but occupy a comparatively unimportant place, because the land has been found more valuable for other purposes. Failure in crops of any of these products is unknown.

The manufacture of redwood lumber is the most important industry. With a supply of standing timber estimated at over 45,000,000,000 feet, the greater part of which is fairly accessible, the question of a cessation, or even a pronounced decline, is a matter of remote future consideration. The annual export of lumber of all kinds is above 250,000,000 feet. This is the product of large plants, which are operated nearly continuously. Some smaller plants, limited in capacity, saw almost entirely for the local trade.

Of the subordinate branches of this industry, the most important is the making of shingles. Redwood shingles are a superior article, and in the last few years efforts to introduce them in the Eastern market have been quite successful, so that now nearly one half of the total output, either kiln or air-dried, is disposed of east of the Rocky Mountains.

Humboldt County is at present without direct rail connection with the outer world, but this disadvantage is more than made up by its possession of the only safe and commodious harbor, accessible to vessels of all but the deepest draft, between San Francisco and the Columbia River. Humboldt Bay is 14 miles in length and from one-half mile to 4 miles in width. It has a tidal area of 28 miles and 35 lineal miles of navigable channels. It is situated near the center of the coast line of the county, and extends nearly parallel therewith, being separated from

the ocean by two narrow peninsulas of sand. Being so completely landlocked, this harbor is of the utmost importance to a coast.

Trinidad, 18 miles north of Humboldt Bay, is a deep open port, well sheltered from all winds except those from the south to the west. Shelter Cove, near the southern boundary of the county, is an open roadstead affording excellent shelter from the northerly winds of summer.

There are lines of railroad, with an aggregate length of 150 miles. All of them, either directly or through connections, terminate at tide water on Humboldt Bay. Two enter the city of Eureka, and another connects with the city by a steam ferry service. Four transport passengers, freight, and produce, and the others are built chiefly to transport logs, lumber, and other forest products.

Good wagon roads connect all points of any importance. The road north along the coast gives connection with Crescent City, the county seat of Del Norte County (100 miles north of Eureka), and there are two roads giving overland connection with Mendocino County—one in the interior leads to Willits, the northern terminus of the S. F. & N. P. Railway; the other is along or near the coast.

But little attention has been paid to manufactures aside from that of lumber. There are tanneries. The bark is furnished by the near-by forests; the hides are mostly brought from San Francisco.

In 1901 a woolen mill was erected and put in operation at Eureka. It has been very successful; operates steadily, usually on overtime. The larger portion of its product is shipped to the Eastern market.

There is one fruit cannery, and a preserving and canning plant.

There are sash and door factories and planing mills in Eureka, and at Samoa, Arcata, and Fortuna. These are important branches of the lumber business, and their product is largely exported.

At Arcata there is an extensive stave factory which prepares staves and barrel-heads for shipment to San Francisco.

Shipbuilding has for years been a most important industry. A quality of pine excellently adapted to this purpose is plentiful throughout the forest region, and the bay shore offers abundant yard-room for the purpose.

In the northeastern portion, along the Klamath and Trinity rivers, placer mining for gold is the leading industry. While no excessively rich "strikes" have been noted, "pay ground" is unlimited in extent, and water abundant for profitable working. The beach sands south of the mouth of the Klamath, and also near Little River, have long been worked with fair success.

Granite and sandstone are plentiful for building purposes. Mineral paint has been produced in commercial quantities. Lime is burned at Jacoby creek. Mineral water is plentiful, and is an article of commercial export. As the result of a prospecting well sunk at Briceland (a small town near Garberville) some years ago, that place has since been lighted and heated by natural gas.

Fishing is quite an important industry, salmon being the principal variety, although halibut, rock-cod, flounders, perch, sea-trout, shad, herring, etc., are plentiful.

The public schools stand high in efficiency. In design and general appearance, the buildings range from the ordinary rural school house to the fine and costly buildings in the towns and cities. They are so

distributed over the county as to give practically every one good school facilities.

The United States Government maintains in Eureka a custom house, land office, and weather bureau. On the north spit, near the entrance to Humboldt Bay, is located an efficient life-saving station, and the Government also maintains a system of harbor lights. At Trinidad, on Table Bluff, just south of Humboldt entrance, and at Cape Mendocino, are well-kept light-houses, the Mendocino light being one of the most important on the coast. At Price Creek, near Grizzly Bluff, a Government fish hatchery is maintained. On both sides of the Trinity River, in the northeastern portion of the county, is the Hoopa Indian Reservation, covering a tract about seven and a half miles square.

Eureka is the county seat and principal business center. It has about three miles of water frontage on Humboldt Bay. Its streets are broad, well drained and graded, and many of them are either graveled, macadamized, or paved with bitumen. There is a sufficient water supply; an excellent volunteer fire department; electric light and power, and gas plants; the usual proportion of schools, churches, and benevolent and secret associations and societies. An electric trolley street railroad, now in operation, is rapidly extending its system to cover all the more important thoroughfares. Ocean-going steamers, local railroads and ferries, the telegraph and telephone, furnish means of communication with the world.

Area of county, 3,507 square miles, or 2,244,480 acres.

INYO COUNTY.

Inyo, the third largest county, has the most diversified topography in the State, or in fact in the nation, claiming as it does Mount Whitney, the highest elevation, and Death Valley, the lowest depression. The Sierras, which form its western border, here attain their greatest altitude, there being many towering peaks scarcely inferior to Whitney itself. This great natural wall is impassable for ordinary travel, so that the traveler to or from Inyo must pass through western Nevada, if making the trip by rail, or by the southern route stage 120 miles between the railroad at Mojave and that at Keeler, on the shore of Owens Lake.

With exceptions not worthy of note in a brief review, all the agricultural land is contained in Owens Valley. This valley is about 100 miles long; at its northern end it is about 15 miles wide, narrowing to 2 miles half way down its length, where a spur of the Sierras almost divides it, and south of that broadening to an average of 6 to 8 miles. Of its area of 500,000 acres, the Reclamation Service estimates that 200,000 acres can be made valuable agricultural land. Almost this amount is under claim of some kind, but less than one fourth is cultivated.

The soil of Owens Valley is especially fertile. Fruits attaining maturity are of quality second to none, in either size or flavor. Grains and garden produce of all kinds are grown to perfection.

The honey industry is of steadily increasing importance. The product is of superior quality, and invariably commands the highest market prices.

The valley is especially adapted to stock and dairy interests. The purity of the air and water, richness of the natural and cultivated grasses, mildness of climate, and fine mountain ranges for summer use, are all factors of importance. The shipments of livestock to outside markets is increasing annually. There are several creameries in operation, while Tonopah and other markets easily reached are supplied with fresh milk from this valley. Poultry-raising is also beginning to be managed in a systematic way, and is becoming an important source of revenue.

The rapid descent and large volume of several of the streams offer great possibilities for development of electric power. Companies for this purpose are already at work, the point of the delivery of the power to be Goldfield and Tonopah, some 80 miles to the eastward. One plant of this kind has been in operation for three years, furnishing light and power for the incorporated town of Bishop.

Text-books on California mineralogy credit Inyo with having the largest variety of minerals of any county. About 150 different substances have been listed, including all the common metals in large quantity and many rarer ones. While not the most important, prob-

ably the most unique in local mineral production is the soda plant on the shore of Owens Lake, where the highly mineralized water of the lake is evaporated and the salts thus obtained gathered for refining. Marble, slate, and building material are included in the make-up of this well-favored county.

The greatest drawback is that of communication. As previously mentioned, the county is wholly cut off from western California by the Sierras.

The grand scenic attractions of the county have been painted by Bierstadt and described by many travelers who have ventured into the Sierra fastnesses. When communication is opened so that the trip can be made with comfort, and without too great a loss of time, the county will unquestionably have many summer visitors.

STATISTICS OF INYO COUNTY FOR 1905.

General.

Area, 10,224 square miles, or 6,543,360 acres	Value of county buildings.....	\$14,000
Number of acres assessed..... 210,351	Irrigating ditches—miles, 106;	
Value of country real estate..... \$1,100,492	cost.....	\$50,000
Of improvements thereon..... \$401,502	Railroads, Steam — miles, 74½;	
Of city and town lots..... \$143,652	assessed value.....	\$137,985
Of improvements thereon..... \$186,828	Electric power plants, 2; assessed	
Of personal property..... \$699,744	value.....	\$11,000
Total value of all property..... \$2,468,954	Electric power lines.....	5 miles
Road levy per \$100, 1905..... 25 cts.	Number of acres irrigated.....	40,000

Cereal Products.

The cereal products are given as 4,200 acres of wheat, 1,000 acres of barley, 900 acres of oats, 3,000 acres of corn, and 35,000 acres of meadow hay.

Number of Fruit Trees.

The fruit trees given as bearing are: Apple, 18,600; apricot, 612; cherry, 680; fig, 50; nectarine, 1; peach, 700; pear, 2,000; prune, 2,000; quince, 4; other kinds, 2,400; almonds, 40; walnuts, 400; grapes, 120 acres. There are 400 apple trees non-bearing.

Livestock Industry.

There are 4,000 beef cattle, worth \$120,000; stock cattle, 20,000, worth \$200,000; thoroughbred cattle, 50, worth \$2,000; graded dairy cows, 1,200, worth \$3,000; standard-bred horses, 10, worth \$2,000; common horses, 4,000, worth \$160,000; colts, 500, worth \$5,000; imported sheep, 20, worth \$400; common sheep, 25,000, worth \$75,000; Angora goats, 2,000, worth \$5,000; chickens, 2,000 dozen, worth \$1,000; turkeys, 1,000, worth \$2,000; eggs, 200,000 dozen, worth \$50,000.

There are 4 creameries and 20 skimming stations, the output of which is not given..

Miscellaneous Products.

There are 34 power plants—25 steam, 3 electrical, and 6 water.

There are 10,000 bee hives; output, 240,000 pounds.

There are 2 flouring-mills, with 6 employes; output, 20,000 barrels, worth \$80,000.

Exports.

The exports are 12,000 tons of hay; 10,000 dozen chickens, worth \$60,000; 500 dozen turkeys, worth \$15,000; 150,000 dozen eggs, worth \$45,000; 120 tons of honey, worth \$24,000; 3,500 cattle, worth \$116,000; horses, 500, worth \$40,000; sheep, 1,250, worth \$5,000; swine, 1,250, worth \$10,000; wool, 250,000 pounds, worth \$31,250.

KERN COUNTY.

Kern County comprises the southern part of the San Joaquin Valley and the greater part of the semi-circle of mountains which inclose it on all sides except the north.

The greater portion of the arable land lies in the amphitheater formed by the Sierra Nevada and the Coast Range, joined by the San Emidio Mountains. In this area there are about 2,000 square miles, consisting of the bordering foothills and the lower portion of the valley known as the "delta"—the latter being very fertile and productive, about 150,000 acres of which are covered by the irrigating systems, a large portion of which are in alfalfa.

The portion of the Mojave Desert embraced within the county lying east of the Sierra Nevada Mountains has an elevation of about 1,800 feet. It is only a desert by reason of the scanty rainfall and the absence of water for irrigation. The Tehachapi Pass has an elevation of 5,302 feet; the Tejon Pass 5,285 feet, and Walker's Pass, 3,964 feet. The foothills bordering the base of the mountains and sloping down to the valley are mostly valuable for grazing purposes. Being in the thermal belt, wherever water can be obtained this portion of the valley is suitable for the cultivation of lemons, oranges, and other tropical fruits, beets, and all kinds of vegetables for early shipment to Eastern markets.

There is a very elaborate and well-constructed system of irrigation, by means of which all of the water, except in flood periods, is diverted upon the agricultural lands, with profitable and satisfactory results.

Kern River flows through 35 miles of one of the grandest cañons of the Sierras. It enters the valley a few miles above the city of Bakersfield, and has a catchment area of 2,383 square miles. The river has a mean discharge of about 900 feet, and a discharge of about 3,000 feet during the principal irrigating season.

In the lower portion of the valley artesian water is obtained at a depth of from 300 to 900 feet. In some localities the wells discharge as high as 5 cubic feet per second. In other localities only a small flow can be obtained. What is known as the "Artesian Belt" covers about 100,000 acres.

In all portions of the delta lands, and in some localities in the high lands, an abundant supply of surface water can be had at from 12 to 40 feet. By means of cheap power this water can be raised to the surface for irrigation at a trifling cost. The irrigation systems in use are supplemented by wells and pumping plants. These plants are operated by electricity transmitted from a power plant in Kern River Cañon by gasoline, by distillate or by steam generated with crude oil.

The irrigated portion of the valley is adapted to the production of a great variety of fruit, all kinds of cereals, and particularly to the growth of alfalfa, which produces as high as ten tons of hay per acre in one

season. Alfalfa as a forage plant is unsurpassed, and will grow continuously for fifteen years without reseeding.

Kern County sends out to market apricots, peaches, pears, plums, prunes, nectarines, apples, quinces, pomegranates, olives, figs, grapes, raisins, almonds, English walnuts, oranges, lemons, and all kinds of berries and melons; celery, asparagus, cabbage, cauliflower, sugar-beets, potatoes, corn, pumpkins, and all other vegetables of whatever variety.

The oranges and lemons raised in Kern County are equal to any produced in the State. Scale is entirely unknown. There is much unoccupied orange, fruit, and vegetable land available at a low price and on easy terms.

There are many mountain valleys where cereals are produced without irrigation, and well adapted to the raising of the hardier kinds of fruit.

Cereals are largely produced, both in the valleys and on the higher levels. Wheat-growing is the leading industry of Tehachapi. Barley, oats, hay, and rye are raised to some extent, and Indian corn is extensively cultivated in the valley, growing to an astonishing size. Alfalfa is the standard feed crop, growing on the irrigated lands with unsurpassed luxuriance, and yielding from three to six crops a season, of two tons at each cutting to the acre.

Cattle, horses, sheep, and hogs can be pastured with profit during the entire year on alfalfa. Either green or cured for hay, the nutritive qualities of alfalfa are surpassed by few other plants, red clover not exceeding it in protein or muscle-forming elements. Farm animals of all kinds relish and thrive upon the dry hay alone, and cows kept upon it demonstrate its value for milk-making in both quantity and quality of product.

Among the most profitable industries is the dairy business. The climate is so mild that cattle can be kept out of doors all the time, and by breeding at the right season the cows can be made to give plenty of milk at the time of year when butter is highest.

The rich, irrigated soils are well adapted to hops, tomatoes, melons, and all varieties of vegetables.

Stock ranks among the great sources of wealth, and thousands of head are raised on the feed of the plains. In addition to this, there is a large extent of natural range. The best blooded stock is found. One farm is devoted entirely to the raising of thoroughbred horses. The Kern County Land Company raises all classes of livestock on a very extensive scale.

The poultry industry, while yet in its infancy, promises to become one of the leading and most remunerative ones.

Raising of swine of pure breeds is profitably and extensively carried on.

Aside from the heavy growth of oak in the foothills useful for fuel, there are in the mountains large forests of pine, cedar, fir, spruce, and hemlock, extending the entire length of the county, and several saw-mills are at work among them.

The county has extensive and valuable mineral resources, producing borax, mica, copper, gold, silver, lead, antimony, iron, sulphur, fuller's earth, lime, gypsum, and petroleum. In the Mojave Desert, in this county, are some of the most productive gold mines in the State, there being producing mines in Randsburg, Roderick, Goler, and Summit mining districts—all situated in that desert, within the boundaries of

Kern County. On Greenhorn Mountain and in the vicinity of Kernville are many producing gold mines, and many very promising ones awaiting development.

The daily shipment of oil from the Kern River, McKittrick, and Sunset fields runs into many thousand barrels, produced from wells which yield from 50 to 400 barrels a day. There are many wells which flow continuously. The oil territory is so large that it is not probable the demand for the oil will equal the possible production within a period of fifty years, making it certain that for a long period the county will have the cheapest fuel and the cheapest power of any place west of the Rocky Mountains.

There are two transcontinental railroads passing through the county, with branch roads running to the Kern River, Sunset, and McKittrick oil fields.

The power plant at the mouth of Kern River Cañon is one of the best equipped and most reliable installations of the kind in the world. It furnishes light and power to the city of Bakersfield, and to many pumping plants in the outlying country. There are other power plants installed to utilize the water power available in Kern River Cañon.

Bakersfield, the county seat and distributing point for the county, is a prosperous and growing city, with public library, churches, school buildings, opera-house, oil exchange, and many finely equipped halls and meeting-places for various fraternal societies. There are banks, foundries, machine shops, planing-mills, tank factories, packing-houses, flouring-mills, refineries, oil plant, gas and electric-light plant, and fine county buildings. There is a system of sewerage, miles of street railway, and an elaborate waterworks plant.

STATISTICS OF KERN COUNTY FOR 1905.

General.

Area, 8100 square miles, or 5,184,000 acres	Value of county buildings, including high school building.	\$156,000
Number of farms ----- 800	Irrigating ditches—miles, 208½; cost -----	\$335,530
Number of acres assessed ----- 2,837,722	Railroads, Steam—miles, 291.84; assessed value -----	\$3,690,970
Value of country real estate ----- \$11,435,712	Electric—miles, 7½; assessed value -----	\$38,050
Of improvements thereon ----- \$1,338,580	Electric power plants, 2; assessed value -----	\$583,780
Of city and town lots ----- \$1,335,817	Electric power lines—miles, 88.4; assessed value -----	\$116,820
Of improvements thereon ----- \$1,844,185	Number of acres irrigated -----	120,000
Of personal property ----- \$5,584,260		
Total value of all property ----- \$25,134,795		
Amount expended on roads ----- \$53,238		
Amount expended for bridges ----- \$5,450		
Number of miles of public roads ----- 1,600		
Road levy per \$100, 1905 ----- 24 cts.		

In addition to railroad mileage reservation, improvements, and personal property attached to the railroad operation—assessed value, \$273,643.

Value of county buildings includes high school building, valued at \$16,000.

Irrigating ditches do not include 12 miles of canal used for electrical purposes, valued at \$413,600.

Pullman car equipment, \$33,316, is not included in railroad valuation.

Number of Fruit Trees and Vines.

	Bearing.		Bearing.
Apple	8,000	Pear	1,500
(Also 2,000 non-bearing.)		Prune—French	70,000
Apricot	20,000	Other kinds	1,000
Cherry	1,000	Almond	1,200
Fig	1,000	Walnut	100
Lemon	300	Vines—	
Olive	5,000	Raisin grapes (acres)	1,000
Orange	6,000	Table grapes (acres)	100
Peach	40,000		

Fruit and Vegetable Products.

The fruit and vegetable products are: 320,000 pounds of dried apricots, worth \$20,000; canned apricots, 700 cases, worth \$1,925; oranges, 4,900 boxes, worth \$4,900; peaches, fresh, 300,000 pounds, worth \$45,000; dried, 350,000 pounds, worth \$24,500; canned, 3,400 cases, worth \$10,200; pears, canned, 50 cases, worth \$200; plums, canned, 50 cases, worth \$140; prunes, cured, 3,200,000 pounds, worth \$12,000; raisins, 1,100,000 pounds, worth \$40,000.

Livestock Industry.

	Number.	Value.		Number.	Value.
Cattle—Beef	5,000	\$150,000	Horses—Standard-bred	1,500	\$80,000
Stock	55,000	825,000	Common	5,000	150,000
Dairy cows—Graded ..	1,800	50,000	Colts	1,000	20,000
Holsteins	100	3,500	Common sheep	140,000	350,000
Jersey	100	3,500	Lambs	45,000	32,000
Calves	10,000	75,000	Common goats	3,000	7,500
Swine	5,000	20,000	Wool (pounds)	1,580,000	210,000

Poultry and Eggs.

Number of poultry farms, 8.

	Dozen.	Value.		Dozen.	Value.
Chickens	725	\$4,350	Turkeys	250	\$3,000
Ducks	50	300	Eggs	50,000	10,000

No mention made in the above except the poultry farms.

Dairy Industry.

There are 120 dairies and 3 creameries, the latter valued at \$10,000.

The amount of butter produced is 230,000 pounds, valued at \$64,400; cheese, 25,000 pounds, valued at \$3,100.

Forest Products.

There is one sawmill that cuts 200,000 feet of yellow pine, worth \$40,000.

All except about 10,000 acres of the timber land in the county is in the forest reserve owned by the Government.

Miscellaneous Products.

The miscellaneous products of Kern County are 8,000 hives of honey, worth \$16,000; beeswax, 3,000 pounds, worth \$750; honey, 450,000 pounds, worth \$18,000; alfalfa seed, 466,000 pounds, worth \$46,600; sorghum, 2,000 acres.

Manufactories.

Among the manufactories there is one bookbindery, which employs two people and does work valued at \$1,500.

Three brickkilns employ 46 people, and make 3,500,000 brick, worth \$280,000.

Two cigar factories employ 5 people, and turn out 312,000 cigars, worth \$15,000.

Two confectionery establishments; 6 employes; output 27,000 pounds, worth \$9,500.

One flouring-mill; 10 employes; output 15,500 barrels, worth \$71,400.

Two foundries; 59 employes; output worth \$19,300.

Four limekilns; 100 employes; output 125,000 barrels, worth \$100,000.

Hides, 478,000 pounds, worth \$38,250; meat packed, valued at \$5,000; tallow, 600 barrels, worth \$7,500.

Two planing-mills; 8 employes; output consumed locally and no figures given.

Exports.

The exports of the county are hay, 25,000 tons; oranges, 2,000 boxes; raisins, 760,000 pounds; turkeys, 18,000 pounds; beeswax, 3,000 pounds; honey, 450,000 pounds; alfalfa seed, 270,000 pounds; cattle, 15,000; hides, 478,000 pounds; horses, 700; cured meats, 12,500 pounds; sheep, 30,000; swine, 3,000; wool, 1,580,000 pounds; lime, 125,000 barrels.

KINGS COUNTY.

Kings County lies midway between the cities of San Francisco and Los Angeles. It is in the heart of the great San Joaquín Valley. The county is traversed by the Southern Pacific and the Santa Fé Railroad lines.

Practically the whole surface of the county is level. In the southwest portion there are some mountainous hills that lie contiguous to the great West Side oil fields, of which Coalinga is the center.

In no part of the Pacific Coast does irrigation obtain to such a perfect degree and at so low a cost as in Kings County. The irrigation system is made up of about eight different capitalized irrigating corporations, covering with the ditch systems a very large acreage, and the cost of irrigation throughout the county is twenty-five cents per acre annually. The corporations handling the water get the water supply from streams that are fed from the unfailing watersheds of the Sierra Nevada Mountains. In addition to these ditch systems, there is the artesian-well system, also fed from the waters that come down from the Sierra Nevada range, and that fall into the sands in the foothills and furnish the inexhaustible reservoir in the valley, which needs only to be tapped with a hole and a casing to give forth every minute of the day and every day of the year the water which has made the desert bloom with whatever is planted. These wells also emit, in many instances, great quantities of natural gas, and in the Tulare Lake region, where fuel is scarce, this gas furnishes material for fuel, light, and power, and it comes from the same hole that furnishes water for irrigation, for stock, and for domestic purposes.

Kings County was carved out of Tulare County in 1893. At that time the population was 7,325; to-day the population is more than 14,000. The extended work along the lines of irrigation and reclamation bids fair to help again double the population in the next half decade.

The county seat is Hanford, a well-built city. It has many manufacturing establishments, electric light and power plant, gas light and power plant, ice factory, flour and feed manufactory, packing-houses for all kinds of deciduous fruits and raisins, creameries that do a large butter-making business, cheese factory, commercial and savings banks, excellent opera-house and fraternal-hall facilities, etc. The educational needs are well provided for. The city owns its sewer system, which is quite complete; also its Holly water system for protection against fire. A new Carnegie library, new grammar school building, and a large addition to the high school building, also extensive street-paving enterprises, are among the latest improvements. The city is substantially

built of brick, and large brick-manufacturing plants already exist. All the leading religious and civic and fraternal societies are well represented.

The county has a total production of fruits and raisins of fully \$1,295,000 per annum.

There are large wineries. The amount of grapes crushed and made into brandy by these institutions give large returns to the grape-growers.

Kings County has many varied resources, and the grain production is quite large. The annual yield of wheat, barley, alfalfa seed, and corn amounts to about 8,500 tons.

Among its other products are butter, cheese, sheep, cattle, hogs, horses, poultry, hay, honey, beeswax, wood for fuel, broom-corn, and sorghum. Its fruit yield is large and its raisin industry very extensive.

The area of the county is 1,257 square miles, or 804,480 acres.

LAKE COUNTY.

By her sister counties, Lake has long been cheerfully accorded the title of "The Switzerland of America," owing to her beauty of scenery. The county is located in the heart of the Coast Range, about 100 miles north of San Francisco, and is about 75 miles long and 25 miles wide. Mount St. Helena guards the southern extremity. Clear Lake is a splendid sheet of fresh water 25 miles long and from 2 to 10 miles broad. With the lake surface at an elevation of 1,350 feet above sea-level; having a depth sufficient to float vessels of considerable tonnage and draft; receiving in its basin the waters from several streams of considerable flow; stocked with an amazing wealth of native food fishes; bordered by smiling valleys of great fertility, by orchards of luscious fruit, by gently swelling slopes, by rugged mountains, by wild cañons touched with a certain savage beauty; and bearing upon its heaving breast a constantly increasing proportion of the internal commerce of the community, Clear Lake is the pride of Lake County, as well as the source of its name.

Although classed as mountainous, Lake County has a number of very fertile valleys, some of them being of large area.

Artesian water is obtainable in profuse quantities, and with comparatively small outlay of money or effort.

The valleys exhibit a lasting fertility. Fields are growing luxuriant crops of grain, though annually sown in the same crops for more than a half century. A variety of soils is found throughout the county, and even the valleys show differences. Generally the valleys are rich with alluvium, but in places there are extensive tracts of adobe, black and heavy, and apparently inexhaustible in productiveness. Occasionally a sandy loam is found in the valleys, especially in the neighborhood of the streams traversing the county at short intervals. On the plateau crowning the low foothills which ring the valleys is a lighter soil, but when cleared is capable of raising large vineyards and orchards of peaches, prunes, etc. The rocky hillsides furnish pasture for flocks of Angora goats.

Wheat, barley, oats, and corn are the principal grains raised. Hops, beans, potatoes, and garden vegetables of various kinds are raised profitably in several localities. Fruits of widely varied nature are grown in gradually increasing quantities, oranges, lemons, figs, prunes, peaches, plums, apricots, apples, and pears being cultivated. The apples have been noted for their excellence for nearly twenty years. The Bartlett pears are eagerly sought by the canning companies. The planting of pear orchards has been encouraged of late years by the demonstration repeatedly given that this fruit tree is a reasonably certain bearer, and the returns are large. Strawberries, blackberries, and loganberries are cultivated increasingly, with good results.

There are extensive horse and cattle ranges. Dairying is a remunerative occupation, and with railroad facilities this line of production

will be vastly increased. The making of cheese is followed with profit in Upper Lake.

Large bodies of sugar and yellow pine, fir, cedar, and oak give employment to several sawmills and furnish the home market a good quality of lumber. The minerals have heretofore been represented by the quicksilver industry, although gold, silver, copper, and oil have been discovered in small quantities. Besides quicksilver, immense quantities of mineral water have been bottled at the many mineral springs and shipped to all parts of the country. The several mineral springs are the sites for as many health resorts, as many as thirty thousand guests being entertained from all parts of the country each summer. Some of them go to the resorts for their health, the bright, clear atmosphere being very beneficial, and the waters frequently having a highly curative property in certain complaints. Others seek the deer, the fishing, and other sports. Among the resorts are Bartlett, Highlands, Adams, Harbin, Zeigler, Witter, and Anderson springs. Blue Lakes, Laurel Dell, Hoberg's, Soda Bay, Glenbrook, Carlsbad, Saratoga, Bonanza, Astorg, England, Howard, and Bynum are among the resorts.

There are several mines from which large amounts of quicksilver have been taken. Natural gas is found. There are large deposits of sulphur and of borax in some parts of the county.

Area of the county is 1,332 square miles, or 852,480 acres.

STATISTICS OF LAKE COUNTY FOR 1905.

General.

Number of farms.....	906	Amount expended for bridges...	\$3,000
Number of acres assessed.....	366,391	Number of miles of public roads.....	488
Value of country real estate.....	\$1,915,505	Road levy per \$100, 1905.....	50 cts.
Of improvements thereon.....	\$512,610	Value of county buildings.....	\$19,000
Of city and town lots.....	\$161,050	Irrigating ditches — miles, 20; cost.....	\$7,000
Of improvements thereon.....	\$233,120	Electric power plants, 3; assessed value.....	\$1,000
Of personal property.....	\$479,735	Number of acres irrigated.....	50
Total value of all property.....	\$3,327,865		
Amount expended on roads.....	\$13,750		

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.		Bearing.	Non-Bearing.	Total.
Apple.....	17,591	4,825	22,416	Nuts—Almond.....	5,787	257	6,044
Apricot.....	1,756	550	2,306	Chestnut.....	25	20	45
Cherry.....	659	50	709	Walnut.....	796	900	1,698
Fig.....	878	25	903	Grapes.....	585	125	710
Nectarine.....	34	—	34	Raisin.....	50	—	50
Olive.....	3,216	2,400	5,616	Table.....	50	—	50
Orange.....	207	44	251	Wine.....	485	125	610
Peach.....	9,895	1,000	10,895	Blackberries.....	30	—	30
Pear.....	26,487	25,126	51,613	Currants.....	1	—	1
Plum.....	2,303	100	2,403	Gooseberries.....	1	—	1
Prune—French.....	32,511	1,000	33,511	Raspberries.....	2	—	2
Other kinds.....	1,703	—	1,703	Strawberries.....	13	—	13
Quince.....	268	25	293				

Cereal Products and Hay.

	Acres.	Tons.	Value.		Acres.	Tons.	Value.
Wheat.....	4,460	2,148	\$64,440	Alfalfa hay.....	2,170	5,547	\$33,280
Barley.....	1,410	1,082	13,552	Grain hay.....	7,534	9,393	65,751
Oats.....	588	317	5,000	Grass hay.....	1,730	3,000	15,000
Corn.....	450	450	4,500				

Wines, Brandies, Etc.

Number of wineries..... 9.			Number of breweries..... 1.		
	Gallons.	Value.		Gallons.	Value.
Wine—Burgundy.....	1,000	\$250	Wine—Sauterne.....	5,000	\$1,000
Cabernet.....	1,200	350	Zinfandel.....	1,000	200
Claret.....	53,300	5,330			

Fruit, Vegetables, Nuts, Etc.

<i>Green.</i>	Pounds.	Value.	<i>Green—Continued.</i>	Pounds.	Value.
Apples.....	660,000	\$4,950	Irish Potatoes.....	820,000	\$8,200
Apricots.....	21,000	630	Quinces.....	200	25
Blackberries.....	34,000	1,320	Raspberries.....	700	35
Beans.....	40,000	3,000	Strawberries.....	15,000	1,200
Beets.....	61,000	305	Tomatoes.....	39,000	390
Cabbage.....	29,000	435	Walnuts.....	15,000	1,800
Celery.....	2,000	200	Yerba Santa.....	180,000	6,750
Currants.....	300	15			
Cherries.....	11,000	440			
Figs.....	8,000	200			
Gooseberries.....	200	10			
Grapes.....	2,130,000	15,975			
Onions.....	2,000	50			
Pears.....	1,906,000	18,120			
Peaches.....	480,000	4,800			
Plums.....	2,800	30			

<i>Dried.</i>	Pounds.	Value.
Almonds.....	67,300	\$6,730
Beans.....	33,000	1,320
Pears.....	128,000	10,240
Prunes—French.....	382,000	11,460

<i>Canned.</i>	Cases.	Value.
Beans.....	24,000	\$48,000

Livestock Industry.

	Number.	Value.		Number.	Value.
Cattle—Beef.....	2,806	\$56,120	Swine.....	9,972	\$29,916
Stock.....	7,713	77,130	Horses—Thoroughbred.....	14	4,200
Thoroughbred.....	206	7,710	Standard-bred.....	25	3,000
Dairy Cows—Graded....	1,249	24,980	Common.....	3,484	139,360
Herefords.....	3	300	Colts.....	284	4,260
Holsteins.....	30	1,500	Sheep—Common.....	10,580	21,080
Jersey.....	62	1,860	Lambs.....	1,300	2,600
Polled Angus.....	20	800	Angora Goats.....	10,982	27,455
Red Polled.....	1	35	Wool (pounds).....	60,500	10,296
Shorthorns.....	50	1,500	Mohair (pounds).....	52,000	18,200
Calves.....	2,526	12,530			

Poultry and Eggs.

	Dozen.	Value.		Dozen.	Value.
Chickens.....	2,229	\$6,687	Turkeys.....	578	\$10,404
Ducks.....	98	294	Eggs.....	140,000	2,100
Geese.....	34	408			

Dairy Industry.

There are 3 dairies and 2 creameries.

The production of butter is 99,208 pounds, valued at \$19,840; cheese, 79,000 pounds.

Forest Products.

	Amount.	Value.		Amount.	Value.
Area of timber lands (acres).....	121,000	\$605,000	Lumber—Fir (feet)....	1,575,000	\$23,625
Sawmills (number)....	11	22,000	Oak (feet).....	2,500	750
Shakes (thousand)....	150,000	1,200	Sugar pine (feet)....	325,000	9,750
			Yellow pine (feet)....	207,500	31,125

Power used—Steam, 14; water, 2.

Miscellaneous Products.

Of miscellaneous products, Lake county has 342 bee hives, worth \$684; honey, 4,000 pounds, worth \$400; hops, 88 acres, output 132,000 pounds, worth \$10,500; alfalfa seed, 41,000 pounds, worth \$4,600.

Manufactories.

It has brickyards that turn out 300,000 bricks, worth \$3,000.

Three flouring-mills; output, 3,600 barrels, worth \$18,000.

Meat products, 232,000 pounds, worth \$23,200; hides, 65,000 pounds, worth \$6,500; lard, 35,000 pounds, worth \$3,500; packed meat, 92,000 pounds, worth \$9,200.

The county turns out 100 gallons of olive oil, worth \$300, and 300 gallons of pickled olives, worth \$150.

There are 3 planing-mills; 8 employes; output \$6,000.

Exports.

The exports are 108,000 pounds of almonds, 3175 boxes of apples, 170,000 pounds of grapes, 22,325 boxes of pears, 382,000 pounds of prunes, 12,000 pounds of walnuts, 128,000 pounds of dried peaches, 200 dozen chickens, 60,000 pounds turkeys, 40,000 dozen eggs, 1,000,000 pounds of canned beans, 1,000 head of cattle, 6,500 pounds of hides, 1,000 sheep, 3,000 hogs, 60,500 pounds of wool, 30,000 pounds of butter, 50,000 pounds of cheese, 180,000 pounds of yerba santa, 45,000 cases of mineral water, 50,000 gallons of wine, and 950,000 feet of lumber.

LASSEN COUNTY.

Lassen County is one of the most northerly of California and lies on the eastern slope of the Sierra Nevada Mountains. There are 375,000 acres of valley land, 325 acres of foothill land, and the remainder is classed as mountainous.

The county is a succession of mountain ranges and valleys, and the ranges have a general trend to the southeast and northwest. A ridge having an altitude of 8,200 feet, and called Diamond Mountains, makes the dividing line between Lassen and Plumas counties. Diamond Mountains form the southern side of Honey Lake Valley, which extends southeast and northwest a distance of 45 miles, with a width of about 15 miles. In the extreme northwest corner lies Big Valley, a large stretch of agricultural land, extending into Modoc County and comprising in Lassen about 75,000 acres. This valley is watered by Pitt River, Ash Creek, and several smaller streams. Long Valley, lying in the extreme southeast of the county, contains but little agricultural land, and is remarkable for its singular conformation. Its south side is a high and very heavily timbered ridge, while the rise in the north is gradual and the country dry, timberless, and open. This valley is about 40 miles in length, but very narrow, having an average breadth of from 1 to 3 miles between Big and Honey Lake valleys, which are separated from each other and from the main valley by intervening ridges of various lengths. The last named valleys are small, containing but few ranches, and are mostly occupied by the bodies of water from which they take their names. In the eastern central part lies the Madeline Plain, a large level tract of land, at an altitude of 5,300 feet. This plain appears to have been at one time the bed of a lake, and to have been formed to its present condition by some change of nature. It is about 35 miles long and 15 miles wide, and covered with a dense growth of sagebrush.

The precipitation varies with altitude the distance eastward from the Sierra. The Sierra plateau presents no western arresting wall against the moisture-laden clouds from the ocean, and the fall of rain and snow is very heavy, especially the latter. The melting snow supplies the irrigating water in Susan River, Willow Creek, Ball's Cañon Creek, many other streams, and Eagle Lake, providing permanent and liberal irrigation for a vast area.

Extensive systems of irrigation, with reservoirs and canals for the distribution of water, exist in almost all portions of the county, insuring at all seasons a sufficient supply of water, and many thousands of acres of heretofore arid lands have been brought under cultivation.

Agriculture is confined chiefly to the growing of barley, rye, wheat, oats, and potatoes, and large and certain crops are regularly secured. Alfalfa is extensively grown for hay for the winter feeding of stock; it is cut three or four times in a season, and, under irrigation, will

average six tons to the acre. Clover, timothy, and other natural grasses grow very prolifically without irrigation.

Potatoes of excellent quality are grown, the yield being enormous.

Stock-raising is one of the leading industries. The ranges are excellent, bunch and other natural grasses furnishing plenty of feed in summer. Considerable stock is driven in from adjacent counties during the summer to pasture in the mountains and smaller valleys. The Madeline Plain is noted for its extensive and fine forage range, and horses for general purposes are chiefly raised; they are well known for their hardy and sound constitutions, and are in great demand for the San Francisco and other markets and for army and other purposes.

Dairying is a profitable industry, and many creameries, with skimming stations, are established in the valleys. The Honey Lake and other creamery butter is of a very high grade. Large quantities of butter are shipped to San Francisco and other commercial points, and bring good prices.

The apple-growing industry is rapidly becoming important and profitable. The apples are of a superior quality, and are not excelled in flavor or keeping qualities by any grown in the Eastern or Northern States. They find a ready market, and are in demand for export. A very high grade of cider is manufactured.

The production of poultry and eggs is quite large, and considerable shipments of both are made to outside markets.

The N. C. & O. R. R. connects the county with the main line of the Southern Pacific Company at Reno, Nevada.

There are close to 700,000 acres of valuable timber, consisting of yellow and sugar pine, fir, cedar, etc. The lack of railroad facilities retards many possibly profitable industries.

While not, properly speaking, a very prominent mining county, considerable placer and quartz mining has been done at a profit. The quartz mines at Hayden Hill have been worked successfully and now are producing considerable ore.

The county seat is Susanville, at which is located the United States land office of the district.

STATISTICS OF LASSEN COUNTY FOR 1905.

General.

Area, 4465 square miles, or 2,857,600 acres	Number of miles of public roads.	625
Number of farms	Road levy per \$100, 1905	38 cts.
Number of acres assessed..... 647,848	Value of county buildings.....	\$15,000
Value of country real estate..... \$3,421,800	Irrigating ditches — miles, 50;	
Of improvements thereon..... \$606,587	cost.....	\$250,000
Of city and town lots..... \$90,740	Railroads, Steam — miles, 115;	
Of improvements thereon..... \$384,606	assessed value.....	\$223,700
Of personal property..... \$1,230,773	Electric power plants, 2; assessed	
Total value of all property..... \$5,375,552	value.....	\$38,000
Amount expended on roads..... \$12,500	Number of acres irrigated	25,600
Amount expended for bridges.. \$5,000		

Cereal Products and Hay.

	Acres.	Tons.	Value.		Acres.	Tons.	Value.
Wheat	5,260	2,370	\$48,000	Rye	420	76½	\$2,200
Barley	1,700	560	13,500	Alfalfa hay	4,200	15,200	75,000
Oats	400	174	4,700	Grass hay	90,000	135,000	540,000

Number of Fruit Trees.

Of fruit trees bearing the county has 20,000 apple, 100 apricot, 1,500 cherry, 4,000 peach, 500 pear, 600 plum, 1,000 prune, 400 other kinds. Of nut trees there are 150 walnut; and of berries there are 7 acres of blackberries, 3 acres of currants, 5 acres of gooseberries, 12 acres of raspberries, and 20 acres of strawberries.

Fruit, Vegetables, Nuts, Etc.

<i>Green.</i>	Pounds.	Value.	<i>Green—Continued.</i>	Pounds.	Value.
Apples.....	60,000	\$180,000	Irish potatoes.....	182,000	\$2,730
Blackberries.....	4,000	400	Raspberries.....	6,000	600
Beets.....	150,000	2,250	Strawberries.....	7,000	700
Corn.....	15,000	375			
Gooseberries.....	1,500	200			
Onions.....	20,000	750	<i>Dried.</i>	Pounds.	Value.
Peaches.....	40,000	800	Beans.....	4,000	\$240

<i>Dried.</i>	Pounds.	Value.
Beans	4,000	\$240

Livestock Industry.

	Number.	Value.		Number.	Value.
Cattle—Beef	3,700	\$90,000	Colts	1,000	\$18,000
Stock	30,000	600,000	Swine	3,500	8,700
Dairy cows—Graded	2,500	87,500	Sheep—Common	55,000	192,500
Calves	9,500	9,000	Lambs	9,000	22,500
Horses—Thoroughbred	8	10,000	Goats—Common	100	400
Standard-bred	2,300	115,000	Wool (pounds)	260,000	40,000
Common	5,500	220,000			

Poultry and Eggs.

	Dozen.	Value.		Dozen.	Value.
Chickens -----	1,500	\$6,000	Turkeys -----	750	\$2,700
Ducks -----	20	400	Eggs -----	12,000	3,000
Geese -----	10	250			

Forest Products.

	Amount.	Value.		Amount.	Value.
Area of timber lands (acres)-----	230,640	\$1,615,000	Lumber—Cedar (feet).....	100,000	\$2,000
Sawmills (number).....	7	35,000	Fir (feet)-----	300,000	4,200
Fuel, wood (cords).....	15,000	26,000	Sugar pine (feet).....	80,000	1,250
Shakes (thousand).....	60,000	480	Redwood (feet).....	2,100,000	24,000
Shingles (thousand).....	257,000	871	Posts (pieces)-----	14,000	1,400

There are 7 mills or plants in the county run by steam.

Dairy Industry.

There are four creameries in the county, which turn out 586,100 pounds of butter, worth \$117,200, and 49,600 pounds of cheese, worth \$6,900.

Honey—Alfalfa Seed.

There are 2,000 hives of bees that turn out 120,000 pounds of honey, worth \$12,000.

There are 500 acres of alfalfa which yield 190,000 pounds of alfalfa seed, worth \$19,000.

Manufactories.

One brickyard employs 4 people, and turns out 30,000 brick, worth \$2,000.

Two confectionery establishments employ 4 people, and turn out 3,500 pounds of products, worth \$900.

Three flouring-mills, employ 8 people, and turn out 10,900 barrels, worth \$54,500.

There are turned out 850 hides, worth \$2,900; 7,500 pounds of lard, worth \$930, and 30 tons of packed meat, worth \$9,000.

Three planing-mills employ 6 people, and work up 800,000 feet of lumber into material, worth \$16,000.

Exports.

The county exports 1,600 boxes of apples, 75 dozen chickens, 25 dozens turkeys, 7,300 dozen eggs, 60,000 pounds of honey, 400 sacks of Irish potatoes, 100,000 pounds of alfalfa seed, 10,000 barrels of flour, 400,000 pounds of butter, 45,000 pounds of cheese, 7,500 cattle, 800 hides, 760 horses, 23,000 sheep, and 260,000 pounds of wool.

LOS ANGELES COUNTY.

In wealth, population, and resources Los Angeles is the most important county in Southern California. There are two rivers in the county: the Los Angeles and the San Gabriel. During a large part of the year these are dry beds of sand, what little water they contain finding its way through the porous sand to the bedrock. In the winter they are dangerous streams. The Los Angeles River rises in the western part of the San Fernando Valley, about 12 miles northwest of the city, and flows easterly 18 miles to the Los Angeles Pass. Its stream is fed all along by springs. Two other "rivers," the Pacoima and the Tejuanga, join it in the San Fernando Valley. Turning south, it flows through the Los Angeles Pass, and on through the city. In former years its waters flowed through the southwestern part of the city, and out through the cienega district, and emptied into the ocean through La Ballona Harbor. Subsequently the river changed its course, and for years emptied its waters into the lowlands around Compton and Wilmington.

Los Angeles County embraces within its limits a great variety of scenery and climate. Within its territory may be found the climate and scenery of almost every part of the State, from the cool and breezy seashore to the warm inland plains and bracing mountain-tops. Of the area of the county, about four fifths is capable of cultivation, the remainder being mountainous. The shore line is 85 miles in length. Nine tenths of the population is within thirty miles of the ocean.

The marvelous growth which has been made during the past few years may be seen from the statement that, within the space of twenty-four years, the population of the county has increased more than eight-fold, and the assessed valuation of property in proportion.

The chief industry is horticulture, the list of products including everything that can be grown in the State, and almost everything that can be raised in semi-tropic countries. The area of land devoted to horticultural purposes is being rapidly extended, as the large tracts are subdivided and improved.

Los Angeles County is well provided with transportation facilities. A dozen lines of railroad center in Los Angeles City, tapping almost every section of the county, while coast steamships call regularly at the leading seaports.

Perhaps the most important enterprise for Los Angeles is the big breakwater by the Federal Government at San Pedro, for which an appropriation of \$3,000,000 was made by Congress. By means of this breakwater the depth of water over the bar will be so increased as to permit ocean-going vessels to come to the wharves, and Los Angeles will then be able to compete for its share of the growing Oriental trade. Other improvements, such as dry docks, wharves, and fortifications, will follow the harbor work. Other shipping points of the county are Port Los Angeles, near Santa Monica, and Redondo.

The San Gabriel Valley, a choice section of Los Angeles County, has the Sierra Madre range on the north. These mountains are grand and precipitous, inclosing the valley like a wall. This valley is the best known of any portion of Southern California. Even before there was any "boom" here worthy of mention, lands in the valley commanded a comparatively high price. As with most attractive sections, the level-headed mission fathers discovered its advantages, and founded the San Gabriel Mission—whose church is still in good preservation—in 1771. Now railroads traverse the valley, and the land is rapidly being transformed into a succession of small homes and thriving little cities. The valley contains 100 square miles of territory. The San Gabriel contains some of the choicest fruit land in Southern California, and is largely devoted to the raising of oranges and lemons, as well as deciduous fruits.

Pasadena, a beautiful city, is located at the foot of the Sierra Madre range, about seven miles from Los Angeles. Within twenty years Pasadena has grown from a sheep pasture to a city of beautiful homes, with a world-wide reputation. Other settlements in the valley are Alhambra, Monrovia, Duarte, and Azusa, all of which are mainly supported by horticulture.

Adjoining San Gabriel Valley on the east is Pomona Valley. Irrigation is cheaply supplied to this section from the San Antonio River, which comes down out of the cañon of the same name, a romantic spot, and a favorite resort for pleasure-seekers. The soil and climate are peculiarly adapted to the culture of citrus fruits, which flourish in great luxuriance. Railroad facilities are very good, and increasing, which has caused the valley to settle up rapidly. It contains a number of flourishing towns, the chief of which is Pomona, one of the most thriving cities of Southern California. For miles in every direction around Pomona extend continuous orchards of oranges, lemons, apricots, peaches, prunes, olives, and other fruit trees, a specialty being made of olive culture.

Other important sections of the county are Los Nietos Valley, a well-watered district, noted for corn, alfalfa, and dairy products; the stretch of country between Los Angeles City and the ocean; San Fernando Valley, north of Los Angeles, in which a large amount of fine wheat is raised; and Antelope Valley, an elevated region in the northern part of the county, where land is cheap and, with water, very productive.

Los Angeles enjoys railroad competition in the shape of three trans-continental lines. The Pacific Coast Steamship Company runs vessels every few days from Los Angeles County ports to San Francisco and San Diego.

There is a great variety of soil in Los Angeles County, varying from light sandy loam to heavy adobe. The price of land varies greatly. Land may be purchased on easy terms. A great many improved places with bearing orchards and comfortable houses are always in the market. For those who have the means, it is often more advisable to purchase one of these improved places than to buy raw land and improve it.

A mistaken idea prevails to some extent in the East that farming is only carried on in Los Angeles County by means of irrigation, and that without it crops would be a failure. For grains and winter crops irrigation is not employed. Corn is irrigated in some localities, being

a summer crop, but is successfully grown in many places without irrigation. Upon some lands, after a crop raised without irrigation has been harvested, another is raised by means of irrigation. On irrigated land two or three crops a year are frequently raised. With an artificial supply of water, the farmer is rendered independent of the season's rain, while the product of his lands is enormously increased.

One of the surprises to new arrivals is the small amount of land that is needed to support a family. It is a fact that many families not only make a good living on five acres, or even less, of irrigated land, carefully tilled, but also manage every year to lay something by for a rainy day. Ten acres are, in fact, about all that one man and his family can attend to, if worked to their full capacity, and as soon as a settler begins to hire help the profits decrease very rapidly. Fruit trees can be planted on the land, between them small fruits, and then again vegetables, until the trees become too large. Under such circumstances there is a constant succession of crops.

The development of the horticultural industry during the past few years has been remarkable. The most important horticultural product is the orange. Besides the orange and lemon, the principal fruits raised are the almond, fig, prune, apricot, walnut, peach, pear, and berries.

The shipment of citrus fruits from Southern California points now reach close to 30,000 carloads per annum. A large proportion of these shipments are contributed by Los Angeles County. Deciduous fruits are shipped fresh, canned, dried, and crystallized. An active demand for our dried fruits has grown up in Europe.

Each section, as a rule, has an agricultural or horticultural product of which it makes a specialty, although in some sections almost every crop raised in Southern California is grown.

Alfalfa, which is largely grown for hay, is a most valuable forage plant. It is cut from three to six times a year. Large quantities of wheat and barley are raised. Corn sometimes grows to a height of twenty feet. Pumpkins have been raised weighing over 400 pounds. There is a beet-sugar factory at Alamitos. Los Angeles honey is celebrated all over the country. In the neighborhood of Los Angeles calla lilies, tuberose, carnations, and other flowers are grown by the acre. Hundreds of acres are devoted to the cultivation of celery, which is shipped East by the trainload. Winter vegetables, such as string beans, tomatoes, green peas, and chile peppers constitute a big business.

Until only a few years ago, most of the butter consumed in Southern California was imported from the North and East. This is no longer the case, a number of creameries having been established during the past few years with most successful results.

Poultry does well in Los Angeles County when it is given the same attention it receives in the East. Eggs always command a good price.

Ostriches are raised for their plumes, and the industry is profitable. There is a large ostrich farm at South Pasadena.

Among the game found in the county are wild geese, ducks, snipe, rabbits, squirrels, foxes, deer, wildcats, California lions and bear, the latter being found in the northern part of the county, within 60 miles of Los Angeles City.

The angler finds plenty of trout in the mountain cañons. In the ocean there is excellent fishing, both with line and seine, and some

remarkable catches are made. The yellowtail, ranging from 15 to 80 pounds, is very numerous in the waters of the Pacific. The tuna attains a length of five feet or more, and a weight of from 100 pounds upward. "Jewfish" are sometimes caught weighing 400 pounds.

Although Los Angeles County is chiefly noted as a horticultural section, its mineral wealth is by no means unimportant. Including petroleum, it ranks fourth in mineral products among the counties, and is the only one which leads in five mineral products. Los Angeles is the center of a number of rich mineral fields in Southern California which last year yielded products to the value of about \$16,000,000. The chief of these, exclusive of petroleum and asphaltum, were gold and borax. There were also produced, in smaller quantities, silver, clay, gypsum, granite, cement, lime, and other mineral substances.

One of the most remarkable features of development in Los Angeles County has been the greatly increased production of petroleum. For over twenty-five years petroleum has been produced on a limited scale in Los Angeles and Ventura counties, but it is only within the past few years that the industry has assumed great importance. To-day the petroleum industry is attracting the attention of capitalists throughout the country. While development has been extended into other counties, Los Angeles still leads in the production of petroleum. The oil produced in California differs from that of the Eastern States, being of a heavier grade, with an asphaltum base, and it is used almost exclusively for fuel. It has been adopted by most of the leading factories of this section, and is used largely by the railroads. A careful test made with a locomotive showed that oil at \$1 a barrel is equivalent to coal at \$4 a ton.

The school facilities of Los Angeles are especially good. Besides the complete system of public schools, private schools and colleges abound in Los Angeles, Pasadena, and other towns. Many Eastern people avail themselves of the opportunity to send children with a tendency to weak lungs to a country where plenty of out-of-door exercise is a possibility every day in the year. Most of the leading religious denominations are represented, not only by scores of churches, but also by one or more religious colleges. The work of the school is further supplemented by an army of specialists in music, painting, and every department of art. The Chautauqua has an active membership of nearly a thousand, and meets annually at Long Beach. Lectures and other entertainments, by home and foreign talent, are of almost daily occurrence. The educational and social facilities afforded by Los Angeles are, in the widest sense of the word, unsurpassed. Public libraries are numerous and well stocked with the latest works.

At the Los Angeles County Farm, as the county's almshouse institution is known, the orange crop of the season nets the county \$3,000. Ninety head of cows are kept at the place. The milk is used for the farm inmates and for the county hospital. Three hundred swine are kept. There are 400 chickens, the eggs from which are consumed at the farm and at the county hospital.

Catalina Island is a most attractive and popular resort in the Pacific, just off the coast of Los Angeles County. Between this resort and Los Angeles City there is a most excellent rail and boat service.

STATISTICS OF LOS ANGELES COUNTY FOR 1905.

General.

Area	44 square miles	Amount expended for bridges..	\$31,246
Number of acres assessed.....	686,138	Value of county buildings, including public schools	\$4,167,689
Value of country real estate	\$30,519,970	Value of other county property.....	\$626,132
Of improvements thereon	\$6,353,285	Irrigating ditches and conduits; cost	\$500,000
Of city and town lots	\$98,657,291	Railroads, Steam—miles, 411.41; assessed value	\$5,389,414
Of improvements thereon	\$52,138,330	Electric—miles, 573.75; assessed value, including franchise..	\$5,717,110
Of personal property	\$38,546,105	Electric power plants, 19; assessed value	\$1,036,645
Of money	\$1,006,358	Electric power lines—miles, 1.321½; assessed value.....	\$523,010
Total value of all property.....	\$227,221,339		
Amount expended on roads	\$204,610		
Number of miles of public roads outside of cities.....	7,000		
Road levy for 1905, 60 cents per \$100; total	\$249,809		

Cereal Products and Hay.

	Acres.	Tons.	Value.		Acres.	Tons.	Value.
Wheat	24,000	12,000	\$336,000	Corn	5,000	5,000	\$125,000
Barley	40,000	20,000	412,000	Alfalfa hay	4,000	20,000	200,000
Oats	1,000	1,000	30,000	Grain hay.....	30,000	30,000	330,000
Rye	300	200	6,000				

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.		Bearing.	Non-Bearing.	Total.
Apple	20,379	---	20,379	Pear	2,529	---	2,529
Apricot	80,005	---	80,005	Prune—French	9,038	---	9,038
Cherry	390	---	390	Other kinds..	10,177	---	10,177
Fig	17,776	---	17,776	Almond	19,782	---	19,782
Lemon	400,000	---	400,000	Walnut	125,000	25,000	150,000
Nectarine	4,000	---	4,000	Grapes—			
Olive	200,000	40,000	240,000	Table	2,592	---	2,592
Orange	1,100,000	---	1,100,000	Wine	2,168	---	2,168
Peach	52,380	---	52,380	Strawberries } acres	800	---	800

Fruit, Vegetables, Nuts, Etc.

<i>Green.</i>	Pounds.	Value.	<i>Green—Continued.</i>	Pounds.	Value.
Apples	500,000	\$11,250	Potatoes—Irish	4,500,000	\$49,500
Apricots	13,600,000	204,000	Sweet	2,000,000	22,000
Asparagus	30,000	2,500	Quinces	200,000	2,000
Blackberries	800,000	48,000	Raspberries	100,000	10,000
Beets—Table	200,000	1,000	Strawberries	5,000,000	350,000
Cabbage	2,000,000	15,000	Tomatoes	1,000,000	20,000
Celery	1,000,000	10,000	Walnuts	6,375,000	637,500
Cherries	10,000	300	Cauliflower (dozen)....	250,000	10,000
Figs	400,000	16,000			
Grape-fruit	136,000	16,060			
Lemons (boxes)	811,200	2,839,200	<i>Dried.</i>	Pounds.	Value.
Nectarines	40,000	2,000	Almonds	60,000	\$7,200
Oranges (boxes)	2,194,800	5,487,000	Apricots	1,700,000	144,500
Pears	500,000	17,500	Beans	9,000,000	267,000
Peaches	2,000,000	70,000	Chestnuts	1,000	120
Persimmons	10,000	500	Onions	1,500,000	15,000
Plums	800,000	16,000	Peaches	200,000	18,000
			Peanuts	2,000	100

Dried.

	Pounds.	Value.
Almonds	60,000	\$7,200
Apricots	1,700,000	144,500
Beans	9,000,000	267,000
Chestnuts	1,000	120
Onions	1,500,000	15,000
Peaches	200,000	18,000
Peanuts	2,000	100

Wines, Brandies, Etc.

Number of wineries..... 52			Number of breweries 3		
	Gallons.	Value.		Gallons.	Value.
Wine—Angelica	69,000	\$17,250	Wine—Port.....	345,000	\$86,250
Burgundy	5,100	1,020	Riesling	70,700	14,140
Cabernet	5,100	1,020	Sauterne	6,350	1,270
Claret	330,000	49,500	Sherry	235,000	58,750
Hock	36,000	7,200	Tokay	5,000	1,250
Madeira	4,000	1,000	Zinfandel.....	50,500	10,100
Malaga	500	125	Beer (barrels)	142,000	842,000
Muscatel	63,000	15,750	Brandy	118,588	207,530

Much of the brandy is used by the wineries for fortifying sweet wines.

Livestock Industry.

	Number.	Value.		Number.	Value.
Cattle—Beef	1,500	\$52,500	Swine	500	\$50,000
Stock	3,000	90,000	Horses—Thoroughbred	400	100,000
Dairy Cows—Graded	3,600	126,000	Standard-bred	800	160,000
Angus	200	8,000	Common	25,000	2,000,000
Ayrshire	50	4,500	Colts	5,000	200,000
Guernsey	200	13,000	Sheep—Imported	50	2,250
Herefords	200	9,000	Common	100,000	300,000
Holsteins	2,000	130,000	Lambs	20,000	60,000
Jersey	2,000	140,000	Goats—Angora	300	3,600
Polled Angus	35	3,150	Common	12,000	48,000
Shorthorns	250	18,750	Wool (pounds)	1,000,000	125,000
Calves	9,000	45,000			

The figures given for beef cattle, swine, and wool represent production for the year. The remaining figures represent the number and value of livestock in the county and not the annual production.

Poultry and Eggs.

Number of poultry farms, 2,000.

	Dozen.	Value.		Dozen.	Value.
Chickens	20,000	\$150,000	Turkeys	5,000	\$90,000
Ducks	4,000	20,000	Eggs	2,073,675	518,400
Geese	100	500			

Dairy Industry.

There are 600 dairies, which produce 73,000,000 gallons of milk, valued at \$1,100,000. There are 12 creameries and 6 skimming stations.

The production of butter amounts to 2,000,000 pounds, valued at \$575,000; cheese, 1,000,000 pounds, valued at \$160,000; cream, 800,000 gallons, valued at \$584,000.

Fish Industry.

The fish output is 4,000,000 pounds, worth \$200,000; of this there are 800,000 pounds of sardines, worth \$16,000.

Products of the Forest.

In the county are about 65,000 acres of forest land, all of which is included in the Government forest reservation. The output of fuel wood is 5,000 cords, worth \$30,000.

Miscellaneous Products.

	Acres.	Pounds.	Value.		Acres.	Pounds.	Value.
Bees (hives)	30,000	----	\$150,000	Seeds—Alfalfa	----	10,000	\$1,500
Beeswax	----	45,000	8,750	Garden	1,000	----	----
Flowers and plants	120	----	400,000	Sugar Beets (tons)	----	50,000	250,000
Honey	----	3,000,000	150,000	Oil (bbls)	----	3,900,000	1,755,000

Productions Shipped Out of County.

Almonds	60,000 lbs.	Wool	1,000,000 lbs.
Apricots, dried	1,700,000 lbs.	Macaroni	557,500 lbs.
Grape-fruit	68,000 boxes	Wall plaster	400 tons
Lemons	780,000 boxes	Fertilizer	6,342 tons
Oranges	2,046,000 boxes	Mill-work	\$251,700
Peaches, dried	200,000 lbs.	Beer	28,000 bbls.
Strawberries	100,000 lbs.	Sardines	8,000 cans
Walnuts	6,000,000 lbs.	Brick	500,000 M.
Beans	3,450,000 lbs.	Brooms	10,600 doz.
Beeswax	25,000 lbs.	Cigars	1,000,000
Sugar-beets	50,000 tons	Flour	69,900 bbls.
Cabbage	1,000,000 lbs.	Paint	610,488 lbs.
Celery	500,000 lbs.	Olive oil	38,600 gals.
Honey	2,000,000 lbs.	Olives, pickled	78,800 gals.
Onions, dried	375,000 lbs.	Pickles	58,000 gals.
Potatoes, Irish	1,125,000 lbs.	Confectionery	1,603,333 lbs.
Potatoes, sweet	500,000 lbs.	Piano hammers	20,000 sets
Tomatoes	335,000 lbs.	Shoes and slippers	140,000 prs.
Cauliflower	187,500 doz.	Felt	186,600 lbs.
Cattle	3,000	Clothing (No. of garments)	780,000
Hides	4,017,499 lbs.	Leather goods	\$200,000
Packed meats and by-products	13,175,104 lbs.	Furniture	\$350,000

Manufactories.

	Number.	Number of Employés.	Quantity Produced.	Value of Product.
Bookbinderies.....	17	260	----	\$330,000
Boxes—Paper.....	6	167	----	188,250
Wood.....	6	135	----	260,000
Brick.....	14	600	100,000,000	600,000
Brooms.....	9	60	40,000 doz.	107,000
Carriages and wagons.....	50	284	1,068	369,171
Cigars.....	35	300	4,000,000 M.	180,000
Clothing.....	3	560	1,086,000	856,000
Coffee, spices, etc.....	12	90	3,045,400 lbs.	541,000
Confectionery.....	20	343	4,697,000 lbs.	673,760
Cooper shops.....	----	24	103,465 bbls.	130,000
Crackers.....	3	----	----	----
Electrical supplies.....	2	22	----	36,000
Flouring-mills.....	6	210	372,000 bbls.	1,850,000
Foundries and iron works.....	10	475	----	770,000
Fertilizers.....	5	35	11,950 tons	346,661
Furniture.....	20	400	----	1,000,000
Jewelry.....	10	75	----	112,000
Leather goods.....	200	300	----	600,000
Wall plaster.....	----	14	2,500 tons	20,000
Lime.....	1	----	10,000 bbls.	10,000
Macaroni.....	3	21	1,230,000 lbs.	50,000
Malt.....	----	----	2,000 tons	80,000
Meat products.....	5	570	----	----
Hides.....	----	----	4,017,499 lbs.	566,824
Lard.....	----	----	2,654,232 lbs.	218,955
Meat packed.....	----	----	26,158 tons	4,235,982
Tallow.....	----	----	5,890 bbls.	96,320
Olive oil.....	7	200	50,000 gals.	75,000
Paper.....	----	25	1,860,000 lbs.	40,000
Pickles.....	6	70	190,000 gals.	47,800
Olives.....	3	145	182,600 gals.	102,300
Other kinds.....	----	110	550,000 gals.	33,000
Pipe—Iron.....	10	334	----	750,000
Sewer, etc.....	2	85	----	140,000
Planing-mills.....	37	2,050	----	4,740,000
Potteries.....	6	35	----	40,000
Granite.....	----	----	60,000 tons	60,000
Sandstone.....	----	----	120,000 tons	120,000
Limestone.....	----	----	2,000 tons	2,000
Syrups and extracts.....	5	30	----	113,630
Tanneries.....	2	15	----	30,000
Tiling.....	2	60	----	15,000
Willow and wooden ware.....	2	8	----	10,000
Felt mills.....	----	100	186,600 lbs.	140,000
Piano hammers.....	----	50	20,000 sets	50,000
Shoes and slippers.....	2	60	154,500 prs.	159,000
Paint.....	4	35	2,274,841 lbs.	266,190

MADERA COUNTY.

Madera County was organized from a portion of Fresno County in 1893. While less fortunate in the matter of development than her sister counties of the San Joaquin Valley, during the past few years there has been a steady breaking away from the great wheat farm to the small fruit orchard and vineyard, which with the raising of alfalfa and dairying is a source of greater profit with less labor. There are several large dairies near the town of Madera which ship their cream to Fresno and San Francisco, and two large farms operate their own creameries and find a ready sale for their product.

The industrial interests of the county in the order of importance are lumbering, stock-raising, farming, and mining.

The county has substantial public buildings and no bonded indebtedness.

About 50,000 acres of the choicest land in the county is under the system of the Madera Canal and Irrigation Company. Many farmers, especially those who have taken up dairying, have installed pumping plants and find them profitable.

Lumbering is the principal industry. The Madera Sugar Pine Company has the largest lumbering plant, and its sawmills are at Sugar Pine, 65 miles back in the Sierras. It ships its output to Madera, its distributing point, through a "V" flume. There are several smaller mills in the sugar pine belt, which haul lumber to Madera and Fresno by teams. There is a large sash and door factory at Madera.

In the irrigated sections raisins do well, and this county has no superior in the growing of the wine grape. The Italian-Swiss Colony Company, about the largest wine-grower in the State, has a thousand-acre vineyard near Madera, and a big winery with a capacity of 2,000,000 gallons, and a large distilling plant for the making of brandy. Another large winery is at Minturn.

Madera County is rich in mineral wealth. Gold, silver, and copper are extensively mined. The mineral belt is extensive and comprises almost every metal common to the United States. The Minarets, mountains of solid iron, which Government mineralogists have pronounced the largest body of iron ore in the world, lie in the eastern and most inaccessible portion. The best class of granite is quarried at Raymond, where there is an inexhaustible supply.

The San Joaquin Electric Company has its plant in the mountains in eastern Madera County, obtaining power from the upper waters of the San Joaquin River. To insure an unfailing supply in the summer the company has large reservoirs in Crane Valley and North Fork. The Southern Pacific and Santa Fé lines cross the county north and south, and a branch line extends from Berenda on the Southern Pacific to Raymond, where passengers for Yosemite Valley leave the trains and take the stages to complete their journey.

Madera is the county seat. It is a thriving town, with a full complement of business houses, good schools (grammar and high), and churches of every denomination. There are two banks, one State and one National. Building is active, several substantial brick blocks being under way.

STATISTICS OF MADERA COUNTY FOR 1905.

General.

Area	2,200 square miles	Number of miles of public roads	620
Number of acres assessed	724,333	Road levy per \$100, 1905	32 cts.
Value of country real estate	\$3,997,100	Value of county buildings	\$160,000
Of improvements thereon	\$450,845	Irrigating ditches—miles, 129; cost	\$40,000
Of city and town lots	\$296,285	Railroads, Steam—miles, 76½; assessed value	\$1,165,704
Of improvements thereon	\$239,285	Electric power plants, 2; assessed value	\$51,500
Of personal property	\$1,258,325	Number of acres irrigated	13,500
Total value of all property	\$6,263,200		
Amount expended on roads	\$32,764		
Amount expended for bridges	\$2,000		

Cereal Products and Hay.

	Acres.	Tons.	Value.		Acres.	Total.	Value.
Wheat	110,000	12,500	\$350,000	Alfalfa hay	5,000	20,000	\$160,000
Barley	64,000	25,000	500,000	Grain hay	2,000	6,000	72,000

Number of Fruit Trees and Vines.

	Bearing.		Bearing.
Apple	5,200	Pear	1,000
Apricot	6,100	Prune—French	1,200
Cherry	33	Quince	25
Fig	633	Almond	1,350
Lemon	50	Walnut	50
Nectarine	3,000	Grapes (acres)	4,262
Olive	5,500	Raisin (acres)	2,500
Orange	225	Table (acres)	112
Peach	27,300	Wine (acres)	1,650

Fruits, Vegetables, Etc.

The fruit and vegetable output is: apples, 150,000 pounds, worth \$3,000; cured almonds, 12,000 pounds, worth \$960; dried apricots, 120,000 pounds, worth \$7,200; dried figs, 150,000 pounds, worth \$3,000; dried grapes, 8,480,000 pounds, worth \$84,800; nectarines, 160,000 pounds, worth \$3,000; dried peaches, 640,000 pounds, worth \$64,000; raisins, 1,813,500 pounds, worth \$54,360.

There are 2 wineries and 2 distilleries in the county: output not given.

Livestock Industry.

	Number.	Value.		Number.	Value.
Cattle—Beef	600	\$15,000	Horses—Common	3,125	\$71,875
Stock	24,000	360,000	Colts	410	6,150
Thoroughbred	25	1,250	Sheep—Common	28,500	57,000
Dairy Cows—Graded	810	20,250	Lambs	11,000	5,500
Calves	5,610	34,780	Goats—Common	100	200
Swine	4,900	12,250			

Miscellaneous Industries.

The chickens are given at 1,216 dozen, worth \$3,040.

Four dairies have an output valued at \$30,000.

Timber land, 25,000 acres, worth \$175,000. Sawmills, 3; worth \$27,500; output 3,850,000 feet of sugar pine, worth \$738,000. One sash and door factory, output \$13,000.

There are 100 bee hives, worth \$100, with an output of 3,500 pounds of honey, worth \$280.

One brickyard, 9 employes; output 500,000 brick, worth \$4,250.

Two granite quarries employ 85 men; output 60,000 feet of stone, worth \$54,000.

Exports.

The county exports 12,000 pounds of almonds, 150,000 pounds of figs, 8,480,000 pounds of grapes, 160,000 pounds of nectarines, 640,000 pounds of peaches, and 1,813,500 pounds of raisins.

MARIN COUNTY.

Marin County is decidedly one of water frontage, being bounded on the west and south by the Pacific Ocean and by the Golden Gate, which separates it from San Francisco by only a mile and a half at its nearest point, and on the east by San Francisco Bay.

The topographical features are rolling hills and numerous small valleys. A part of the Coast Range crosses Marin in a northwesterly and southeasterly direction, and much of the surface of the county is broken and hilly, but a considerable portion immediately on the shore is composed of marsh and overflowed lands. The highest land is Mount Tamalpais, which has an elevation of 2,608 feet.

The soil varies from the rich adobe clay of the salt marshes to the sharp, gravelly loam of the higher foothills. In the valleys it is composed of heavy black loam with an admixture of gravel; in the foothills a reddish loam prevails, sharper, and carrying less adobe. It is all easily worked, heavily charged with the elemental constituents of plant life, admirably suited to horticultural purposes, and wherever worked to fruit yields heavily. Irrigation is not required. The depth of the soil, its retentive nature, and ample rainfall in winter, render artificial watering unnecessary.

Average annual rainfall at Point Reyes, 17.56; Point Bonita, 25.39; San Rafael, 39.58. Mean summer temperature of San Rafael, 76° for June, July, August, and September; for the other months, 61°.

The principal industry is dairying, but of late years attention has been paid to fruit-growing. Some of the finest apples grown in the State are produced. On the dairy lands of the Novato ranch there are ten orchards. On every rented subdivision of this, and the Burdell ranch, are apple, pear, quince, fig, pomegranate, persimmon, apricot, peach, plum, and other fruit trees, the thrifty growth and large yield from which prove the superior adaptability of the soil and climate of this portion to fruit-growing. On the Novato ranch is one of the largest fruit orchards, including one of the oldest and most celebrated apple orchards, in the State.

The land is generally held in large tracts, and rented out for dairying purposes. As a result there is but a sparse population, and but little advance is made in horticulture, although the greater part of the county is eminently fitted for this industry. The DeLong orchard was planted in 1857, and has been in continuous bearing from the beginning.

Immense amounts of vegetables are shipped from the low lands.

The shipments of butter are enormous, and the quality is first class. Most of the large ranches are stocked by the owners, and divided into tracts, which are leased at annual rentals, according to the number of cows.

San Rafael is the county seat. It has many fine buildings, public and private, elegant hotels, banks, fine churches, schools, electric lights, and a perfect sewerage system. It is a noted place of residence for San Francisco business men, and its hotels are a favorite resort for invalids and tourists. Its climate is regarded as very favorable for those with pulmonary complaints. Its private dwellings are elegant and its drives most beautiful and romantic. The road to the summit of Mount Tamalpais is a continuous and easy grade. San Rafael, in a sheltered valley, is secure from ocean fogs and winds. It is in constant communication with San Francisco by rail and ferry at Point Tiburon.

Sausalito is also a favorite place of residence for San Francisco businessmen, possessing features similar to San Rafael. Novato is the center of the fruit district; Point Reyes of the dairy interests.

At San Quentin is located one of the two State prisons. It is situated on San Francisco Bay, about 12 miles north of San Francisco, with which it is connected by ferry.

STATISTICS OF MARIN COUNTY FOR 1905.

General.

Area	516 square miles, or 330,000 acres	Total value of all property	\$8,227,600
Number of farms	400	Amount expended on roads	\$33,932
Number of acres assessed	324,624	Amount expended for bridges	\$6,032
Value of country real estate	\$5,669,630	Number of miles of public roads	268
Of improvements thereon	\$1,170,155	Road levy per \$100, 1905	35 cts.
Of city and town lots	\$278,850	Value of county buildings	\$115,000
Of improvements thereon	\$225,635	Railroads, Steam — miles, 85.05; assessed value	\$765,158
Of personal property	\$879,250		

Cereal Products and Hay.

	Acres.	Tons.	Value.
Oats	782	12,103	\$351,076
Corn	43	380	1,706
Wheat and oat hay	5,676	29,728	264,492

Number of Fruit Trees and Vines.

	Non-Bearing.				Non-Bearing.		
	Bearing.	Bearing.	Total.		Bearing.	Bearing.	Total.
Apple	7,660	1,963	9,623	Pear	771	---	771
Apricot	2,312	50	2,362	Plum	331	20	351
Cherry	213	---	213	Prune—French	3,326	100	3,426
Fig	32	---	32	Quince	232	---	232
Olive	3,000	---	3,000	Almond	140	---	140
Orange	189	---	189	Walnut	2	25	27
Peach	2,170	50	2,220	Grapes (acres)	2,036	55	2,091

Fruit, Vegetables, Nuts, Etc.

Green.			Green—Continued.		
	Pounds.	Value.		Pounds.	Value.
Apples	462,600	\$1,251	Peaches	1,280	\$640
Beans	650	13	Peas	7,500	94
Beets	2,200	1,100	Quinces	5,220	52
Cabbage	2,800	420	Tomatoes	318,000	3,212
Celery	1,000	30	Walnuts	300	18
Corn	22,500	225			
Cherries	400	30			
Grapes, Table	760,000	7,700			
Onions	8,500	85			
Pears	6,000	80			

Wineries, Breweries, Etc.

The county produces 4,000 barrels of beer, worth \$12,000. There are two wineries in the county, but the output is not given.

Livestock Industry.

	Number.	Value.		Number.	Value.
Cattle—Beef	704	\$17,690	Horses—Thoroughbred	2	-----
Stock	4,300	118,604	Standard-bred	1	\$250
Dairy Cows—Graded ..	24,495	797,820	Common	3,056	210,010
Holsteins	2,362	60,865	Sheep—Common	1,315	3,615
Jersey	1,505	65,000	Lambs	223	426
Shorthorns	700	-----	Goats—Angora	40	320
Calves	3,527	20,807	Common	6	18
Swine	9,953	72,234	Wool (pounds)	2,811	365
Colts	552	25,840			

Poultry and Eggs.

	Dozen.	Value.		Dozen.	Value.
Chickens	13,172	\$79,800	Turkeys	32	\$787
Ducks	10	90	Eggs	1,521,337	301,011
Geese	19	228	Pigeons	150	270

Dairy Industry.

	Number.	Production.	Value.
Dairies	89	656,200 lbs.	\$106,363
Creameries	3	109,500 lbs.	13,687
Butter	---	2,114,390 lbs.	429,888
Cheese	1	2,400 lbs.	2,400
Cream	---	130,790 gals.	76,814

The report claims that the production of 35 dairies and 2 creameries, and value of same, are not included in the above figures.

Miscellaneous Products.

The fish catch amounts to 6,080 pounds, worth \$15,475; charcoal, 1,500 sacks, worth \$525; fuel wood, 2,300 cords, worth \$15,500; lumber, 400,000 feet, worth \$6,400; flowers and plants, $1\frac{1}{2}$ acres, worth \$400.

Manufactories.

There are 3 brickyards, which employ 90 men; output, 21,000,000 brick, worth \$1,500,000.

Hides, 56,250 pounds, worth \$7,860; lard, 8,000 pounds, worth \$150; tallow, 150 barrels, worth \$2,420.

One planing-mill; 6 employes; output, \$5,000.

One salt works; 2 employes; output, 300 tons, worth \$750.

Exports.

Marine exports 11,990 tons of hay, 3,500 pounds of almonds, 16,680 boxes of apples, 8,164 boxes of apricots, 132 boxes of cherries, 3,200 boxes of figs, 72 boxes of oranges, 24,525 boxes of peaches, 1,525 boxes of pears, 116,600 pounds of prunes, 37,644 dozen chickens, 400 pounds of turkeys, 1,009,340 dozen eggs, 1,760 sacks of Irish potatoes, 2,827,228 pounds of butter, 608,000 pounds of cheese, 3,643,264 gallons of milk, 120,077 gallons of cream, 200 gallons of wine, 400,000 feet of lumber, 1,300 cords of wood, 5,000,000 brick, and 300 tons of miscellaneous products.

MARIPOSA COUNTY.

The county reaches eastward from the edge of the San Joaquin plains across the foothills far into the Sierra Nevada Mountains, its altitude varying from 300 to 13,000 feet, Mount Dana, the highest point of land, reaching an elevation of 13,227 feet.

There are about 300,000 acres of plains and lower foothills together, the latter predominating, and the balance consists of high hills and mountains; bare of timber on the plains, then scattering oak and scrub pines, then rising to immense tracts of sugar and yellow pine, fir, spruce, and cedar, and the giant sequoias of Mariposa Big Tree Grove, which contains some 427 trees, many of 35 feet in diameter and 150 to 300 feet high. The county is well provided with natural water in the Merced, Mariposa, and Chowchilla rivers, fed from perpetual snows. The famous Yosemite Valley is located in the eastern part of this county, at an elevation of 4,060 feet, with walls 5,000 feet higher. The Merced River flows through the valley.

The soil of the plains and valleys is black alluvial, and in the lower foothills there is a sharp, red admixture of adobe and gravel, all easily cultivated and good for grain and fruits.

Mariposa County achieved its greatest prominence on account of its yield of gold from its quartz veins and placers, and this industry will rank first for years to come. In all directions, properties—old and new—are being put into condition for active mining, and promise an awakening of the industry that will rival the golden days of old. There are three mining belts in the county—the Mother Lode with its off-shoots, the east belt, and the copper belt.

As a fruit-raising county Mariposa has not attained the distinction her fruits deserve. There is no variety that does not grow to perfection in size and color, and the flavor is unsurpassed, being of that delicious quality found only in mountain fruits. Irrigation is practiced to some extent, water being taken from streams and mining ditches, and used with good results. With the exception of berries, vegetables, and some of the smaller fruits, however, irrigation is not required.

Apples are the chief fruit product, though wine and raisin grapes, oranges and olives have been prize winners at World and State expositions. Some of the best apples that find their way to the San Francisco market are produced in Mariposa County.

The agricultural and fruit interests are steadily improving. Thousands of acres are taken up by settlers every year, and there is yet considerable valuable land left for newcomers. Fruit-growing and poultry-raising promise to be important industries.

Lumbering is of considerable importance, the splendid forests of pine and fir being extensive.

Stock-raising is a thriving enterprise. The cattle and sheep are ranged in the mountains in the summer and in the valleys and plains during the winter.

Considerable dairying is carried on during the summer in the mountain valleys, and a high grade of butter is made.

The public school system is of high order. There is an adequate number of schoolhouses, well supplied and furnished.

The greatest drawback to advancement has been and is the lack of shipping facilities. Long-distance hauling over mountain roads prevents fruits and other products being profitably marketed. This hindrance will be corrected by an electric railroad, now in course of construction, from one of the main railroad lines to Yosemite National Park, via the Merced River cañon. Another proposed railroad to Wawona through the eastern part of the county will be of vast benefit. These roads would give quick and cheap access to the markets.

Mariposa, the county seat, is well built and provided with churches, schools, hotels, and substantial county buildings and business houses.

Area of the county is 1,580 square miles, or 1,011,200 acres.

MERCED COUNTY.

Merced County is in the heart of the San Joaquin Valley. The greater part of its area, which is about 90 miles east and west and 40 miles north and south, extends from the foothills of the Sierra Nevada range on the east to the summit of the Coast Range on the west.

With the exception of a small portion of the eastern part, and that situated on the eastern slope of the Coast Range, the county is almost a level plain, broken only by watercourses. The San Joaquin River passes in a northerly and southerly direction almost through the center of the county. To the west of the San Joaquin River are the rolling foothills of the Coast Range. A large number of creeks take their rise in the mountain ranges on both sides of the valley. The principal stream is the Merced River, which, having its source in Mariposa County, in the Yosemite Valley, runs the greater part of its course through Merced, flowing through the entire length of the county, and reaching the San Joaquin on its western border.

On the eastern side of the San Joaquin are bottom and plains lands, skirted on the east by a narrow strip of low foothills. The Merced river bottom has an average width of three miles, with an abrupt bluff on each side.

Irrigation is an absolute necessity over the larger portion of Merced County for the production of fruits, alfalfa, grain, and vegetables. Two of the largest and most complete irrigation systems in the State are owned and operated—one on the east side, the other on the west side, of the San Joaquin River.

Considerable attention is being given to the breeding of dairy stock, and the dairy business has gone ahead with such rapidity that it has become the principal industry. Some of the best equipped creameries in the United States are to be found in Merced County, and some of the recently constructed ones are models of up-to-date factories. The great success of the creamery business is not only based upon good markets and shipping facilities, coupled with thorough manufacturing processes, but also, and especially, is due to the great alfalfa-growing industry.

One acre and a half of some land will produce ten tons of alfalfa hay and support one cow, whose milk will sell for \$40 at the creamery, one calf worth \$10, and two pigs worth \$20.

Merced County is the natural sweet potato belt of the State. In the county are several thousand acres of land that seem to be peculiarly adapted to their growth, as experience has demonstrated. Cereals of most kinds are raised, and even with its other great resources it is one of the leading wheat, barley, and corn producers.

Alfalfa grows prolifically, and produces four crops a year, besides pasturage. Table, raisin, and wine grapes find a natural home. Orange, lemon, olive, and fig trees thrive well, while apples, cherries,

peaches, apricots, prunes, pears, nectarines, quinces, and persimmons are very profitable. The smaller fruits, such as strawberries, blackberries, raspberries, currants, and gooseberries, yield abundantly. Walnuts, chestnuts, pecans, almonds, and peanuts are easily raised.

A commercial product is buhach, from which the celebrated insect powder is manufactured and sent all over the United States. Over 300 acres are devoted to the growing of the pyrethrum plant.

The Chowchilla Ranch and Pastoral Company, located near the city of Merced, is extensively engaged in the raising of pure-bred and grade shorthorn cattle. The herd of thoroughbred Durham cattle on the Howard ranch is second to none in the State. There are also large flocks of pure-bred and high-grade Merino sheep. The raising and fattening of hogs for market has proved very profitable. Poultry-raising is a paying industry. Climatic conditions are favorable to the raising of chickens.

Merced is the county seat. It has fine educational facilities and modern systems of sewers and water supply, and is lighted by electricity. It is the starting point, via the Coulterville route, to the world-famed Yosemite Valley. Merced Falls, Snelling, LeGrand, Dos Palos, Volta, Los Banos, Atwater, and Cottonwood are thriving towns, located in districts with surroundings of unexceptional fertility.

Merced County is traversed by two transcontinental railroads, viz: the Southern Pacific and the Santa Fé.

The settlement of land by colonization has resulted very successfully. No more successful colonies can be cited than those of Dos Palos, the Rotterdam, the Pioneer, El Capitan, and the British, all regularly laid out in tracts of five, ten, and twenty acres. Diversified farming is practiced, and comfortable homes and thrifty farms are the result.

STATISTICS OF MERCED COUNTY FOR 1905.

General.

Area, 2,000 square miles, or 1,280,000 acres	Road levy per \$100, 1905.....	40 cts.
Number of farms.....	Value of county buildings.....	\$187,000
Number of acres assessed.....	Irrigating ditches — miles, 151½;	
Value of country real estate.....	cost.....	\$308,883
Of improvements thereon.....	Railroads, Steam—miles, 129.81;	
Of city and town lots.....	assessed value.....	\$1,933,104
Of improvements thereon.....	Electric power plants, 1; assessed	
Of personal property.....	value.....	\$13,805
Total value of all property.....	Electric power lines—miles, 18½;	
Amount expended on roads.....	assessed value.....	\$20,612
Number of miles of public roads.....	Number of acres irrigated.....	145,084

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.		Bearing.	Non-Bearing.	Total.
Apple.....	4,224	4,343	8,567	Nuts — Almond	19,994	2,209	22,203
Apricot.....	9,720	3,470	13,190	Chestnut....	58	23	81
Cherry.....	283	198	481	Pecan.....	50	45	95
Fig.....	7,850	7,717	15,567	Walnut.....	688	468	1,156
Lemon.....	448	133	581	Hazel.....	.....	3	3
Nectarine.....	689	93	782	Grapes (acres).....	.....	.....	1,709
Olive.....	1,572	2,848	4,420	Raisin.....	190,186	38,567	228,753
Orange.....	2,044	1,040	3,084	Table.....	84,570	31,750	320
Peach.....	81,193	65,495	146,688	Wine.....	600,339	183,098	783,437
Pear.....	8,473	1,389	9,862	Blackberries }	20	.....	20
Plum.....	2,217	464	2,681	Strawberries }	10	.....	10
Prune—French	12,911	678	13,589	Loganberries }	10	.....	10
Quince.....	303	813	1,116				

Cereal Products and Hay.

	Acres.	Tons.	Value.		Acres.	Tons.	Value.
Wheat	95,270	9,384	\$234,600	Corn	2,600	1,400	\$35,000
Barley	86,570	31,165	623,300	Alfalfa hay ...	17,280	103,680	518,400
Oats	9,895	3,648	80,256	Grain hay	13,250	12,000	108,000
Rye	12,350	666	17,982				

Fruit, Vegetables, Nuts, Etc.

<i>Green.</i>				<i>Green—Continued.</i>			
	Pounds.	Value.			Pounds.	Value.	
Apples	316,800	\$3,950		Potatoes—Irish	559,900	\$7,498	
Apricots	672,050	8,400		Potatoes—Sweet	15,356,850	162,500	
Blackberries	100,000	5,000		Quinces	30,300	303	
Beets, sugar	5,250	230		Strawberries	24,750	1,608	
Cabbage	16,500	170		Tomatoes	181,500	3,630	
Celery	2,600	435		Walnuts	5,020	552	
Chestnuts	2,320	162					
Corn, green	12,000	240		<i>Dried.</i>			
Cherries	7,075	353			Pounds.	Value.	
Figs	49,400	494		Almonds	58,140	\$6,452	
Grapes	8,208,000	37,646		Apples	1,000	80	
Loganberries	75,000	4,875		Apricots	42,850	2,571	
Olives	49,125	1,965		Beans	146,350	2,907	
Lemons (boxes)	100	200		Figs	434,000	14,243	
Nectarines	68,900	689		Nectarines	1,000	80	
Oranges (boxes)	1,410	1,410		Onions	223,900	1,798	
Pears	308,000	616		Pears	3,600	292	
Peaches	7,391,790	20,170		Peaches	510,365	36,353	
Peas	6,210	216		Plums	1,850	130	
Plums	221,700	2,217		Prunes—French	75,130	2,253	
				Raisins	1,000	60	

Livestock Industry.

	Number.	Value.		Number.	Value.
Cattle—Beef	875	\$26,250	Colts	1,345	\$16,140
Stock	38,675	580,125	Mules	3,408	170,400
Thoroughbred	350	35,000	Sheep—Imported	850	4,250
Dairy Cows—Graded ..	8,837	220,925	Common	110,230	220,460
Calves	8,320	49,920	Lambs	58,245	43,683
Swine	13,780	55,120	Goats—Angora	41	82
Horses—Thoroughbred ..	50	25,000	Common	2,327	2,327
American	5,130	179,550	Wool (pounds)	566,920	101,044
Common	1,022	20,440			

Poultry and Eggs.

	Dozen.	Value.		Dozen.	Value.
Chickens	4,479	\$17,916	Turkeys	650	\$15,600
Ducks	79	553	Eggs	47,000	9,400
Geese	20	180			

Dairy Industry.

	No.	Value.		Production.	Value.
Creameries	4	\$40,000	Butter (pounds)	1,944,140	\$486,035
Skimming stations	1	3,000	Cheese (pounds)	92,560	15,735

Productions Shipped Out of County.

	Quantity.	Value.		Quantity.	Value.
Broomcorn	---	\$177	Beans	146,350 lbs.	\$2,970
Almonds	58,140 lbs.	6,452	Beeswax	644 lbs.	51
Apricots	526 boxes	526	Honey	5,000 lbs.	400
Figs	434,000 lbs.	14,243	Potatoes—Sweet	101,250 sacks	112,500
Grapes	2,600,000 lbs.	18,000	Tomatoes	4,000 boxes	3,500
Lemons	---	200	Cattle	15,225	396,300
Oranges	504 boxes	504	Hides	3,060	13,770
Peaches	12,506 boxes	12,506	Horses	303	30,025
Pears—Dried	3,600 lbs.	---	Sheep	22,000	77,000
Pears—Green	160,000 lbs.	---	Swine	17,350	104,100
Plums	3,578 boxes	1,789	Wool	566,920 lbs.	101,044
Prunes—French	35,730 lbs.	13,078	Butter	1,944,140 lbs.	486,035
Walnuts	6,320 lbs.	695	Cheese	92,560 lbs.	15,735
Chickens	515 doz.	2,062	Brandy	5,500 gals.	5,500
Turkeys	88,443 lbs.	23,688	Cider	30 gals.	7
Eggs	38,000 doz.	7,600	Wine—Sweet	65,000 gals.	22,750

MENDOCINO COUNTY.

Mendocino County has 100 miles of coast-line. In general topography it is mountainous, with valleys lying between the mountain chains or along the coast. It is one of the three great northern counties—Humboldt and Trinity being the others—that embody the greater part of the northern Coast Range Mountains, taking in their highest peaks, their deepest cañons, their fertile valleys, wooded slopes, rushing rivers, and picturesque scenery. It shares with Sonoma, Humboldt, and Del Norte the glory of the great redwood belt. From north to south, Mendocino County has a length of 85 miles. Its width east and west is 45 miles. The Coast Range, composed of two parallel ridges, traverses the central portion its entire length. These mountains vary in height from 1,000 to 3,000 feet. Their lower slopes have a gentle declivity, while the higher portions are generally precipitous and furrowed with ravines and gulches. In the eastern and northern parts many small productive valleys are found. The Eel River, running north, and the Russian River, running south, have their sources in this county, and are the principal streams. A large number of tributaries connect with them; while down the slope of the western ridge large numbers of creeks, some of which might aspire to the dignity of rivers, find their way to the Pacific. Mendocino is well watered with the numerous streams which take their rise in the mountain chain that intersects her territory.

In Ukiah Valley there is the greatest variety of soil, even on a small tract. All of the best lands are under cultivation. Holdings are not large, 200 acres of valley land being an exceptional farm, and the tendency is to subdivision.

The soil in Yorkville Valley is a rich, black loam, and well adapted to the growing of vegetables, fruits, grains, and hops. The soil of the hillsides and mountains is well suited to the growing of grass, vines, and fruits, and in some places grain.

Anderson Valley is a long, narrow strip of land lying between two chains of mountains. It extends 17 miles southeast and northwest, and is from 1 to 2 miles in width. The soil in this valley is a rich alluvium, and is well adapted to the growing of vegetables, fruits, and cereals. The soil of the hills is a rich, black loam, except in a few places, where there is adobe and gravel.

In Potter Valley the soil is mostly a sedimentary deposit, but a variety exists—some clay, a small amount of adobe, and some lands well adapted for fruit-raising.

In Little Lake Valley the soil generally is a rich, sandy loam, but in a few places a black loam is found. The soil is very productive, and never in the history of the valley has there been anything approaching a failure.

The principal agricultural industries are wool-growing, dairying, poultry and stock raising, and the growing of hops, grain and other

cereals, potatoes, apples, and fruits of almost all descriptions. Wine-making is very thriving, and new vineyards are constantly coming into bearing.

Dairying is one of the leading interests. There are some up-to-date creameries, with numerous skimming stations. The butter produced is of a very high grade and finds a ready market.

Stock-raising, grazing, and wool-growing are very much in evidence.

The Angora goat thrives well, the mountains being an ideal pasture. There are about 1,000,000 acres of land specially adapted for grazing purposes. The shipments of wool, of a grade second to none, amounts to about 1,000,000 pounds per annum.

Hops are a very prolific crop and of the finest grade.

Crops of wheat, oats, and barley are always certain.

Potatoes and apples of a very fine quality are raised and bring remunerative prices. The apples excel in size and flavor.

The Bartlett pear, nectarine, peach, and fig are grown very successfully. Berries of all descriptions grow abundantly and are of large size and fine flavor.

No irrigation is required, and crops do not suffer from drought at any time.

In the county are large tracts of redwood, covering over 600,000 acres, the lumber cut from which amounts to 100,000,000 feet annually. The lumber mills, in addition to having their logs floated on the streams on which they are situated, have modern railroads extending into the heart of the redwood belt. The largest mill in the interior is at Willits. All employ a large number of persons in the woods, about the shipping points, on their railroads, and in their mills. Shingles, boxes, and other lumber products are manufactured and shipped in large quantities. Ukiah, the county seat, is located on the California Northwestern Railroad.

Most of the trade is carried by vessels from coast points to San Francisco. The California Northwestern Railroad, connecting with San Francisco, runs 60 miles through the country from south to north.

All the streams abound in trout. Game—quail, grouse, pigeons and deer—is abundant.

Land suitable for agricultural purposes, fruit-growing, etc., can be obtained at reasonable prices.

STATISTICS OF MENDOCINO COUNTY FOR 1905.

General.

Area, 3,860 square miles, or 2,442,000 acres	700	Number of miles of public roads	850
Number of farms.....	1,519,520	Road levy per \$100, 1905.....	40 cts.
Number of acres assessed.....	\$7,178,840	Value of county buildings.....	\$70,000
Value of country real estate.....	\$1,153,788	Irrigating ditches cost.....	\$10,000
Of improvements thereon.....	\$633,540	Railroads, Steam — miles, 180;	
Of city and town lots.....	\$917,466	assessed value.....	\$482,300
Of improvements thereon.....	\$2,164,602	Electric power plants, 10; as-	
Of personal property.....	\$12,048,236	sessed value.....	\$100,000
Total value of all property.....	\$49,626	Electric power lines—miles, 25;	
Amount expended on roads.....	\$38,254	assessed value.....	\$10,000
Amount expended for bridges.....		Number of acres irrigated.....	2,500

Cereal Products and Hay.

	Acres.	Tons.	Value.		Acres.	Tons.	Value.
Wheat.....	20,000	22,000	\$660,000	Alfalfa hay....	1,500	7,500	\$90,000
Barley.....	1,000	1,000	14,000	Barley hay....	2,000	7,000	70,000
Oats.....	1,000	400	8,000	Oat hay.....	8,000	24,000	216,000
Corn.....	2,000	40,000	200,000	Wheat hay....	1,000	2,500	30,000

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.		Bearing.	Non-Bearing.	Total.
Apple	200,000	50,000	250,000	Prune—French	100,000	.....	100,000
Apricot	1,000	.....	1,000	Walnut	500	.....	500
Cherry	3,000	500	5,500	Grapes	2,000	300	2,300
Fig	1,000	.....	1,000	Table	500	.....	500
Olive	500	.....	500	Wine	1,500	300	1,800
Orange	200	.....	200	Blackberries	10	2	12
Peach	20,000	.....	20,000	Currants	1	.....	1
Pear	30,000	5,000	35,000	Raspberries	10	.....	10
Plum	5,000	.....	5,000	Strawberries	100	.....	100

Fruit, Vegetables, Nuts, Etc.

<i>Green.</i>	Pounds.	Value.	<i>Green—Continued.</i>	Pounds.	Value.
Apples	10,000,000	\$75,000	Pears	2,000,000	\$20,000
Apricots	5,000	100	Peaches	600,000	15,000
Asparagus	1,000	50	Peas	500,000	5,000
Blackberries	5,000	500	Plums	100,000	2,000
Beans	10,000	200	Potatoes—Irish	35,000,000	350,000
Beets	10,000,000	40,000	Raspberries	5,000	500
Cabbage	100,000	4,000	Strawberries	50,000	4,000
Celery	1,000	50	Tomatoes	10,000	300
Corn	10,000	200	Walnuts	2,500	250
Currants	600	60			
Cherries	15,000	1,500	<i>Dried.</i>	Pounds.	Value.
Figs	1,000	50	Apples	3,000	\$150
Onions	150,000	4,500	Prunes—French	300,000	10,000

Livestock Industry.

	Number.	Value.		Number.	Value.
Cattle—Beef	6,000	\$240,000	Horses—Thoroughbred	100	\$150,000
Stock	10,000	100,000	Standard-bred	200	60,000
Dairy Cows—Graded	300	2,000	Common	4,000	165,000
Ayrshire	4,000	100,000	Colts	1,200	12,000
Devon	500	2,500	Sheep—Imported	30,000	250,000
Holsteins	100	4,500	Common	70,000	210,000
Jersey	3,000	150,000	Lambs	65,000	65,000
Calves	12,000	30,000	Goats—Angora	1,700	8,500
Swine	11,500	23,000	Wool (pounds)	600,000	120,000

Poultry and Eggs.

	Dozen.	Value.		Dozen.	Value.
Chickens	6,000	\$24,000	Turkeys	800	\$16,000
Ducks	100	600	Eggs	150,000	30,000
Geese	400	7,200			

Dairy Industry.

	Number.	Production.	Value.
Dairies	100	300,000 lbs.	\$75,000
Creameries	11	1,000,000 lbs.	300,000

Forest Products.

	Amount.	Value.		Amount.	Value.
Area of timber lands (acres)	850,000	.....	Lumber—Fir (feet)	10,000,000	\$155,000
Fir	100,000	.....	Red wood (feet)	110,000,000	2,200,000
Oak	100,000	.....	Pickets (pieces)	500,000	30,000
Pine—Sugar	1,000	.....	Piles	10,000	50,000
Yellow	9,000	.....	Posts (pieces)	100,000	6,000
Red wood	640,000	.....	Railroad ties (pieces)	3,000,000	900,000
Sawmills (number)	26	\$357,000	Shakes (thousand)	700	5,000
Charcoal (sacks)	2,000	1,000	Shingles (thousand)	75,000	200,000
Fuel, wood (cords)	2,000,000	6,000,000	Stave bolts (cords)	500	3,500
Laths (thousand)	6,000	12,000	Tanbark (cords)	40,000	400,000

Miscellaneous Products.

	Pounds.	Value.		Acres.	Pounds.	Value.
Bees (hives)	400	\$1,200	Flowers and plants	5	.....	\$3,000
Beeswax	100	10	Hops	1,200	2,160,000	540,000
Honey	4,000	\$400				

Manufactories.

	Number.	Number of Employés.	Quantity Produced.	Value of Product.
Boxes—Wood	1	6	200,000	\$20,000
Brick	4	20	350,000 M.	1,400
Brooms	1	2	500 doz.	1,250
Cigars	3	7	200,000 M.	6,000
Flouring-mills	3	9	4,000 bbls.	16,000
Hides	--	--	270,000 lbs.	20,000
Lard	--	--	100,000 lbs.	10,000
Meat packed	--	--	200 tons	6,000
Tallow	--	--	1,000 bbls.	16,600
Planing-mills	4	50	2,000,000	50,000
Tanneries	3	8	10,000	3,000

Exports.

The county exports 2,000 boxes of apples, 30,000 boxes of pears, 225,000 pounds of prunes, 2,000 dozen chickens, 40,000 pounds of turkey, 50,000 dozen eggs, 2,160,000 pounds of hops, 15,000 sacks of Irish potatoes, 2,000 cattle, 270,000 pounds of hides, 15,000 sheep, 3,000 swine, 600,000 pounds of wool, 1,000,000 pounds of butter, and 100,000,000 feet of lumber.

MODOC COUNTY.

Modoc County lies in the extreme northeastern corner of California. The county is a succession of mountain ranges and valleys branching off from the Sierra Nevada Mountains, the principal spur of which is the Warner Range. It is principally drained by Pitt River, which flows into the Sacramento, near Redding, Shasta County. The lava-bed section occupies over one half the total area. The county has two large lakes, but barring the lakes and the large cattle ranges it is sparsely settled.

The valleys are the principal features, the leading ones being Surprise Valley, Goose Lake Valley, Hot Springs Valley, Jess Valley, Big Valley, and Little Hot Springs Valley.

Wheat, barley, grain, fruit, vegetables and hay are the leading staples. Thousands of acres are in alfalfa, and the stock and dairying industries are thriving. Every ranch has a fine orchard, and ranch houses and barns, costing \$5,000 or \$6,000 in total improvements, are not uncommon. Trees, both shade and ornamental, abound around every place.

The climate is that of the temperate zone, and the products are those of the great intermountain region which stretches from the Sierra to the western plains of Kansas. Snow falls in the valleys and much deeper in the mountains, forming the principal supply of moisture for the development of the country. Stock is usually fed for several months through the winter, although it is not always necessary so to do. The thermometer will sometimes run below zero for a few days in winter, but not for very long, and 90° is extreme heat for summer. Even in summer the evenings are cool and delightful.

The county is well watered. Surprise Valley has nearly twenty streams, which run both winter and summer. Goose Lake Valley is equally fortunate, while the Pitt River supplies water for many farms and ranches. Many springs exist, especially in the mountains; and in Surprise Valley there are many artesian wells.

The timber of the county is pine and fir in the Warner Range, and sugar pine in the western part.

Horticulture has had but a small place in the industries, only sufficient fruit for home uses being raised. However, the gradual approach of the railroad running north from Reno, Nevada, will increase the productivity in this line immensely, as the county is well adapted for apples, pears, and berries. The wild plum is about the only native fruit. The cultivated fruits were brought in the earlier days from Eastern States by the immigrants who came across the plains. A great deal of orchard planting has been done within the last few years.

The last five years have seen a great deal of reservoir work undertaken throughout the county and its tributary valleys. The rains come in time to insure abundant harvests year after year.

The nearest railroad point to Alturas, the county seat, is Madeline, in Lassen County. Daily trains are run from Madeline to Reno, Nevada.

There are flouring-mills, located at Bidwell, Lake City, Cedarville, New Pine Creek, Alturas, and Adin. There are sawmills, located at Bidwell, Cedarville, Eagleville, Willow Ranch, Davis Creek, Jess Valley, Alturas, Adin, and Widow Valley.

Area of the county is 4,097 square miles, or 2,622,080 acres.

MONO COUNTY.

Mono is a long, narrow county lying on the eastern slope of the Sierras, its greatest length bordering on the State of Nevada, which forms its northeastern boundary; its general direction being southeast and northwest.

The general contour is mountainous and very rough, all but 400 square miles, or less, being mountainous. The western portion lies among the Sierra Nevada Mountains, along their summit, the heights being clad in snow, and the slopes of the range being covered with forest trees.

Among the highest peaks are Mount Dana, 13,627 feet; Mount Lyell, 13,217 feet; and Castle Peak, 13,000 feet. The greater portion of the population is in the eastern part, in the valleys and the mining camps in the surrounding mountains. This portion, which has always been considered a strange, mysterious country, is of a desert-like, volcanic character, abounding in salt pools, alkali, and volcanic table lands, its character being significantly indicated by some of the local names, such as Hot Springs, Geysers, Sulphur Springs, Black Lake, Soda Pond, Volcanoes, Obsidian Mountain, Deep Cañon, Volcanic Tableland, Red Crater, Adobe Meadows, and Oasis.

Mono Lake, the "Dead Sea of America," is one of the attractions, and situated in the center of the county; it is about 12 miles long and 8 miles wide; its waters are a somewhat unusual compound, various chemical substances being found in solution in them. Several attempts have been made to utilize this water without success. This lake has all the appearances of having once been the scene of volcanic action. The country surrounding it, as Bodie, Aurora, Lundy, Tioga, and Benton, abounds in minerals. The lake has a number of small streams flowing into it, but is without a perceptible outlet.

Owens River in the south, which takes its rise in a high peak in the Sierras, and Kitten and Walker rivers in the north, are the principal streams. One passes through the southern part into Inyo County. The other, after rising in Mono County, continues its course into the State of Nevada. These two streams with their branches, together with the small streams that flow into Mono Lake, furnish the principal water supply for irrigation.

The retaining of the snow in the high mountains, at the sources of the streams used for irrigation until later in the season, assures an abundance of pasturage on the mountain ranges, which are thronged with vast herds of cattle and bands of horses and sheep that are brought from the lower sections to graze during the summer.

That portion of the valley soil lying contiguous to the streams is very rich. A great deal of the sagebrush land, formerly considered barren, is found to be very productive when placed under cultivation. Thus the area of tillable land has been vastly increased within the last few years, and wherever water can be got onto the land, even well up on the foothills, there are ranches that are making comfortable homes for their owners.

The agricultural resources are chiefly confined to the raising of hay and the hardier cereals and vegetables for home consumption. The

small surplus finds a ready market in the mining camps. Apples raised in the lower valleys are of superior quality and flavor and thrive well. Plums and peaches are grown on a limited scale. Berries also do well, considering the high altitude.

Grazing is the leading industry, and the pasturage is good and plentiful. Herds of dairy cattle are moved from the valleys during the summer, and an excellent product of butter is made. Large bands of sheep are also driven to its mountains for summer pasturage. Goats, hogs, horses, poultry, and mules are raised in large numbers.

Farming is on the increase, and much new land is annually being brought under cultivation.

The timber belt is very large and the product of good marketable quality, but as there is no means of transportation to market, the development of the lumber interests is retarded, although considerable quantities are used for local mining purposes.

Bridgeport is the county seat, and is located in a prosperous farming section.

Considerable mining for precious metals is carried on, the leading camp being Bodie. This industry is again prosperous. The introduction of the cyanide process, and the installing of electric power plants on the several streams of the county, thereby furnishing cheap power, make it possible to work at a profit large bodies of low-grade ore that heretofore were of no value, on account of cost of reduction.

The latest report of the United States General Land Office gives the area of vacant land as nearly one and a half million acres, described as grazing, mineral, timber, and agricultural.

STATISTICS OF MONO COUNTY FOR 1905.

General.

Area, 2,796 square miles, or 1,789,440 acres	Number of miles of public roads	265
Number of farms	Road levy per \$100, 1905	24 cts.
Number of acres assessed	Value of county buildings	\$45,600
Value of country real estate	Railroads, Steam—miles 67.37;	
Of improvements thereon	assessed value	\$87,515
Of city and town lots	Electric power plants, 2: assessed	
Of improvements thereon	value	\$38,000
Of personal property	Electric power lines—miles, 16;	
Total value of all property	assessed value	\$7,000
Amount expended on roads	Number of acres irrigated	21,341
Amount expended for bridges		

Mono is credited with 35 acres of wheat, yield 30 tons, worth \$900; alfalfa hay, 860 acres, yield 1,290 tons, worth \$5,760; grass hay, 5,000 acres, yield 5,000 tons, worth \$15,000.

The yield of Irish potatoes is 24,000 pounds, worth \$240.

Livestock Industry.

	Number.	Value.		Number.	Value.
Cattle—Beef	1,500	\$30,000	Horses—Common	1,274	\$28,550
Stock	3,768	45,216	Colts.	138	1,570
Dairy Cows—Graded	416	11,400	Sheep—Common	5,423	14,095
Calves	1,114	5,570	Goats—Angora	200	500
Swine	139	521			

A very large number of cattle, horses, and sheep are grazed in the county during the four summer months that are owned and assessed elsewhere: therefore, it is difficult to estimate just what the livestock interests are.

Miscellaneous Products.

The chickens raised in the county total 160 dozen, worth \$480; eggs, 1,920 dozen, worth \$480.

The forest area is 40,000 acres; lumber cut, 175,000 feet, worth \$2,100; fuel wood, 700 cords, worth \$2,800.

In the county are 3 steam and 2 electrical power plants.

There are 90 hives of bees, worth \$90.

Lime produced, 1,000 barrels, worth \$500.

MONTEREY COUNTY.

Monterey County is situated about 100 miles south of San Francisco, and 500 miles north of Los Angeles, on the Pacific coast. It is 124 miles long and 45 miles wide, its extreme length being from north to south.

Owing to the peculiar topography, with its rough mountains and broad plains, its great river running from south to north, with tributaries from either side, its rolling hills and rugged mountains, it is found to be a miniature of the State, with its entire diversity of climate and soil, enabling it to yield everything produced in the State, and rendering it one of the most desirable regions for settlement.

Its rivers furnish a never-failing supply of water for irrigation, and the mountains abound in minerals—gold, silver, copper, coal, bitumen, and oil.

The county is divided into three sections—the mountains and hills on the east, mountains and hills on the west, and the great Salinas Valley situated between these ranges of mountains.

The portion of Pajaro Valley lying south of the Pajaro River, and running to Monterey Bay on the southwest, is in Monterey County, and is about 15 miles long, and from 6 to 8 miles wide. The land is exceedingly fertile and under a thorough system of cultivation, producing immense crops of all kinds of vegetables, grain, fruit, and berries. Well-tilled farms greet the eye, and villages, school houses, churches, and picturesque residences dot the landscape in every direction. The foothills are covered with flocks and herds, and the lower ranges are timbered with live oak. The Pajaro River flows southwesterly and finds an outlet in Monterey Bay, near the mouth of the Salinas River.

The great Salinas Valley opens out on Monterey Bay and extends southward 100 miles, with an average width of 10 miles; therefore its area is about 1,000 square miles, or 640,000 acres. The Salinas River flows through its entire length. The land may be divided into three classes, viz: First, the heavy, rich bottom lands, which produce almost everything, the soil being sediment and black adobe, which often contains just enough sand to make it work easily. Second, the mesa or table lands, particularly adapted to growing wheat, barley, and other cereals; the average yield of wheat being 30 bushels per acre. Third, the uplands and slightly rolling hills, some of which are the finest fruit lands in California, and will produce oranges, lemons, grapes, peaches, apricots, almonds, walnuts, figs, apples, plums, pears, berries, and all other fruits common to the State.

Nearly all semi-tropical fruits do well in some part of this county, especially in the thermal belt along each side of Salinas Valley. A number of orange and lemon trees in yards of Salinas City hang full of fruit each year and are never injured by frost.

In barley, beets, and carrots, this valley can not be surpassed.

Going south, wheat excels; and grapes, peaches, prunes, apricots,

cherries, and almonds grow to perfection in the foothills, cañons, and small valleys, and figs do well in sheltered places.

Olive trees flourish with all the vigor they possess in their native country. Currants, gooseberries, blackberries, loganberries, and raspberries grow luxuriantly. Strawberries are in the market all the year round, and are shipped from Pajaro by carloads. Grapes grow to perfection everywhere in the county, except in the heavy bottom lands of the lower Salinas Valley.

As to potato-raising, the Salinas Valley has not its equal; here is the home of the famous Salinas Burbanks that are in such great demand all through the northwest, and thousands of sacks are shipped to the Philippine Islands. As high as four hundred bushels to the acre have been raised near Salinas.

Dairying is a very prominent, if not a leading industry, most of the dairies being devoted to butter-making. Some of the finest dairies in the State are in Monterey County, and some of the best butter in the State is made here. They have the latest and best improved machinery, and have found their business very profitable.

Extensive work has been done in the last few years in bringing the valley under a thorough system of irrigation. Near San Lucas there is some irrigation; a canal near King City, taken from Salinas River, distributes water to several thousand acres. Another, from Arroyo Seco, covers several thousand acres. Opposite Soledad, on the south side of Salinas River, considerable irrigation is done around Fort Romie on lands purchased by the Salvation Army, and sold on most favorable terms to worthy poor in need of homes. This is one of the most prosperous colonies in America. At Soledad is another canal, leading to Gonzales, which covers several thousand acres of fine land. Around the Spreckels sugar factory, 4 miles from Salinas City, a great deal of land has been irrigated for raising beets. This is the largest beet-sugar factory in the world. It requires 30,000 acres of land, planted to beets each year, to supply this factory.

The main transcontinental line of the Southern Pacific Railroad enters this county through Pajaro Valley on the north, and runs southeast through its entire length, paralleling Pajaro and Salinas rivers.

Pajaro is the great shipping point for apples, berries, all fruits, and dairy products of its section.

Hotel Del Monte, "the queen of American watering-places," including the main structure and two annexes, together with the connecting wings, is simply immense, and everything connected with the establishment is on the same magnificent scale. The grandeur of the hotel is repeated in the grounds, which cover 140 acres laid out in lawns, flower-beds, parks, and groves, and the landscape gardening is a marvel of beauty.

A little farther on is Monterey, situated on the beach of Monterey Bay, lying back on her sloping hills, and overlooking the placid waters of the bay—one of the grandest and most beautiful townsites nature ever formed.

Two miles farther on is Pacific Grove. Nestled among the pines is this little town, with beautiful streets, magnificent cottages, fine churches and school houses, charming drives, and with never a saloon in its sacred limits.

The harbor of Monterey Bay is second in importance on the coast. The largest battleships of our navy find anchorage within 100 feet of

the shore, and during heavy storms at sea it is not unusual to see many ships of different nations anchored in the calm waters of the bay. The fishing is incomparable for quantity and variety, and a cannery is located at Monterey. There is an abalone canning factory located at Point Lobos, and one at Point Sur. Monterey Bay contains about one hundred and fifty species of food fish, and many are annually taken for market. There is a whaling company at Monterey, and some seasons many whales are captured.

Salinas City, the county seat, is in the heart of the best portion of Salinas Valley, the head of the first division of the railroad, near the Spréckels sugar factory, and containing extensive gas and water works, a large flouring-mill, a large creamery, a planing-mill, and shops, banks, churches, and school houses. There are many magnificent residences and well-improved streets. Fraternal societies are well represented.

Soledad, named for Soledad Mission, is in another wheat belt, and is an important shipping point for grain and dairy products. It is the nearest point to Paraiso Springs, whose waters contain medicinal properties of a high order.

The narrow-gauge railroad from Pajaro to Salinas parallels the main line on the west, taps Monterey Bay at Moss Landing—where there are extensive warehouses and lumber yards, and where the coast vessels stop regularly for grain and merchandise—then continues to Spreckels's sugar factory, and is used principally for hauling beets to the factory and linerock from the quarries, though considerable grain is shipped by it from the region west of Salinas.

STATISTICS OF MONTEREY COUNTY FOR 1905.

General.

Area, 2,977 square miles, or 476,320 acres	Number of miles of public roads.	993.75
Number of farms..... 3,350	Road levy per \$100, 1905.....	40 cts.
Number of acres assessed..... 1,114,388	Value of county buildings.....	\$120,000
Value of country real estate..... \$9,122,185	Irrigating ditches—cost.....	\$8,000
Of improvements thereon..... \$4,762,000	Railroads, Steam—miles, 101.91..	
Of city and town lots..... \$1,646,165	assessed value.....	\$967,178
Of improvements thereon..... \$1,342,060	Electric -- miles, 7: assessed	
Of personal property..... \$1,892,585	value.....	\$7,500
Total value of all property..... \$18,560,595	Electric power plants, 3: assessed	
Amount expended on roads..... \$1,126,221	value.....	\$46,890
Amount expended for bridges..... \$8,500		

Cereal Products and Hay.

	Acres.	Tons.	Value.		Acres.	Tons.	Value.
Wheat.....	50,025	15,852	\$387,872	Corn.....	376	491	\$8,000
Barley.....	22,587	34,167	1,116,476	Alfalfa hay.....	1,110	6,650	38,050
Oats.....	4,154	8,736	115,530	Grain hay.....	6,627	11,249	73,565

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.		Bearing.	Non-Bearing.	Total.
Apple.....	226,745	119,875	346,620	Quince.....	116	.....	116
Apricot.....	21,626	8,450	30,076	Nuts—Almond.....	3,125	.....	3,125
Cherry.....	15,396	30	15,426	Chestnut.....	75	1	76
Fig.....	71	15	86	Walnut.....	270	1,710	1,980
Lemon.....	106	5	111	Grapes.....	241	.....	241
Nectarine.....	50	.....	50	Blackberries.....	128	.....	128
Olive.....	1,110	210	4,320	Currants.....	5	.....	5
Orange.....	155	10	165	Gooseberries.....	10	.....	10
Peach.....	5,888	200	6,088	Raspberries.....	85	.....	85
Pear.....	5,732	2,120	5,852	Strawberries.....	329	.....	329
Plum.....	975	50	1,025	Loganberries.....	55	.....	55
Prune—French.....	4,700	100	4,800	Dewberries.....	5	.....	5
Other kinds.....	2,115	.....	2,115				

Fruit, Vegetables, Nuts, Etc.

<i>Green.</i>	Pounds.	Value.	<i>Green—Continued.</i>	Pounds.	Value.
Apples	51,366,850	\$763,840	Peaches	281,500	\$5,575
Apricots	244,000	14,660	Peas	609,050	18,270
Asparagus	2,850	171	Plums	65,000	250
Beans	2,022,160	47,500	Potatoes—Irish	30,263,606	228,750
Beets	144,682,570	1,446,820	Prunes—French	650,000	3,250
Cabbage	10,725	200	Raspberries	567,500	33,875
Celery	2,560	100	Strawberries	3,759,900	106,100
Corn	806,650	8,066	Tomatoes	10,560	450
Currants	2,000	170	Walnuts	100	—
Cherries	151,500	7,565			
Gooseberries	2,500	150	<i>Dried.</i>	Pounds.	Value.
Grapes	15,000	300	Almonds	7,000	\$400
Onions	739,840	5,528	Apricots	1,500	120
Pears	1,051,700	14,470	Prunes—French	2,500	100

Livestock Industry.

	Number.	Value.		Number.	Value.
Cattle—Beef	8,248	\$191,400	Horses—Standard-bred	3,558	\$315,430
Stock	20,063	286,050	Common	12,364	620,900
Thoroughbred	29	1,380	Colts	2,750	97,750
Dairy Cows—Graded	10,069	223,625	Sheep—Imported	200	2,000
Holsteins	460	1,580	Common	27,453	61,600
Jersey	55	1,650	Goats—Angora	3,000	10,000
Calves	10,324	95,700	Common	353	1,000
Swine	14,433	68,390	Wool (pounds)	115,120	15,930
Horses—Thoroughbred	45	8,500			

Poultry and Eggs.

	Dozen.	Value.		Dozen.	Value.
Chickens	9,912	\$39,900	Geese	57	\$445
Ducks	226	12,156	Turkeys	142	2,430

Number of poultry farms, 20.

Dairy Industry.

There are 151 dairies and 6 creameries, with an output of 1,061,776 pounds of butter, worth \$212,143, and 2,353,580 pounds of cheese, worth \$235,358, and 200,000 gallons of cream, value not given.

Products of Forest.

There is one sawmill, worth \$2,000. The forest output is 4,750 cords of fuel wood, worth \$10,600; redwood lumber, 200,000 feet, worth \$2,000; posts, 48,000, worth \$4,400; shakes, 70,000, worth \$770; shingles, 150,000, worth \$375.

Miscellaneous Products.

The miscellaneous products are 1,969 bee hives, worth \$6,069; beeswax, 750 pounds, worth \$50; honey, 59,445 pounds, worth \$4,845.

Sugar beets, 1,970 acres; output, 28,400 tons, worth \$113,600.

The beer output of the county is 4,000 barrels, worth \$25,000.

Four cigar factories employ 15 people, and turn out 636,000 cigars, worth \$31,800.

Productions Shipped Out of County.

	Amount.		Amount.
Beans	900,000 lbs.	Pears	15,000 boxes
Barley	23,000 tons	Strawberries	5,500 chests
Corn	400 tons	Walnuts	37,400 lbs.
Hay	2,800 tons	Chickens	1,600 doz.
Oats	5,000 tons	Turkeys	7,500 lbs.
Apples	1,000,000 boxes	Eggs	762,000 doz.
Apricots	80,000 boxes	Cattle	6,750
Blackberries	12,500 chests	Hides	500
Cherries	15,000 boxes	Horses	1,950
Currants	500 boxes	Sheep	10,000
Onions—Green	7,000 sacks	Swine	12,500
Peas—Dried	600,000 lbs.	Wool	115,000 lbs.
Potatoes—Irish	128,722 sacks	Butter	582,000 lbs.
Peaches	8,000 boxes	Cheese	246,000 lbs.
Prunes—French	600,000 lbs.	Cigars	48,000
Other kinds	50,000 lbs.	Flour	80,000 bbls.

NAPA COUNTY.

Napa County lies in a northeasterly direction from San Francisco, its county seat, Napa, being about 40 miles from San Francisco and about 70 miles southwesterly from Sacramento. Though one of the smallest, it is one of the most important counties of the State, on account of its proximity to the great market of San Francisco, with which it has several lines of rail and water communication, the variety and wealth of its agricultural, mineral and manufactured products, the fertility of its soil, the salubrity of its climate, and the excellence of its educational facilities. The length is about 50 miles, and its width varies from 30 to 35 miles.

Spurs of the Coast Range Mountains having a northwesterly trend divide the county into several valleys and afford a variety of scenery of unsurpassed beauty. The western boundary runs for its entire length from San Pablo Bay to Mount St. Helena, along the top of one of these ridges. The only valley of importance intersecting the slope of this western range is Brown's Valley, a productive glen that lies west of Napa City and contains many pretty suburban homes. East of this range, extending for almost the entire length of the county, lies the beautiful Napa Valley, varying in width from 1 to 5 miles, and opening at its lower end into a wide, fanlike expanse of tule land. Mount St. Helena, at the head of this valley, rears its summit nearly 4,500 feet above the level of the sea. The valley is watered by numerous streams that flow from the mountains and find their way into Napa River, which flows the entire length of the valley, and is navigable for steamers and sailing craft as far as Napa City.

The northeastern half of the county is broken by ranges of high mountains into several valleys, of which Berryessa, the most easterly, is the largest.

The rainfall averages so well that a shortage of crops is unknown. The influence of the ocean breeze is felt during the summer to an extent amply sufficient to temper the sun's heat, while the hills act as a barrier against the fogs. The foothills are especially famed for their climatic features, and here are some of the most noted health resorts in the State.

The soil may be divided into five classes. The first class, termed argillaceous, is common to the mountains on the east side of the county, and is not very productive. The second class, adobe, does not exist to any great extent. The best soil is the loam, which may be found in all the valleys, but principally in Napa. Tule soil is found from Napa City southward, and along the margin of the bay. The last class is lava, a decomposed volcanic formation, and is excellent for vineyards. It is found in the vicinity of Howell Mountain.

As the climate of Napa Valley corresponds strikingly in its main features to that of the south of France, grape-growing, wine-making,

and horticulture are followed with great success. The olive, which requires a temperate climate, and dreads equally excessive hot or cold weather, thrives remarkably, and has been largely planted on stony hillsides that would be almost useless for other fruits. The oil and pickled olives manufactured are not excelled by any other domestic or imported product.

Napa County at one time led the State in the amount of wine produced, but the ravages of the phylloxera caused the death of many of the finest vineyards, and curtailed the production of grapes. Some of these vineyards have been re-planted with resistant vines, and thus the output of wine is increasing.

The raising and curing of French prunes has been brought to a high state of excellence. Cherries and peaches are successful crops, and walnuts, almonds, apricots, pears, and apples thrive in all sections. While Napa County makes no claims to general adaptability to the culture of citrus fruits, there are few orchards that do not contain a number of orange and lemon trees to provide for the use of the family and for local sale. The output is uniformly of fine quality. Berries of all kinds thrive, and form a very material part of the produce.

Diversified farming is carried on on a large and profitable scale, the nature of the crops raised depending upon the character of the soil. The hay crop is generally large, and, being near to market, finds a profitable sale. Wheat, oats, barley, and corn are raised on a large scale, particularly in the eastern valleys. Potatoes, asparagus—in fact, vegetables of all kinds—do well. All the crops are raised without irrigation, the rainfall being ample, even in the driest years, to insure a good crop.

More and more attention is being paid, year after year, to dairying and stock-raising, and also to poultry-raising.

Napa County has always been noted for the fine horses that its farms produce. The most complete establishment devoted exclusively to the breeding of thoroughbred horses, the Napa Stock Farm, has several high-class imported stallions, and over sixty thoroughbred mares.

Quicksilver, magnesite, mineral waters, and building stone are produced in large quantities.

Napa City is situated at the head of navigation, on Napa River. It is chiefly interested in the manufacture of leather and leather goods. There are tanneries, glove factory, shoe factory, woolen mill, and many other industries. It has excellent streets and buildings, fine schools and numerous churches. The State Hospital is located a short distance from the city. At Yountville, 9 miles from Napa, is the State Home for Volunteer Soldiers.

St. Helena, farther up the valley, is the second town in size, and is chiefly devoted to the wine-making industry. It is also the business center for Pope Valley. Here is situated the St. Helena Sanatorium and the health-food factory.

Napa County is famous for the excellence of its roads and the size and number of its stone bridges. All the main county roads are sprinkled in the summer, and rural delivery routes carry the daily mail to the doors of the country people.

NEVADA COUNTY.

Nevada County extends from the summit of the Sierra Nevada range, on the east line of the State, westward to the Sacramento Valley, a distance of 70 miles. It is from 12 to 20 miles in width. On its western line it has an elevation of about 1,000 feet, increasing to 2,000 or 3,000 feet in the central portion, and 8,000 feet along its eastern boundary. Its natural boundaries are the South Yuba and Bear Rivers on the south, and the Middle Yuba River on the north. The general course of these rivers is from northeast to southwest, and through the northern and central portions the county is partly divided by the South Yuba River, which unites with the Middle Yuba, near the western boundary, and forms the main river, which is a tributary of the Feather.

The western and middle portions present a pleasing variety of landscapes in wooded hills, small valleys, or rolling uplands, a large part of which is well adapted to agriculture and grazing, and to orchards and vineyards. Along the extreme western boundary citrus fruits grow to perfection, as do the olive and other sub-tropical fruits: through the central portion, at an altitude of 2,500 feet, the Bartlett pear and other fruits of the temperate zone reach their best development in flavor; while at an altitude of 3,500 feet and 400 feet farther up the mountain slopes, the apple attains a superiority unequaled by any raised at lower elevations.

The variety in soil, the difference in temperature, and accessibility are encouragements to fruit and vineyard culture that are making a valuable and profitable production.

The rainfall for the season is not often excessive, the average annual precipitation being about 50 inches. These figures vary with the altitude. The annual rainfall makes the failure of crops an impossibility, and insures generous harvests.

The abundance of rain and the melting of snow in the mountains afford an adequate supply of water for the canals and artificial reservoirs, that can be used for either mining or irrigation, and for the latter the demand is steadily increasing for clover and grass lands and orchards. The soil of Nevada County, with proper cultivation is capable of producing cereals and fruits without the aid of irrigation. Wherever irrigation has been used, crops of every character have been raised in remarkable abundance. There is plenty of water stored in artificial reservoirs along the summit of the mountains. Originally these artificial lakes and expensive ditches were constructed to supply hydraulic mines.

Nevada County holds a prominent position among the fruit-growing counties, and with her great variety of soil, climate, and altitudes seems well adapted to nearly all varieties of fruit. Orchards of fruit and nut-bearing trees, and vineyards of the choicest table, raisin and wine grapes are specialties.

The abundant rainfall is especially propitious for the growth of the Bartlett pear, which here reaches perfection.

Any kind of fruit adapted to the temperate zones flourishes. The olive, fig, prune, and all kinds of berries do well.

The principal fruits are apples, pears, peaches, plums, cherries, grapes, and nuts, and the contiguous country is fast being converted into orchards and vineyards.

Nevada County is the banner gold-producing county, having the largest hydraulic mines in the world and a number of quartz mills running forty stamps. An electric railroad is in operation between Grass Valley and Nevada City, being a broad gauge with seventy-pound rails, and the very latest style of cars. This line is supplied with power from the Bay Counties Power Company, whose plant is situated on the Middle Yuba River, which is the dividing line between Nevada and Yuba counties. This plant supplies eighteen counties. The Truckee River General Electric Company, situate in the western part of the county, supplies the mines of Virginia City with power.

The second largest paper mill in the United States is at Floriston, on the Truckee River. The pulp used is manufactured from the forests of the immediate neighborhood.

One of the great industries is that of lumbering. From the earliest times the woodman's ax has been heard reverberating through these hills, and the mines have furnished a splendid market for this product. The mountains are thick with sugar and yellow pine, fir, spruce, and cedar. The lumber industry is principally in and around Nevada City, Grass Valley, and Truckee. At present the scene of greatest activity in this industry is in the vicinity of Truckee, where large sawmills, door, sash and box factories are located. The town of Overton has one of the largest box factories and sawmills in the State, and is connected by railroad with Truckee.

Much stock is raised and fine butter made in the high altitudes of the Sierras in summer, with every advantage of clear, pure water, cool weather, and abundant nutritious grasses.

Nevada County is well equipped with schools and churches. Of the private educational institutions, Mount St. Mary's Academy is by far the largest. Its graduates are found all over the country. Grass Valley also has a business college of high standard.

The principal towns are Grass Valley, Nevada City, and Truckee. Nevada City is the county seat, and Grass Valley is the largest mining town in the State. They are 4 miles apart. All these towns are provided with modern systems of lighting and sewerage; have paved streets, and a pure and wholesome water supply. At Nevada City is the courthouse, a fine building that cost over \$100,000. Grass Valley has an auditorium costing \$35,000.

The Central Pacific Railroad enters the county east of Truckee and runs thence westward, close to its south boundary, for a distance of 60 miles to Colfax, below Cape Horn. Colfax is the south terminus of the Nevada County Narrow Gauge Railroad. Grass Valley and Nevada City are also connected by an electric railroad making hourly trips. At Truckee the Lake Tahoe Railroad makes daily trips to Lake Tahoe, one of the scenic wonders of the State. Boca is the south terminus of the Boca and Loyalton Railroad.

Area of the county is 958 square miles, or 613,120 acres.

ORANGE COUNTY.

Orange County is one of the youngest counties, having been organized in 1889 from a portion of Los Angeles County. Its area is divided into mountains, 65; foothills, 150, and valleys, 550 square miles.

The Santa Ana range of mountains is the line between Orange and San Bernardino counties at the northeast corner of the former county. It is also the dividing line between Orange and San Diego counties on the east. This range also sends up a line of foothills westwardly along the seashore nearly half way across the county. All of the western portion of the county is included in the Santa Ana plain, or valley. There are also several small valleys among the foothills and along the mountain streams. The Santa Ana plain is covered with rich loam, and, with the exception of some patches of alkali, is very productive. The highest point of land is what is locally known as Saddleback, or Santa Ana Peak, with an elevation of 5,675 feet.

There is an abundant water supply. The Santa Ana River enters near the northeast corner, and traverses the entire Santa Ana plain, flowing into Newport Bay. Besides this stream there is Santiago Creek; also Aliso, Trabuco, Mission Vieja, San Juan, and Coyote creeks, and other streams. The last-named creek forms the boundary between Orange and Los Angeles counties on the west. The artesian belt running through Orange County furnishes a plentiful and cheap water supply, and makes the section as nearly independent of rainfall as it is possible to be. Much artesian water has been developed; more in the artesian belt west of the river than in any other portion. There hundreds of artesian wells have been sunk, and the farmers have installed pumping plants and organized irrigation districts.

In the foothills a sharp, gravelly loam of a reddish color prevails. Descending into the valleys, this loam loses its color and its sharpness and becomes black, with a large admixture of adobe and frequent streaks of alkali. West of the Santa Ana River large deposits of peat are found, the product of tule roots and other swamp vegetation. This varies in depth from a few inches to sixteen feet. This land is considered the best for agricultural purposes, and is held at a high figure.

All the fruits do well. Many varieties of oranges and several of lemons are grown. Oranges are shipped from the last of December until June, and the bulk in March and April.

There are some portions where apples are grown which vie with those of the Eastern States, in size, flavor, and appearance. It was only during the past few years that much fruit besides oranges and grapes was grown. Now, however, large orchards are annually being planted to almost every known variety.

Apricots, peaches, apples, oranges, lemons, figs, prunes, and walnuts do well, apricots especially holding front rank, with walnuts in the second place.

The larger amount of the fruit produced finds a market in the East, the citrus fruits and walnuts being shipped entirely out of the county. The deciduous fruits are very largely disposed of to the drying establishments and packing-houses, and by them shipped both dry and green to Eastern States.

The rich bottom lands yield immense crops of corn, and large portions grow the finest alfalfa and natural grasses.

The mesa, or uplands, are of the finest quality, and admirably adapted to barley, oats, wheat, flax, hemp, and the vine, as well as all the ordinary northern fruits.

Every character of soil that is found in California can be duplicated in these lands, and every product grown in the semi-tropics can be successfully raised.

Celery-raising has grown to a very large industry, the output reaching this past season 1,800 car loads.

While celery-growing is occupying much attention, other sources of income are not neglected, and of these the most important are the dairy interests and the rearing of cattle and hogs.

The shipping of vegetables, consisting of early onions, potatoes, cauliflower, cabbage, etc., is a growing and profitable business.

The sugar-beet is raised extensively, and a factory is located at Los Alamitos. This factory runs four months, and consumes the product of over four thousand acres, turning out millions of pounds of sugar ready for table use. The big sugar factories at Chino and Oxnard draw extensively from the soil of this county, thousands of tons of beets being shipped to these places from the vicinities of Anaheim, Buena Park, Garden Grove, Westminster, and Bolsa every year.

No business has developed more rapidly than the oil industry. North and east of Fullerton thousands of dollars have been expended in sinking wells, several of which have turned out to be gushers.

Santa Ana is the county seat. Anaheim is next in size, Orange following. Tustin is a charming suburb of Santa Ana, with splendid orchards, attractive homes and people of refinement; Fullerton is a place of much business and the headquarters of the oil industry of that section; El Toro is made up in a large measure of English settlers of wealth and progressive ideas; San Juan Capistrano, in the extreme south, is the seat of one of the largest and most interesting old missions.

STATISTICS OF ORANGE COUNTY FOR 1905.

General.

Number of acres assessed.....	408,619	Irrigating ditches—miles, 120;	
Value of country real estate.....	\$6,470,870	cost	----
Of improvements thereon	\$1,263,605	Railroads, Steam—miles, 98.95;	
Of city and town lots.....	\$2,289,490	assessed value	\$103,655
Of improvements thereon	\$1,833,180	Electric—miles, 15.45; assessed	
Of personal property	\$1,576,590	value	\$83,505
Total value of all property	\$13,433,735	Electric power lines—miles, 20½;	
Amount expended on roads and		assessed value	\$8,610
bridges	\$45,178	Number of acres irrigated	30,000
Value of county buildings.....	\$121,000		

Cereal Products and Hay.

	Acres.	Tons.	Value.		Acres.	Tons.	Value.
Wheat	18,000	9,000	\$225,000	Corn	3,000	3,000	\$75,000
Barley	38,500	19,250	385,000	Alfalfa hay	7,500	37,500	262,500
Oats	1,500	750	17,250	Grain hay	21,000	31,500	189,000

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.		Bearing.	Non-Bearing.	Total.
Apple.....	11,050	3,840	14,890	Orange	536,715	17,480	554,195
Apricot	144,780	57,980	202,760	Peach	23,580	25,970	49,550
Fig	2,510	-----	2,510	Pear	4,070	1,740	5,810
Lemon	45,340	57,490	102,830	Prune	20,220	-----	20,220
Olive	22,935	-----	22,935	Walnut	145,620	93,230	238,850

There are 200 acres of bearing raisin grapes; 700 acres of bearing wine grapes; 5 acres of bearing raspberries, and 100 acres of bearing strawberries.

Fruit, Vegetables, Etc.

There were of apricots, 1,875,000 pounds dried, worth \$150,000, and 1,900 cases canned; cabbage, 275 carloads; lemons, 54,300 boxes, worth \$54,300; oranges, 669,700 boxes, worth \$502,275; sweet potatoes, 50 carloads; walnuts, 4,916,600 pounds, worth \$589,992; peanuts, 500,000 pounds; canned figs, 25 cases; canned grapes, 700 cases; canned pears, 1,700 cases; canned peaches, 1,800 cases; canned plums, 1,000 cases; canned tomatoes, 10,000 cases.

Wines, Etc.

There are 6 wineries and 1 brewery.

The output of dry wine is 43,000 gallons, worth \$10,750; sweet wines, 21,000 gallons, worth \$10,500; brandy, 3,600 gallons, worth \$5,400.

Output of beer, 5,000 barrels; value not given.

Livestock Industry.

	Number.	Value.		Number.	Value.
Cattle—Beef	150	\$2,250	Horses—Thoroughbred	5	\$1,000
Stock	5,560	55,600	Standard-bred	21	5,050
Dairy Cows—Graded...	5,410	116,300	Common	3,815	114,025
Calves	2,580	12,900	Mules	460	18,400
Swine	2,015	6,045	Sheep—Common	34,200	68,400
Colts	1,510	18,875	Lambs	8,200	4,100

Poultry—Dairies—Fish—Bees.

Chickens in the county, 12,550 dozen, worth \$31,380.

There are 4 dairies, 2 creameries, and 12 skimming stations. The output is 257,600 pounds of butter, 65,900,000 pounds of milk, and 170,000 pounds of cream.

The fish output is 500,175 pounds.

There are 2,706 bee hives, worth \$4,060.

Manufactories.

One brickyard turns out 100,000 brick, worth \$750.

There are 3 cement and building block factories, and 1 cigar factory; but the output of these is not given.

One sugar-beet factory; output, 12,235,600 pounds.

One ice factory; output, 1,900 tons.

One flouring-mill; output, 100 barrels per day.

One iron foundry, 80 oil wells, and 1 tin mine; output not given.

Four planing-mills employ 60 men; output not given.

Exports.

The exports are 54,300 boxes of lemons, 669,700 boxes of oranges, and 4,916,600 pounds of walnuts.

PLACER COUNTY.

Placer County lies between latitude $38^{\circ} 70'$ and $39^{\circ} 30'$. Its direction is northeast and southwest. It is about 100 miles long and of varying widths, from 10 to 30 miles, the course and distance being defined by the course of the rivers which mark its boundaries. It extends from about 8 miles from the Sacramento River to the summit of the Sierra Nevada Mountains. Just above Auburn, between the Bear and American rivers, the county is very narrow, being but about 8 miles across. Above Auburn it widens out into the two divides lying between the Bear River and the Middle Fork of the American River. These are known as the Dutch Flat or Railroad Divide, and the Forest Hill Divide. The southwestern portion is more regular in shape than the part just described. This section contains the foothill and level agricultural lands. Its shape is nearly a parallelogram, the southwest two thirds being on the plain proper, and the northeast one third being the foothill and fruit district.

Of the area, 810 square miles are mountainous, 450 foothills, and the remainder valleys. The entire extent faces toward the west, extending from an altitude of some 40 feet on the plains in the western portion to over 7,000 feet at its eastern boundary line, embracing nearly every variety of climate known in the State. At the eastern boundary, separating it from the State of Nevada, is Lake Tahoe, one of the most picturesque lakes in America. The topography of Placer County is as irregular as is its shape. Imagine the whole Atlantic Coast from Labrador to Tallahassee incorporated into one county, and one will have a fair idea of what may be found in Placer, exaggerated as to size, but not as to the great variety of climate, elevations, soils, and resources. As to the latter, the whole Atlantic seaboard can hardly equal the endless variety to be found within the borders of this county, which rivals Florida in the quality of its oranges, excels New Jersey in peaches, equals the New England States in its granite quarries, and compares favorably with Maine in the quality of its lumber.

From an elevation of about 2,500 feet up to the summit of the mountains snow falls in the winter, light at the lower edge of the line, and increasing in depth as it ascends the Sierras. Here is a strip of territory from the snow line up to an elevation of 3,000 feet, particularly well adapted to the apple, the pear, and a great variety of vegetables.

The soil of the western or valley portion is of the same general alluvial composition as all the soil in the Sacramento Valley, and is well adapted to the growth of grain. Over 30,000 acres are annually devoted to wheat, barley, oats, and hay. The low foothills back of Lincoln are excellent for the grape.

The soil of the valley lands is mostly a red loam, mixed with considerable clay in spots; that of the foothills is a gravelly red loam, in places light and sandy, and is excellent for the production of fruits.

Farther up the soil changes to a red character, with a slate bedrock. This, too, is very fertile. The agricultural region includes the valley and foothill lands all the way from the western boundary to an elevation above Colfax. The foothills everywhere possess a soil which only needs cultivation. The granite soils around Newcastle are composed largely of clay, sand, soda, potash, lime, phosphorous, iron and magnesia. The constant decomposition that is going on appears to be of nearly endless duration, and of such a nature as to render the soil almost inexhaustible. Artificial fertilization has not yet been found necessary.

For an irrigation water supply Placer has three sources—the Yuba, Bear, and American rivers. Including its branches, the Bear River irrigation ditch is 200 miles in length. This system has been increased in its capacity, and brings water from the Yuba River, so that an abundance is assured. There are several other canals, originally built for mining but now used for irrigation.

Placer County holds a foremost position among the fruit-producers, and it is the most easterly of the counties of California. With the Central Pacific Railroad running the entire length of her territory, she is one day nearer the Eastern market than any other part of the State, a very large item in the shipping of green fruit. In her thermal belt fruit ripens earlier than in most other places in the State, another large advantage. Pears, plums, prunes, apples, apricots, cherries, persimmons, pomegranates, quinces, and figs all do well. Peaches have been grown for the past twenty-five years, and failure of a crop is unknown. Fine oranges are produced, and Placer holds a position beside Butte in the northern citrus belt. In the production of small fruits, berries, and table grapes Placer holds a foremost place.

The largest cherry trees in the world are at the ranch of Robert Hector, from one of which has been picked as high as 3,000 pounds in one season. At the Pan-American Exposition Placer won gold medals for peaches, oranges, and grapes. An exhibit of fifty oranges averaged twenty-four ounces in weight.

A lemon that was on exhibition at the Sacramento Chamber of Commerce measured 22 inches in circumference the small way, and weighed three and a half pounds.

Olive-growing is a profitable industry. The principal orchards are provided with manufacturing plants and are producing a very fine quality of oil.

Dairying and stock and poultry raising are extensive industries. Butter-making is carried on in the summer, the mountain ranges providing plenty of natural feed; the butter is of a very fine quality.

Considerable quantities of vegetables are raised, not only for local consumption, but also for shipment abroad.

Much sugar and yellow pine, fir, spruce, and cedar are found in the mountains, and the lumber output from that section has been very large for many years. Oak and scrub pine abound all over the foothills, and fuel is plentiful.

Placer County ranks well up among the mining counties. Her average yearly contribution to the world's wealth is something above the million mark. The total production since the discovery of gold at Auburn, May 16, 1848, is estimated at much over \$75,000,000. The mining methods include drift, river, placer, and quartz. Placer's drift mines are among the largest in the world.

The granite quarries rank with the best in the United States. Nearly all the street curbing in San Francisco is from the Placer quarries, while the State Capitol is an example of the value and beauty of foot-hill granite.

Potter's clay is found in abundance at Lincoln, from which is manufactured sewer pipe, tiling, pressed brick, architectural terra cotta, and glazed brick for interior decoration.

Placer County is a natural sanatorium. As a resort for patients suffering from pulmonary diseases, leading physicians say it has no equal on the Pacific Coast. It is here patients find relief and some of them are cured. The altitude is just right for people suffering from asthma or bronchial diseases.

STATISTICS OF PLACER COUNTY FOR 1905.

General.

Area	1,390 square miles	Road levy per \$100, 1905	40 cts.
Number of farms	904	Value of county buildings	\$210,000
Number of acres assessed	643,485	Irrigating ditches—miles, 127; cost	\$130,615
Value of country real estate	\$3,852,180	Railroads, Steam—miles, 131.47; assessed value	\$2,331,880
Of improvements thereon	\$1,331,175	Electric power plants, 2; assessed value	\$30,500
Of city and town lots	\$392,595	Electric power lines—miles, 75½; assessed value	\$35,500
Of improvements thereon	\$914,895	Number of acres irrigated	12,000
Of personal property	\$890,415		
Total value of all property	\$7,433,885		
Amount expended on roads	\$32,228		
Number of miles of public roads	705		

Cereal Products and Hay.

	Acres.	Tons.	Value.		Acres.	Tons.	Value.
Wheat	24,200	7,260	\$188,760	Oats	4,100	820	\$19,680
Barley	12,300	2,460	44,280	Grain hay	36,500	49,075	449,075

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.		Bearing.	Non-Bearing.	Total.
Apple	19,300	6,790	26,090	Prune—French	7,500	2,970	10,470
Apricot	14,600	7,500	22,100	Quince	2,300	.....	2,300
Cherry	17,100	8,000	25,100	Almond	6,700	2,800	9,500
Fig	5,100	2,960	8,060	Walnut	1,100	600	1,700
Olive	36,000	17,500	53,500	Grapes (acres)	2,905	750	3,655
Orange	27,300	17,600	44,900	Raisin (acres)	200	.....	200
Peach	906,300	593,700	1,500,000	Table (acres)	1,400	400	1,800
Pear	112,600	53,730	116,330	Wine (acres)	1,305	350	1,655
Plum	304,000	179,500	483,500				

Fruit, Vegetables, Nuts, Etc.

	Green.	Pounds.	Value.		Green—Continued.	Pounds.	Value.
Apples		290,500	\$3,805	Plums		12,423,000	\$310,575
Apricots		1,534,000	30,680	Quinces		168,000	2,520
Blackberries		202,000	7,600	Raspberries		136,000	5,340
Currants		3,000	180	Strawberries		414,500	16,580
Cherries		1,605,000	160,500	Tomatoes		402,000	3,720
Figs		12,300	615				
Grapes—Table		3,400,000	136,000				
Grapes—Wine		2,900,000	17,400				
Nectarines		51,000	1,020				
Oranges (boxes)		46,000	8,500				
Pears		3,428,000	34,000				
Peaches		36,422,000	728,400				
Persimmons		17,000	510				

Canned.

	Cases.	Value.
Apples	9,483	\$216
Apricots	2,891	143
Blackberries	5,747	445
Pears	217,332	9,256
Peaches	499,378	19,645
Tomatoes	60,405	1,116

Livestock Industry.

	Number.	Value.		Number.	Value.
Cattle—Beef	1,750	\$35,000	Horses—Standard-bred	6	\$1,440
Stock	1,970	30,100	Common	2,904	88,400
Dairy Cows—Graded	3,125	81,300	Colts	570	9,890
Calves	1,740	12,280	Sheep—Common	26,500	66,750
Swine	820	2,460	Lambs	15,400	30,800
Wool (pounds)	178,565	40,784	Goats—Common	840	1,260

Wines, Etc.

Placer County has 2 wineries and 2 breweries.

The output of wine is 23,400 gallons of claret, worth \$4,680; and 2,350 gallons of port, worth \$1,410.

Output of breweries, 4,500 barrels, worth \$6,700.

Dairy Industry.

There are 4 dairies; output, 52,300 gallons of milk, worth \$13,075, and 1,800 gallons of cream, worth \$1,620.

Forest Products.

	Amount.	Value.		Amount.	Value.
Area of timber lands—			Railroad ties (pieces)...	15,000	\$6,000
Cedar (acres)	2,850	----	Laths (thousand).....	689,000	----
Fir (acres)	5,600	----	Lumber—Cedar (feet) ..	34,885	408
Sugar pine (acres)...	5,700	----	Fir (feet)	749,600	6,740
Yellow pine (acres)...	8,300	----	Sugar pine (feet)	4,750,000	71,250
Sawmills (number)....	3	\$38,950	Yellow pine (feet)...	2,439,000	29,268

Manufactories.

The brickyards have an output of 1,100,000 brick, valued at \$22,000.

Two cigar factories work 10 people, with an output of 397,000, valued at \$15,880.

One confectionery establishment employs 3 people; output, 6,000 pounds, worth \$1,200.

Olive oil, 2,500 gallons, worth \$3,750.

Sewer pipe, 500,000 feet, worth \$200,000.

One pottery, 250 employés; total output not given.

Granite output, 300 cars; value not given.

Tiling, 175,000 feet; value, \$5,000.

Productions Shipped Out of County.

	Amount.		Amount.
Hay	2,000 tons	Plums	564,680 boxes
Oats	600 tons	Quinces	168,000 lbs.
Wheat	4,500 tons	Raspberries	136,000 lbs.
Apples	5,810 boxes	Strawberries	414,500 lbs.
Apricots	61,160 boxes	Tomatoes	15,480 boxes
Blackberries	13,465 cases	Wool	178,565 lbs.
Cherries	16,050 boxes	Claret	18,000 gals.
Figs	12,300 lbs.	Port	2,000 gals.
Grapes	3,400,000 lbs.	Lumber—Fir	749,000 feet
Nectarines	2,314 boxes	Sugar pine	3,850,000 feet
Oranges	46,000 boxes	Yellow pine	2,000,000 feet
Peaches	1,655,450 boxes	Cedar	29,000 feet
Pears	85,700 boxes	Olive oil	2,000 gals.

PLUMAS COUNTY.

Plumas is a mountain county. Mountain chains define its limits on several sides. It extends for a distance of 50 miles from north to south, and 75 miles from east to west, in the heart of the Sierras, having Lassen Peak, with an elevation of 10,577 feet, on its northern border, and Pilot Peak, 7,605 feet, and Spanish Peak within its boundaries. Between the parallel ridges and spurs of the mountain range there are some picturesque and fertile valleys. The Feather River and its tributaries afford drainage into the Sacramento River. There is virtually no limit to the fertility of the soil in those valleys, composed as it is of the alluvial deposits carried down by the melting snows and the rains of centuries from the overhanging Sierras. Some of its scenery is among the wildest and most picturesque in the State. All these valleys are fertile, well watered and timbered, and contain an area of agricultural and grazing lands sufficient for the support of many thousands of people.

The rainfall will average about 40 inches.

Where irrigation is needed Plumas has abundant water. Mountain rills run down every cañon and ravine, and streams take their course through every valley. Round Valley reservoir covers about 1,000 acres, and supplies water for mines and for irrigating.

Many parts of the county are adapted to deciduous fruits, apples and pears doing especially well. Plums, prunes, nectarines, and peaches also do well in many localities, and where favorable conditions exist the trees yield abundantly.

Currants, gooseberries, blackberries, raspberries, and strawberries grow in great quantities and of the best quality.

The apple nowhere in the State grows nearer to perfection than in Plumas County, but fruit is only raised on a limited scale for home consumption.

Sheep and cattle are driven in annually in large numbers for summer pasturing, the mountains and their valleys affording abundant natural feed and water. The choicest article of mountain butter is produced.

Poultry and eggs are raised for home consumption, and in quantities to supply the mining camps of Plumas and Sierra.

The magnificent virgin forests of sugar and yellow pine, fir, spruce, and cedar timber are of great size and value.

Considerable mining for precious metals is carried on, and both quartz and hydraulic mines are operated on a very large scale, and are most profitable industries.

The copper prospects are attracting the attention of capitalists, and much prospecting work has been done, with a very encouraging showing.

Iron, marble, asbestos, and other minerals exist in large quantities, and it only needs the influx of capital to open up the mining industries

and bring Plumas County to the front as a leading and profitable mineral-producer.

There are a number of summer resorts on the Feather River and its tributaries. Hundreds of campers pass the summer here, the trout-fishing being unexcelled. Big Meadows is one of the most famous resorts in the State for followers of angling. Game of all descriptions, of both fur and feather, is very plentiful, and excellent sport can be obtained.

Area of the county, 2,361 square miles, or 1,511,040 acres.

RIVERSIDE COUNTY.

Riverside is one of the youngest counties, having been formed in 1893, from the southwestern part of San Bernardino and the northern part of San Diego.

The progress of the county is practically confined to its northwest corner, embracing the largest orange-growing district in the world. The rest is largely an undeveloped desert region, believed to be a storehouse of useful minerals and metals.

The county recently has had exceptional progress and prosperity, and a considerable area of new land has been brought under cultivation. Many new orchards, both citrus and deciduous, have been set out. Alfalfa has also been planted on a large scale.

The orange crop in the county is the largest in the State. The growing of citrus fruits is the main industry, although deciduous fruits of most kinds do well, particularly apricots and prunes. The olive thrives, and a very fine grade of oil is produced. Melons and cantaloupes are extensively grown and mature early.

Diversified farming is quite a feature in several sections. Alfalfa grows luxuriantly; broomcorn does well, and is a very prominent and profitable crop. The sugar-beet thrives, and considerable new land has recently been put under cultivation.

Dairying is profitable, and modern creameries with the latest appliances are located in different sections. The stock used for dairying purposes is of a very high grade, mostly pure-bred representatives of the milk strains.

Considerable stock and hogs are fattened for market, and poultry-raising receives considerable attention.

Bee-keeping is another growing industry, and a fine grade of honey is produced.

In 1901 the city of Riverside completed a \$40,000 steam-power plant, to generate electricity for power and lighting purposes. The sewer system has been extended and the streets extensively improved.

The Riverside Water Company is the chief of the companies that supply Riverside with its fine water system, that has a continuous and ample flow.

The rapid development of Strawberry Valley as a health resort has done much to stimulate local trade.

The importance of Perris has been increased by the rapid development of water, and the consequent large acreage of new land put under cultivation. Thousands of acres in this vicinity have been planted to alfalfa.

Hemet has a large flouring-mill, fruit-drying plant, and broom factory in successful operation. The shipments of olives are large. Fine raisins are produced in this section, and the grain industry is flourishing.

At Elsinore coal mines are successfully operated, and a superior quality of potter's clay is obtained in the vicinity. The domestic water-system is owned by the city. Fine apricots, prunes, olives, and other fruits are raised. Seven miles distant is the Good Hope gold mine, with a stamp mill and a cyanide plant. During the open season Lake Elsinore abounds with wild ducks of various kinds, making it an attractive place for sportsmen.

A modern and progressive colony has been established at Ethance, possessing what is undoubtedly the most perfect and complete private irrigation system in the State. The colony has an electric plant of the most modern type, which is utilized to generate power for pumping and lighting purposes. Broomcorn, sugar beets, and alfalfa produce profitable crops.

Indio is a little health resort that lies below sea-level. A number of artesian wells have been developed, and much land in the vicinity has been placed under cultivation. Watermelons and cantaloupes are extensively grown.

STATISTICS OF RIVERSIDE COUNTY FOR 1905.

General.

Area.....	7,000 square miles	Value of county buildings.....	\$318,670
Number of acres assessed.....	933,210	Irrigating ditches—miles, 115.88;	
Value of country real estate.....	\$17,722,017	cost.....	\$585,585
Of improvements thereon.....	\$5,757,700	Railroads, Steam—miles, 210.378;	
Of city and town lots.....	\$2,520,434	assessed value.....	\$2,549,313
Of improvements thereon.....	\$4,111,410	Electric—miles, 10; assessed	
Of personal property.....	\$2,721,550	value.....	\$15,000
Total value of all property.....	\$31,391,198	Electric power plants, 3; assessed	
Amount expended on roads.....	\$70,387	value.....	\$13,125
Road levy per \$100, 1905.....	50 cts.	Electric power lines.....	3 miles

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.		Bearing.	Non-Bearing.	Total.
Apple.....	12,853	969	13,822	Pear.....	13,541	1,183	14,724
Apricot.....	30,029	2,537	32,568	Prune—			
Cherry.....	1,314	.....	1,314	French.....	35,274	300	35,574
Fig.....	546	.....	546	Raisin grapes			
Lemon.....	119,808	5,235	125,043	(acres).....	306	.....	306
Olive.....	22,056	5,589	27,645	Wine grapes			
Orange.....	1,094,835	259,076	1,353,911	(acres).....	1,120	.....	1,120
Peach.....	16,768	4,342	20,110				

Fruit, Vegetables, Nuts, Etc.

<i>Green.</i>	Pounds.	Value.	<i>Green—Continued.</i>	Pounds.	Value.
Apples.....	577,210	\$14,540	Raspberries.....	1,200	\$84
Apricots.....	507,600	5,776	Strawberries.....	130,000	6,500
Asparagus.....	5,000	340	Tomatoes.....	37,000	690
Blackberries.....	8,300	332	Walnuts.....	16,500	1,950
Beets.....	4,000	40	Vegetables (300 acres).....	.....	45,000
Cabbage.....	18,000	900			
Celery.....	1,000	80	<i>Dried.</i>	Pounds.	Value.
Corn.....	14,000	140	Almonds.....	100,000	\$10,550
Cherries.....	11,500	735	Apricots.....	714,100	50,959
Figs.....	9,800	100	Beans.....	4,230	85
Grapes.....	584,990	8,230	Egyptian corn.....	1,100	1,650
Lemons (boxes).....	422,060	1,055,145	Pears.....	128,341	11,550
Oranges (boxes).....	2,151,000	5,377,495	Peaches.....	170,413	12,149
Pears.....	243,100	2,936	Prunes.....	770,000	43,800
Peaches.....	1,709,100	15,639	Raisins.....	75,740	4,370
Peas.....	9,400	402			
Plums.....	110,930	859	<i>Canned.</i>	Cases.	Value.
Potatoes—Irish.....	874,000	8,740	Apricots.....	40,000	\$2,800
Potatoes—Sweet.....	319,500	8,792	Pears.....	40,000	2,800
Quinces.....	1,000	20	Peaches.....	120,000	7,200

Cereal Products and Hay.

	Acres.	Tons.	Value.		Acres.	Tons.	Value.
Wheat.....	44,152	14,332	\$401,296	Corn.....	172	134	\$3,652
Barley.....	74,316	26,131	522,620	Alfalfa hay....	10,609	58,541	585,410
Oats.....	5,853	480	---	Grain hay.....	---	54,467	544,670

Wine and Brandy.

The county's output of wine and brandy is: Angelica, 10,000 gallons, worth \$2,500; muscatel, 1,000 gallons, worth \$125; port, 40,000 gallons, worth \$10,000; sherry, 50,000 gallons, worth \$12,500; brandy, 25,000 gallons, worth \$17,500.

Livestock Industry.

	Number.	Value		Number.	Value.
Cattle—Beef.....	26	\$1,580	Swine.....	1,735	\$17,350
Stock.....	7,328	219,840	Horses—Thoroughbred	6	3,600
Dairy Cows—Graded..	385	28,875	Standard-bred.....	430	38,700
Thoroughbred—Angus	33	3,300	Common.....	4,483	268,980
Ayrshire.....	3,057	183,420	Colts.....	661	29,745
Calves.....	2,258	33,870	Sheep—Common.....	11,240	67,440

Poultry and Eggs.

	Dozen.	Value.		Dozen.	Value.
Chickens.....	5,800	\$25,284	Turkeys.....	357	\$8,574
Ducks.....	192	972	Eggs.....	328,000	82,000
Geese.....	25	300			

Dairy Industry.

	Production.	Value.		Production.	Value.
Dairies (45).....	1,258,500 gals.	\$209,700	Butter.....	690,615 lbs.	\$192,021
Creameries (6).....	---	---	Cream.....	7,130 gals.	7,130

Products of the Forests.

The area of timber land is about 50,000 acres of oak and about the same of pine.

There is one sawmill, worth \$2,000, with an output of 300,000 feet of yellow pine lumber, worth \$6,000. Fuel wood, 1,000 cords, worth \$4,000.

Miscellaneous Products.

	Hives.	Pounds.	Value.		Acres.	Pounds.	Value.
Bees.....	13,814	---	\$33,493	Alfalfa seed....	620	70,250	\$9,889
Beeswax.....	---	27,580	5,450	Garden seeds....	---	760	228
Honey.....	---	1,977,960	92,335	Sorghum—Cane....	---	54,000	120

Manufactories.

	Number.	Number of Employés.	Quantity Produced.	Value of Product.
Brick.....	4	29	600,000 M.	\$4,800
Brick—Pressed.....	---	---	110 cars	30,800
Carriages and wagons.....	2	4	---	4,000
Rolled barley.....	3	16	90,000 lbs.	90,000
Foundries and iron works.....	2	45	---	115,000
Leather goods.....	2	---	---	2,000
Lime.....	15	---	20,000 bbls.	20,000
Machinery.....	2	---	---	50,000
Hides.....	---	---	25,700 lbs.	2,872
Olive oil.....	---	---	2,413 gals.	7,240
Pickles.....	---	---	480 gals.	400
Pickled olives.....	---	---	4,087 gals.	2,400
Planing-mills.....	2	37	---	102,000
Potteries.....	1	30	7,190 tons	135,500
Granite.....	5	82	88,924 cu. ft.	289,000
Tiling.....	1	30	300 sq. ft.	9,800
Wood turning and carving.....	1	7	---	15,000
Clay (fire brick).....	---	---	25,544 tons	---
Porphyry.....	---	---	15,000 tons	9,000
Terra cotta factories.....	2	---	19,500 tons	253,575

Productions Shipped Out of County.

	Amount.		Amount.
Barley	11,830 tons	Potatoes—Irish	5,740 sacks
Hay	18,888 tons	Alfalfa seed	2,225 lbs.
Oats	255 tons	Garden seeds	1,325 lbs.
Wheat	3,100 tons	Tomatoes	500 boxes
Almonds	96,120 lbs.	Cattle	1,764
Apples	13,150 boxes	Hides	17,705 lbs.
Apricots—Green	6,617 boxes	Horses	26
Apricots—Dried	40,113 lbs.	Packed meats and by-pro-	
Blackberries	625 cases	ucts	36,070 lbs.
Cherries	10,000 boxes	Sheep	2,496
Olives	101,725 lbs.	Swine	2,483
Grapes	72,000 lbs.	Wool	521,318 lbs.
Peaches—Green	33,139 boxes	Butter	197,470 lbs.
Peaches—Dried	169,113 lbs.	Cheese	120 lbs.
Pears—Green	47,201 boxes	Cream	180 gals.
Pears—Dried	128,341 lbs.	Brandy	25,000 gals.
Prunes	273,630 lbs.	Wine	100,000 gals.
Raisins	34,740 lbs.	Brick—Pressed	110 cars
Walnuts	4,200 lbs.	Flour	165 bbls.
Chickens	1,179 doz.	Lime	10,000 bbls.
Turkeys	3,519 lbs.	Olive oil	2,413 gals.
Eggs	66,900 doz.	Olives—Pickled	3,780 gals.
Beeswax	17,580 lbs.	Clay products	26,690 tons
Honey	1,217,770 lbs.	Clay	25,540 tons
Onions—Dried	28 sacks	Iron products	\$70,000

SACRAMENTO COUNTY.

Sacramento County is among the largest in the Sacramento Valley. It was organized by the first Legislature; within its confines is the seat of State government; the annual fairs of the State Agricultural Society are held in and near Sacramento City.

Its cities and towns are: Sacramento, Folsom, Galt, Elk Grove, Florin, Oak Park, Walnut Grove, Isleton, Franklin, Cosumnes.

The area is almost all a rich alluvial plain from 30 to 75 feet above sea level, gradually rising from the rivers to meet the low rolling foothills of the Sierra Nevada Mountains; these foothills commence at the extreme eastern part, and are from 6 to 8 miles wide. There are no mountains and aside from this foothill belt the surface has only gentle undulations.

The Sacramento River traverses the western boundary tortuously for about 90 miles across the rich bottoms, cutting them up at the lower part into numerous small and several large islands. The Sacramento is the longest and largest river in the State, and is navigable from Red Bluff to San Francisco Bay.

The American River rises in the upper Sierras, and enters the county at the northeast corner, among the low foothills. It flows in a southwest direction through the entire width, a distance of some 35 miles, and empties into the Sacramento just north of Sacramento City.

Geological indications prove that in remote ages the entire Sacramento Valley and a section of the foothills to an altitude of several hundred feet were portions of the bed of a vast inland sea or lake, and that into this lake the washings of the surrounding mountains were poured to form the present soils, which are made up of all the fertile mineral and vegetable elements in almost inexhaustible quantities. Many analyses have been made of these soils from the alluvial valleys, the upper lands, and the foothills; these analyses have demonstrated that the soils of this valley are unexcelled for fertility.

The belt of foothills is rolling, interspersed with low hills, and its soils are red and gravelly clays, having a scattered growth of oaks.

The water supply is unlimited and inexhaustible. The first and most important source is the Sacramento River. The bank lands ordinarily require no irrigation; but at such times as fruit-growers along the river need water it is either siphoned or pumped through pipes from the river by gasoline or steam engines.

In addition to the numerous rivers and streams there is, underlying the entire area of the county, an inexhaustible supply of pure and excellent water for domestic and irrigating purposes. Throughout the greater portion this subterranean supply is easily appropriated by means of a light lifting power. By reason of this abundant subterranean water-supply the farmer or fruit-grower who wishes to irrigate his land may do so without being dependent on any canal corporation,

and at a trifling cost. For instance, a windmill with two six-inch pumps will cost about \$100, and has a capacity to irrigate six acres, but gasoline or steam engines and centrifugal pumps are employed in most cases where the need of water is very extensive.

The first venture in agriculture in the Sacramento Valley was by General John A. Sutter in 1839. He received a concession of a large tract of land from the Mexican Government, and located his fort near the junction of the American with the Sacramento River. His first wheat field was a portion of the land now covered by Sacramento City. He planted the first grapevines and fruit trees, and practically demonstrated the unsurpassed fertility of the soil of the great valley in the north.

Thousands of acres along the river bottoms and on the islands are used for the production of all kinds of vegetables, which are shipped East by the carload and at times by the trainload. A great deal of this product is disposed of to the canneries in this and other counties. These vegetable lands along the Sacramento often command an annual rental of \$50 an acre.

Alfalfa grows luxuriantly without irrigation on all the rich bottom lands, producing from four to eight tons to the acre in the four crops that are cut annually.

Fruits of all kinds are produced on any of the lands of the county, and particularly on the river bottoms and the islands.

The winter fruits are oranges, lemons, pomegranates, olives, and persimmons, which all ripen in November, December, and January. The Japanese persimmons grow to the size of apples. Olives are very profitable, both for pickling and for oil.

The spring fruits that mature and are marketed in April, May, and June embrace strawberries, raspberries, blackberries, and cherries.

At Florin, on the western division of the Southern Pacific Railroad, $9\frac{1}{2}$ miles south of Sacramento City, is the most productive strawberry belt in the State. Its product has a reputation for excellence all over the Western States. Tokay grapes from this district are shipped to Eastern markets through the local associations.

After picking his early fruits and collecting the returns, the fruit-grower has to attend to the early summer fruits: apricots, plums, peaches, pears, and nectarines. The first peaches are ready by the last of May. From then until October there is no cessation in the picking and shipping of fruit.

Apricots ripen early, and of all countries in the world California is the only one that has made a thorough success of that fruit, and in this county it reaches its very finest development in size, flavor and productiveness. Much of this product is canned.

A large number of varieties of pears are grown, chief among them the renowned Bartlett.

Plums are very profitable. They grow to a large size, and are shipped in vast quantities to the Eastern and home markets and to the canneries.

Nectarines do well, and are cultivated to a considerable extent.

In the fall the fruit products are apples, pears, grapes, quinces, prunes, and peaches.

Sacramento County is preëminently the home of the grape, and on the red lands of the plains it reaches its highest perfection, particu-

larly with irrigation. The table varieties include the Tokay, Muscat, Black Prince, Morocco, Emperor, and Cornichon. They always bring first-class prices for shipment to the Eastern markets. The wineries of the State handle quantities of some of these varieties.

French, or petite, prunes are a leading fruit. They are remarkably prolific, and when cured excel the imported article, and bring a much higher price in the markets of the world.

Figs grow in any part of the county, but on the river bottoms they reach a great size and are remarkably prolific. The Smyrna, or "fig of commerce," has been introduced and successfully grown.

Raisins are easily cured, the climate being peculiarly favorable.

Almonds have long been found a reliable and profitable crop. They can be grown in any part of the county.

The English soft-shell walnut has been demonstrated to be a profitable crop. Black walnut trees are extensively grown for shade and ornament.

Broomcorn is grown, as is also Egyptian corn—the latter making an excellent and cheap food for stock.

Hundreds of tons of beans of all kinds are produced on the river and island lands. The interior of Grand and Tyler islands is to a great degree devoted to their production.

Potatoes, both sweet and Irish, are grown in large quantities on the bottom lands; of the latter, the average yield per acre is from 100 to 150 sacks.

Sacramento City, by reason of natural advantages, geographical relation to various producing sections, and admirable transportation facilities, deservedly bears the reputation of being the largest fruit and vegetable shipping point in the State. It is the recognized outlet for the products of the Sacramento Valley. The average number of carloads of green deciduous fruits annually shipped from Sacramento County is about 1,300, each car averaging from twelve to thirteen tons. These shipments are distributed in every quarter of the United States and Mexico, and a large quantity is marketed in London, Glasgow, and other European cities.

Ordinarily the highest priced fruit is the Bartlett pear. Each pear is a "golden nugget." It is sold in the Eastern markets at an average of more than \$2 a box. In the London market California Bartletts in half-boxes of twenty-five pounds each are sold for as high as \$3. The freight is 85 cents, so the profit is handsome.

Plums and peaches find ready sale in England and Scotland. The fruit reaches European markets in perfect condition, being specially packed and carefully refrigerated. It is landed and marketed in London and Glasgow within three weeks after leaving Sacramento.

Sacramento cherries always make a remarkable selling record in the East.

In Sacramento County is grown the highest-priced table grape—the Flame Tokay. The favorite qualities of this grape are its size and beautiful coloring. It has a rich, iridescent bloom, which gives it the name "Flame" Tokay.

In addition to table grapes, there is a very large market for wine grapes. So far as the Sacramento Valley is concerned, viticulture is but in its infancy. The Natoma Vineyard, the second largest in the world, and covering over 1,900 acres, is in Sacramento County, and the

largest vineyard (all wine grapes) in the world is at Vina, in Tehama County, also in the Sacramento Valley.

The dry atmosphere is specially suited for the drying of fruits, and the article so produced is regarded as first class in the markets of the world. The prunes raised on the American River are of superior quality, and are everywhere so regarded. A very respectable portion of the product goes direct to France, astonishing as that might seem. Hamburg is an important foreign market.

English walnuts, pecans, and peanuts thrive.

The California Fruit Canners' Association possesses at Sacramento one of the largest and most modern fruit and vegetable canneries in the world. This cannery is in operation during more months each year than any other in the State, beginning on asparagus the latter part of March, and running steadily for the succeeding eight months, ending the latter part of November on tomatoes and beans. During this period the various fruits follow rapidly—strawberries, cherries, apricots, blackberries, early peaches, plums, pears, late peaches, grapes, followed by tomatoes and beans. The weekly payroll is about \$4,500, and goes mostly to women and girls, in sums ranging from \$5 to \$20.

The California Fruit Canners' Association also possesses another cannery in the county, at Vorden, on the Sacramento River, 26 miles below the city. This cannery packs only asparagus, being situated in the vicinity of the finest asparagus fields in the world.

The Central California Canneries commenced operations in 1901. They have an extensive establishment in Sacramento City, and, like the others, do a prosperous business.

Sacramento County presents great opportunities to the livestock breeder and the dairyman. The climate is so even, temperate, and mild that animals remain in the open air, practically unsheltered, the year round without hardship. The soil, because of its richness, is peculiarly adapted to the growth of forage crops, especially alfalfa, which is at the same time one of the best and the cheapest of stock feeds. Because of the economy with which livestock can be maintained and the cheapness with which food can be produced, there is a large margin of profit in breeding and rearing farm stock. Animals mature early and produce heavily, and their judicious breeding has been profitable. There are quite a number of creameries. The average character of the dairy stock is fair, and is being constantly improved by the introduction of well-bred animals. The breeding of pure-bred pedigreed cattle is engaged in by several persons, but not as extensively as the profits of the business would seem to render advisable. The dairy product of California has heretofore been quite insufficient for the supply of the home demand, and as a consequence butter and cheese, as well as eggs and cured meats, have been imported. This short supply has insured profitable prices.

While the farmer as a rule raises more or less stock, the production of beef cattle is not sufficient to supply the demand for meat in the county, and most of the beef comes from the northern coast, principally southern Oregon. What stock is produced finds a ready sale at good prices.

Sheep are raised in the section north of the American River and in the southern and eastern portions of the county. From May to October these sheep are pastured in the mountain ranges of the Sierras.

Hogs are raised generally by the farmers, and several breed pedigreed Poland-China, Berkshire, and Essex swine quite extensively. The breeding of pedigreed hogs has been very profitable.

The poultry business has steadily increased in importance in the last few years. Elk Grove, 15 miles south of Sacramento City, on the line of the railroad, and but 5 miles east of the Sacramento River, is the principal poultry district.

Near Sacramento City the raising of poultry is made a specialty by many, and with profit. As an example of the profit that can be realized from poultry it may be instanced that the Messrs. Stickney, at Elk Grove, from their White Leghorn chickens receive an annual income of \$9,000. The fowls are kept on thirty acres of land, part of which is in alfalfa and the standard varieties of fruit, which of course yield an additional revenue.

Many persons breed fancy poultry—all the leading varieties being represented.

Seven hundred and fifty chickens can be kept on one acre, and when it is considered that each hen will pay a clear profit of one dollar per annum, it can be readily seen that the business is very remunerative. The White Leghorn is the money-maker, and in all of the large and successful poultry farms that variety predominates.

Along the Sacramento, American, and Cosumnes rivers are the most productive hop fields in the United States. Hop culture on this coast dates back to 1858, when the first roots were imported from Vermont by Daniel and Wilson Flint and planted in Alameda County. Hop culture developed slowly, because of the prejudice of brewers against a hop that contained so much greater percentage of strength than that which they had been accustomed to use; but in time they found that it did not take as much for a brewing. It was early demonstrated that the soil and climate of Sacramento County were unsurpassed for hop culture, and that it is the only place known where a crop of from 1,000 to 2,000 pounds per acre can be grown the first year the roots are planted. It is a common occurrence to grow 2,000 or 3,000 pounds on an acre of ground, and in some instances 4,000 pounds.

There are quite a number of wineries in the county. The output is shipped all over the world, and is principally disposed of in the United States, Central America, and the Islands. The port is not heavy in body nor dark in color, but is rather more delicate and lighter, having great character, and resembling closely the light, high-grade ports of Portugal. The county has a great reputation for fine sherry. The range of climate, together with the soil, seems to produce a quality of grape which makes a fine grade of that class of wine.

Few counties contain a greater mileage of railroads than does Sacramento. From the capital city the Central Pacific leads eastward across the continent; the California & Oregon passes to the north into Oregon, and from thence to Washington, and also to the Eastern States. At Galt a branch line runs up into the county of Amador; the California Pacific runs on the west of the Sacramento River to Oakland; and the Sacramento & Placerville passes along the American River through Folsom, and thence into the county of El Dorado. From most all of these roads branches extend into the various counties of the Sacramento Valley. The Western Pacific, a new transcontinental line,

now being constructed, will run through Sacramento from north to south. From its geographical position, Sacramento City is the natural railroad center of the central and northern portions of the State, and the agricultural and mineral products of this great and rich section of the American Union are shipped from her ample storehouses.

The Southern Pacific Company operates two steamboats that make daily trips between Sacramento and San Francisco, touching at the various towns and farm landings to receive and discharge freight. The Sacramento Transportation Company operates eight steamboats and twenty-five barges that are run between Red Bluff and San Francisco. They touch at all landings, and move a great part of the grain that is produced in the up-river counties, as well as all other kinds of freight. The Farmers' Transportation Company is controlled by an association of farmers. Its steamboats run between Colusa and San Francisco, making weekly trips.

Sacramento City, being the center and metropolis of a rich portion of the State, the heart of a vast railroad system, the point from which steamers pass to the north and to the south, and with unlimited water and electrical power at her very doors, presents advantages in manufactures excelled by no other city on the coast. Here are located the extensive shops of the Southern Pacific Company. For years the great power of the swift-flowing American was allowed to go to waste, but in 1888, at the Folsom State Prison, twenty-two miles from Sacramento City and in the county, a mighty granite dam was constructed across the river. At that point solid bluffs of rock rise on either side, affording a splendid site. The natural fall of the American gives as great a force as any other stream west of the Rocky Mountains, and the artificial assistance rendered by the dam creates added power. From the canal the water falls upon turbine wheels. Five generators produce the electric power, and it is transmitted to Sacramento City by four circuits on two sets of poles, so as to guard against breakages and accidents. The distance of the generators from Sacramento is 22.4 miles. The Sacramento Electric, Gas, and Railway Company receives and controls this power. Each of the five generators produces one thousand horsepower. In addition, the company receives current at 40,000 volts from the Bay Counties Company's power plant that is located on the North Yuba, 35 miles above Marysville. This power is transmitted to Sacramento over a circuit 64.2 miles in length. With the combined power so received the street car lines of the company in Sacramento City and suburbs are operated. The lighting of the city is from this source. It also furnishes an aggregate of over three thousand horsepower for manufacturing purposes in and about the city.

The Central California Electric Company derives its power from abrupt drops in the canals of the South Yuba Water Company, located in Placer and Nevada counties. The water company has an immense storage system for municipal supply, irrigation, and water power, and maintains twenty reservoirs on the divide, or in the upper foothills, thirteen distributing reservoirs in the lower foothills, four hundred miles of canal.

The natural fish in the rivers are salmon, sturgeon, pike, perch, hardheads, and dace. Those planted are striped bass, black bass, shad, and three kinds of catfish. The only fish propagated is the salmon, in the headwaters of the Sacramento. All of the planted fish have multi-

plied satisfactorily. In the open season large numbers of salmon and other fish are taken and sold in the local and San Francisco markets.

In the line of game, there are geese, ducks, quail, curlew, doves, and larks. All but the geese are protected. The wild geese arrive from the north from the 15th of September until about the last of October. The varieties are the honker or Canada, the speckled-breasted brant, two of the white brant, the Mexican or black, and the China. The ducks are mostly migratory. Of the non-migratory species are the mallard, spoonbill, and wood duck. The migratory ducks that come from the south are the red-head and the blue-winged teal; and from the north the green-winged teal, widgeon, sprig, canvasback, gadwell or gray duck, bluebill, and black-jack.

One can drive in any direction, at any time of the year, with no inconvenience, over roads that favorably compare with the streets in many towns elsewhere in the State. All of the bridges and roads are free for travel.

The county authorities have experimented with bituminous oils on the roads, with a view of laying the dust in the summer and of preserving their integrity during the winter months. It has proven to be practicable, economical, and lasting in its effects.

On the American River, in what is called the Folsom District, dredge mining is being carried on. The area of gravel so far acquired for dredge purposes is about 5,000 acres. These mining operations are in the hands of people with plenty of capital and skilled engineers. The gold is comparatively evenly distributed, and the results of drill samples indicate that the ultimate probable yield will be over \$40,000,000. Electric power is used and there is an abundance of water, both power and water being supplied at low rates.

Sacramento City, the capital of California and the county seat of Sacramento County, is situated on the east bank of the Sacramento River. The distance by rail from San Francisco is 90 miles. The imposing State capitol building, that cost about \$3,000,000, is one of the finest of its kind in the United States. It stands in the middle of a park of thirty-eight acres, almost in the heart of the city. At the east side of the park is located the Exposition Pavilion of the State Agricultural Society, and also the State Printing Office and Bindery. The Federal building, of red sandstone, costing \$150,000, accommodates the postoffice, the revenue and land offices, and the weather bureau station. The waterworks are the property of the city. The natural-gas wells in the city yield an abundance of gas for domestic purposes— heating and cooking.

In Sacramento is the office of the Sacramento Valley Development Association, which represents twelve counties of the Sacramento Valley and is actively engaged in an effort to attract the attention of the world to the advantages of this great valley and bordering mountain chains. This association is representative of a spirit of coöperation which prevails among the Sacramento Valley communities.

STATISTICS OF SACRAMENTO COUNTY FOR 1905.

General.

Area, 987.66 square miles, or 632,108 acres	Irrigating ditches—miles, 25; cost	\$75,000
Number of farms.....	1,600	
Number of acres assessed.....	607,193	
Value of country real estate.....	\$11,287,330	
Of improvements thereon.....	\$2,219,570	
Of city and town lots.....	\$8,519,760	
Of improvements thereon.....	\$8,126,000	
Of personal property.....	\$5,457,110	
Total value of all property, excluding railroads.....	\$35,609,770	
Amount expended on roads.....	\$71,651	
Amount expended for bridges.....	\$35,584	
Number of miles of public roads.....	1,500	
Road levy per \$100, 1905.....	36 cts.	
Value of county buildings and lands.....	\$473,150	
	Railroads, Steam—miles, 90.25; assessed value.....	\$1,570,853
	Electric—miles, 30; assessed value, track.....	\$60,000
	Electric power plants, 2; assessed value.....	\$300,000
	Electric power lines, 2; miles, 54; assessed value.....	\$100,000
	Number of acres irrigated, about.....	30,000
	Oiled roads.....	60 miles
	Gravel roads.....	20 miles
	Stone roads.....	8 miles

Cereal Products and Hay.

	Acres.	Tons.	Value.		Acres.	Tons.	Value.
Wheat.....	40,000	14,500	\$435,000	Corn.....	1,500	1,000	\$27,000
Barley.....	5,000	2,500	50,000	Alfalfa hay....	3,300	20,000	170,000
Oats.....	25,000	10,000	220,000	Grain hay.....	45,000	45,000	405,000

Number of Fruit Trees and Vines.

	To al.	Total.
Apple.....	24,156	1,730
Apricot.....	35,600	62,560
Cherry.....	20,500	3,560
Fig.....	3,800	35
Lemon.....	3,900	6,780
Olive.....	26,700	8,100
Orange.....	59,300	180
Peach and Nectarine.....	312,513	230
Pear.....	320,000	700
Plum.....	59,250	2,800
Prune—French and other kinds.....	238,800	
	Quince.....	
	Almond.....	
	Walnut.....	
	Raisin grapes (acres).....	
	Table grapes (acres).....	
	Wine grapes (acres).....	
	Blackberries (acres).....	
	Raspberries (acres).....	
	Strawberries (acres).....	
	Asparagus (acres).....	

Fruit, Vegetables, Nuts, Etc.

Green.			Dried—Continued.		
	Pounds.	Value.		Pounds.	Value.
Apples.....	402,000	\$8,040	Beans (sacks).....	800,000	\$1,600,000
Apricots.....	234,000	7,510	Figs.....	40,000	1,200
Asparagus.....	16,000,000	400,000	Nectarines.....	10,000	700
Beans.....	100,000	10,000	Onions (sacks).....	260,000	260,000
Beets.....	150,000	1,125	Pears.....	200,000	14,000
Cabbage.....	2,400,000	24,000	Peaches.....	1,000,000	60,000
Celery.....	20,000	2,250	Peas.....	100,000	3,000
Corn.....	80,000	1,600	Plums and Prunes.....	2,010,000	60,700
Cherries.....	192,000	9,600	Raisins.....	40,000	2,000
Grapes.....	11,844,000	300,000	Walnuts.....	20,000	1,600
Lemons (boxes).....	3,000	7,500			
Onions.....	30,000	750	Canned.		
Oranges (boxes).....	25,200	52,500		Cases.	Value.
Pears.....	4,026,000	166,780	Apples.....	834	\$2,098
Peaches.....	3,000,000	45,000	Apricots.....	36,884	92,210
Peas.....	150,000	6,000	Asparagus.....	73,346	319,829
Plums and Prunes.....	9,222,000	261,385	Blackberries.....	1,000	3,000
Strawberries.....	200,000	125,000	Beans.....	237	1,443
Tomatoes.....	2,800,000	16,800	Cherries.....	1,231	4,126
Carrots.....	600,000	3,750	Grapes.....	7,913	17,943
Turnips.....	300,000	1,800	Pears.....	48,781	148,874
			Peaches.....	100,242	327,771
			Plums and Prunes.....	2,459	6,055
			Strawberries.....	1,570	5,389
			Tomatoes.....	38,704	68,617
			Squash.....	1,816	3,618
Dried.					
	Pounds.	Value.			
Almonds.....	600,000	\$65,000			
Apples.....	40,000	1,600			
Apricots.....	600,000	42,000			

Poultry and Eggs.

	Dozen.	Value.		Dozen.	Value.
Chickens.....	12,000	\$72,000	Turkeys.....	833	\$25,000
Ducks.....	250	1,500	Eggs.....	650,000	162,500
Geese.....	125	1,500			

Wines, Brandies, Etc.

	Gallons.	Value.		Gallons.	Value.
Wine—Angelica	67,304	\$20,191	Wine—Tokay	8,500	\$4,250
Claret	1,150,000	230,000	Beer (barrels)	106,300	780,000
Muscatel	177,680	53,304	Brandy	365,558	182,779
Port	623,490	187,040	Cider (barrels)	160	2,400
Sherry	1,203,430	361,029	Vinegar (barrels)	156	1,170

Number of wineries, 9. Number of distilleries, 11. Number of breweries, 2.

Livestock Industry.

	Number.	Value.		Number.	Value.
Cattle—Stock	10,998	\$241,956	Mules	1,200	\$156,000
Dairy Cows—Graded ..	10,000	400,000	Sheep—Common	80,000	240,000
Calves	6,000	30,000	Lambs	20,000	50,000
Swine	35,000	140,000	Goats—Common	100	200
Horses—Thoroughbred ..	1,000	300,000	Wool (pounds)	250,000	37,000
Standard-bred	1,500	225,000	Hides (pounds)	585,000	58,500
Common	10,000	750,000	Lard (pounds)	315,000	30,000
Colts	3,000	30,000	Pelts, sheep (pounds) ..	30,300	22,275

Dairy Industry.

There are 45 dairies, 8 creameries, 20 skimming stations, and 10 cheese factories.

The production of butter was 2,381,000 pounds, worth \$642,870; cheese, 865,000 pounds, worth \$86,500; and milk, 1,715,500 gallons, worth \$428,875.

Products of the Forest.

The forest output was 25,000 sacks of charcoal, worth \$10,000; fuel wood, 30,000 cords, worth \$180,000.

One sash and door factory employs 15 people and turns out work worth \$30,000.

Miscellaneous Products.

	Acres.	Pounds.	Value		Acres.	Pounds.	Value.
Bees (hives)	1,600	---	\$4,800	Honey	---	50,000	\$4,000
Beeswax	---	1,500	375	Hops	2,533	3,731,265	500,000
Flowers and plants	20	---	60,000	Alfalfa seed	---	18,000	18,000

Productions Shipped Out of County.

	Amount.		Amount.
Barley	\$12,500	Potatoes—Sweet	2,000 sacks
Corn—Green	20 tons	Alfalfa seed	10,000 lbs.
Oats	111,000 tons	Tomatoes (not canned) ..	1,250 tons
Wheat	43,500 tons	Carrots	150 tons
Almonds	575,000 lbs.	Turnips	110 tons
Apples	6,000 boxes	Flowers and plants	\$900
Apricots	7,680 boxes	Hides	585,000 lbs.
Cherries	13,092 boxes	Horses	1,329
Figs	38,000 lbs.	Packed meats and by-products ..	1,000,000 lbs.
Grapes	11,640,000 lbs.	Sheep	100
Lemons	1,500 boxes	Swine	100
Oranges	19,000 boxes	Wool	250,000 lbs.
Peaches	175,840 boxes	Lard	200,000 lbs.
Pears	75,360 boxes	Sheep pelts	30,300
Prunes	346,875 crates	Tallow	1,063 bbls.
Raisins	37,500 lbs.	Butter	806,000 lbs.
Strawberries	150,000 lbs.	Cheese	\$43,000
Walnuts	5,000 lbs.	Beer	53,000 bbls.
Chickens	5,000 doz.	Brandy	350,000 gals.
Turkeys	500 doz.	Wine	1,750,000 gals.
Eggs	223,587 doz.	Sash and doors	\$10,000
Asparagus—Green	200,000 lbs.	Charcoal	2,000 sacks
Beans—Dried	700,000 sacks	Salmon	1,750,000 lbs.
Beets	80,000 lbs.	Other kinds of fish	150,000 lbs.
Cabbage	900 tons	Brick	60,000 M
Celery	60 tons	Brooms	5,500 doz.
Hops	3,731,265 lbs.	Cigars	\$37,500
Onions—Dried	230 tons	Flour	\$800,000
Onions—Green	9 tons	Olive oil	2,700 gals.
Peas—Dried	30 tons	Olives—Pickled	12,500 gals.
Peas—Green	10 tons		
Potatoes—Irish	800,000 sacks		

Miscellaneous Exports.

The value of various products prepared or manufactured in the county and exported to other points is as follows:

Boilers—Steam	\$5,000	Leather goods	\$83,153
Bookbinderies	500	Macaroni	10,500
Boxes—Paper	200	Machinery	10,000
Carriages and wagons	30 vehicles	Malt	2,000
Coffee	\$110,000	Millwork (wood)	125,000
Confectionery	30,000	Iron pipe	2,500,000 lbs.
Cooperage	4,000	Pumps	\$27,554
Crackers	50,000	Syrups, bitters, extracts	93,750
Flowers and plants	1,000	Tents and awnings	6,000
Foundries	25,000	Tin and galvanized iron	50 cars
Furniture	10,000	Wheels and wagon material	\$5,000
Granite and marble	13,000	Willow and woodenware	2,500

Manufactories.

	Number.	Number of Employés.	Quantity Produced.	Value of Product.
Bookbinderies *	2	10	---	\$12,000
Boxes—Paper	1	3	---	1,000
Boxes—Wood	2	40	---	75,000
Brick	1	75	180,000 M	90,000
Boilers—Steam	1	8	---	22,000
Brooms	2	15	8,000 doz.	28,000
Carriages and wagons	4	76	190 vehicles	45,000
Cigars	13	50	3,000 M.	135,000
Clothing	1	3	---	2,000
Coffee	2	8	---	150,000
Confectionery	8	120	---	90,000
Cooper-shops	2	7	---	20,000
Crackers	1	18	---	80,000
Flouring-mills	4	100	---	---
Flour	---	---	165,000 bbls.	1,150,000
Bran	---	---	3,300 tons	
Middlings	---	---	2,500 tons	
Rolled barley	---	---	12,000 tons	
Meals	---	---	10,000 bbls.	---
Foundries and iron works	3	30	---	50,000
Furniture	2	30	---	30,000
Leather goods	8	75	---	100,000
Leather valve cups	1	3	3,420 doz.	3,153
Machinery †	11	160	---	430,000
Macaroni	1	6	540,000 lbs.	13,500
Malt	5	15	---	130,000
Hides	---	---	585,000 lbs.	58,500
Lard	---	---	315,000 lbs.	30,000
Meat packed	3	50	82,500 tons	165,000
Tallow	---	---	1,063 lbs.	16,360
Olive oil	---	---	3,000 gals.	9,000
Olives—Pickled	---	---	25,000 gals.	15,000
Pickles	2	6	---	15,000
Pipe—Iron	1	60	2,860,000 lbs.	206,145
Pipe—Sewer, etc.	1	4	---	12,000
Planing-mills	7	120	---	353,000
Potteries	3	10	---	5,000
Stone—Artificial	6	30	---	100,000
Stone—Granite, Marble, Sand	6	24	---	88,000
Syrups, bitters, and extracts	7	25	---	125,000
Tin and galvanized iron	8	150	90 cars	215,000
Wheels and wagon material	1	7	---	10,000
Willow and wooden ware	1	2	---	5,000
Fruit baskets	2	75	---	180,000
Pumps	1	16	---	28,092
Tents and awnings	3	10	---	12,000

* Exclusive of State Bindery.

† Exclusive of Southern Pacific Railroad Shops.

SAN BENITO COUNTY.

San Benito is larger in area than Rhode Island, with its population of half a million; this county has a population of about 6,000.

San Benito County is 95 miles south of San Francisco. It lies 25 miles inland east of the quaint old town of Monterey, and 15 miles east of Moss Landing, on Monterey Bay. The average precipitation is 12 inches annually, which all falls between November and April. In some of the valleys the rainfall is never less than 18 to 20 inches.

The county is 70 miles in length, and averages about 21 miles in width. From Tres Pinos south, the county opens out like a fan, stretching away for miles, following the courses of the Tres Pinos Creek and the San Benito River. It is inclosed on two sides by mountains: on the east by the Mount Diablo or Mount Hamilton range, and on the west by the Gabilan range. From these ranges the surface slopes to the valley of the San Benito River, which flows northwesterly through the middle of the county and empties into the Pajaro River, which in turn empties into the Pacific Ocean, winding through a gap that gives to the county the refreshing ocean breezes.

Hollister, the county seat, is a beautiful town. It is well laid out with cement walks, graded streets, and magnificent shade trees; it has a sewer system, gravity system of water works, and electric light and gas works. The town is well supplied with schools and religious facilities. All the standard fraternal orders are represented by lodge meetings in fine lodge rooms supported by the town.

San Benito County has many elements vitally necessary to be considered in the selection of a home or place of business. Climate is one of its chief attractions. Proximity to the coast makes it a pleasant one, and the fact that it is not right on the coast renders it suitable for those who cannot live too near the ocean. Sufferers from asthma, lung trouble or catarrh can here find a climate that will at least benefit, if not cure. Mineral springs of different kinds abound, and beautiful mountain scenery can be enjoyed from every front door.

The soil of San Benito County is chiefly sediment, light and loamy. The soil in the valleys is mostly a rich, deep sediment or alluvium. This is particularly true around Hollister, in the San Juan Valley, and at San Felipe. Good public highways lead in and out of Hollister to the west, to the north, to the south, to the southeast, and to the east. These roads are all hard, well graded, and in good condition the year round.

In the southern part of the county are situated the famous New Idria quicksilver mines, the largest producer in the world.

In the way of gorgeous mountain scenery the county presents the Vancouver Pinnacles, the largest conglomerate mass of boulders in the world, covering seven sections of land and rivaling in beauty the famous Yosemite Valley or the Grand Cañon of the Colorado.

In the Hollister and San Juan valleys poultry-raising has become one of the leading industries, and it is successful beyond anticipation by reason of climatic conditions. The capital required for a start in the poultry business is infinitesimal. Newcomers, even though not experienced, have no difficulty in meeting with success.

The climate is peculiarly adapted to the successful raising of poultry. The trade winds reach the valley after passing over the distance from the coast, shorn of their chill, yet cooling the heat of summer so that it is free from extremes, fog and winds. A person can take five acres in the San Juan or Hollister valleys, embark in the raising of poultry, give the business intelligent attention, and be in possession of a cash income three months after he has finished his improvements.

Hay is the main export. Hollister is the largest single shipping point in the State, the average shipments amounting to 25,000 tons annually. Hollister hay is shipped east to Chicago, New York, St. Louis, Cincinnati, Memphis, Lexington, and other points. The fine quality is due to superior climatic conditions—absence of fogs, extreme heat or cold—making a perfect sun-cured hay. The largest hay warehouses in the world are at the Hollister station, furnishing steady employment to several crews the year round.

Large quantities of grain are shipped, in addition to the large quantities retained at home for use as poultry food. Barley and oats are among the principal products.

There is also shipped a large amount of fruit, consisting principally of prunes, apricots and pears. Walnuts and almonds are receiving some attention.

Other shipments are wine, hogs, cattle, horses, poultry and eggs.

With San Benito recognized as the section preëminent for successful poultry-raising, the already large business is bound to increase. The demand for incubators, brooders, and other appliances will justify the establishment of a factory here. The poultry business is a demonstrated success.

A thousand acres can profitably be set out in strawberries and other small fruits to fill the demand from nearby markets. For the vineyardist there is land at a low figure. Land can be rented on shares, the renter only taking the risk of labor and seed. Many of our prosperous farmers to-day secured their start by renting land.

The San Benito River furnishes winter irrigation to about 3,000 acres in Hollister Valley. This water is used in orchards and on dairy farms; one flooding generally suffices for the former, and two floodings generally keep the pastures green late into the summer. Where land can not be irrigated from the river, pumping from wells is resorted to. The average cost of pumping irrigation can be figured at \$1.25 per acre. In almost every section a supply of water can be reached at an average depth of 80 feet. Fifteen miles south of Hollister is the site of an immense storage reservoir. This reservoir, catching and holding the flood water of the San Benito River, will furnish sufficient for summer irrigation.

In the foothills there is room for a hundred thousand beehives. The sagebrush bloom and countless varieties of wild flowers furnish nectar the greater part of the year.

Thousands of acres in the Hollister and San Juan valleys are suitable for seed farms. The seed farms now under cultivation in the vicinity

of Hollister show conclusively that the industry is practicable and successful.

Orchards are fast supplanting the hay and grain fields, and adding materially to the wealth of the county. Orchardists are making money wherever they give attention to the business. The San Juan Valley has 10,000 acres especially adapted to the raising of apples, with a market at every man's door. Apricots, prunes, peaches, walnuts, almonds, in fact every fruit, save tropical, can be grown with profit in any section that can be reached with water.

Among the varied industries of the county, that of dairying is rapidly forging to the front, adding to the wealth of the community generally, and making the dairymen independent. The standard feed is alfalfa, which grows to perfection. Underground streams of water are abundant in all sections of the county, and to the extension of the pumping system is largely due the development of the dairy business.

Scattered all through the county are innumerable cheese factories, some of them worked upon the coöperative plan, but others are individual enterprises. All are meeting with success. In one of the suburbs of Hollister there has recently been established the Alpine Evaporated Cream Factory. This installation requires many tons of milk daily to meet the demand for its product.

A careful estimate is given of the number of cows that can be kept upon an acre of alfalfa. Where the growth is vigorous and constant, a cow and a half to the acre will give the animal plenty of feed and allow of storing for the winter, but the average is one cow to the acre. The best cows will net a profit of from \$4 to \$5 per month, or \$50 a year upon the average. The climate of the county is ideal for this business.

Vegetable-growing for markets outside the State is an assured and popular occupation. All varieties of vegetables are grown to perfection with and without irrigation. The green vegetable shipments are principally cabbage, cauliflower, celery, onions, and potatoes. Truck-gardeners plant and harvest every month in the year.

The raising of beets has met with success. It is one of the most important branches of agriculture, and gives promise of still greater development. The advantages are: early maturity of the beets, earlier opening of the campaign, longer season for harvesting, longer run of the factory, greater yield per acre, greater per cent of saccharine, immunity from frost and rain at critical periods. The sale of beets is contracted for at the time of planting. The tops are sold to dairymen.

In the artesian belt hop-growing is quite an important industry, and the business is profitable. In the same section tobacco has been successfully grown.

The county produces quicksilver, lime, antimony, hematite, manganese, gypsum, coal, asbestos, and copper. Traces of gold and silver have been found in the mountain ranges. Within three miles of Hollister is an immense bed of pottery clay. In the eastern range ledges of copper have been found which have been pronounced by experts to be another Iron Mountain.

The Southern Pacific Company runs passenger trains daily between San Francisco and Hollister, also one freight.

Tres Pinos, 6 miles south of Hollister, is reached by two trains daily on the Southern Pacific. It is one of the most important shipping

points of the county, being the depot for the product of the New Idria quicksilver mines, and the Cienega limekilns. It is the site of immense hay and grain warehouses. The shipments also include livestock, poultry, fruit, and general merchandise.

STATISTICS OF SAN BENITO COUNTY FOR 1905.

General.

Area, 1,056 square miles, or 676,000 acres	Amount expended on roads	\$18,321	
Number of farms	1,150	Amount expended for bridges	\$5,448
Number of acres assessed	559,082	Number of miles of public roads	412
Value of country real estate	\$3,880,150	Road levy per \$100, 1905	33 cts.
Of improvements thereon	\$605,270	Value of county buildings	\$56,000
Of city and town lots	\$289,745	Irrigating ditches—cost	\$50,000
Of improvements thereon	\$400,205	Railroads, Steam—miles, 17.65;	
Of personal property	\$1,015,435	assessed value	\$264,750
Total value of all property	\$6,197,805	Number of acres irrigated	3,500

Cereal Products and Hay.

	Acres.	Tons.	Value.		Acres.	Tons.	Value.
Wheat	10,000	2,700	\$81,000	Corn	50	50	\$1,000
Barley	28,000	7,875	157,500	Alfalfa hay	2,000	8,000	64,000
Oats	3,000	350	10,500	Grain hay	43,150	34,500	276,000

Number of Fruit Trees and Vines.

	Bearing.		Bearing.
Apple	9,500	Walnut	1,500
Apricot	18,000	Table grapes (acres)	15
Cherry	2,200	Wine grapes (acres)	160
Fig	200	Blackberries (acres)	25
Olive	300	Currants (acres)	12
Peach	16,700	Gooseberries (acres)	3
Pear	13,000	Raspberries (acres)	15
Prune—French	8,000	Strawberries (acres)	18
Almond	8,000		

Fruit, Vegetables, Nuts, Etc.

<i>Green.</i>	Pounds.	Value.	<i>Green—Continued.</i>	Pounds.	Value.
Apples	1,187,500	\$6,270	Potatoes—Irish	500,000	\$5,000
Blackberries	20 chests	80	Raspberries	40 chests	200
Beans	3,000	900	Strawberries	1,000	4,000
Beets	10,000	100	Tomatoes (boxes)	2,000	600
Cabbage	200,000	2,000	Walnuts	20,000	1,400
Celery	20,000	400	Chile Peppers	75,000	10,000
Corn	200,000	4,000			
Currants	200 chests	800	<i>Dried.</i>	Pounds.	Value.
Cherries	30,000	600	Almonds	50,000	\$5,500
Gooseberries	2,000	100	Apricots	300,000	21,000
Grapes (tons)	200	5,000	Onions	30,000	1,950
Pears	1,040,000	5,200	Prunes—French	2,400,000	144,000
Peaches	2,000,000	17,700			

Wines, Brandy, Etc.

In the county there is 1 winery, 1 distillery, and 1 brewery.

The output is 1,000 gallons of Angelica wine, worth \$350; 35,000 gallons of claret, worth \$6,300; 35,000 gallons of hock, worth \$7,000; 2,000 gallons of port, worth \$700; 1,000 gallons of brandy, worth \$600; and 1,800 barrels of beer, worth \$13,500.

Livestock Industry.

	Number.	Value.		Number.	Value.
Cattle—Beef	3,157	\$50,505	Horses—Standard-bred	21	\$6,425
Stock	13,316	199,740	Common	2,994	131,730
Dairy Cows—Graded	1,548	61,875	Colts	1,838	23,905
Yearlings	2,869	28,690	Sheep—Common	13,865	27,625
Calves	4,420	33,225	Lambs	7,905	6,325
Swine	2,760	5,935	Goats—Common	1,065	2,130

Poultry and Eggs.

	Dozen.	Value.		Dozen.	Value.
Chickens	6,100	\$30,500	Turkeys	200	\$6,000
Ducks	50	300	Eggs.....	1,000,000	250,000
Geese	25	200			

Number of poultry farms, 125.

Dairy Industry.

There are 40 dairies and 1 creamery. The production of butter was 26,000 pounds, valued at \$6,500; cheese, 1,250,000 pounds, valued at \$112,500; and 46,800 cases of evaporated cream, valued at \$144,000.

Miscellaneous Products.

	Acres.	Pounds.	Value.		Acres.	Pounds.	Value.
Bees (hives)...	15	20,000	\$2,000	Sugar beets			
Hops	30	36,000	\$5,400	(tons)	1,000	9,000	\$36,000
Garden seeds ..	10	12,000	\$720				

There were cut 6,000 cords of fuel wood, worth \$42,000.

Manufactories.

One cigar factory, 3 employés; output, 150,000 cigars, worth \$45,000.

Two confectionery establishments, 3 employés; output, 5,000 pounds, worth \$2,000.

Other manufactured products are 100 tons of malt, worth \$6,000; 50 tons of meal products, worth \$5,000; 25,000 pounds of lard, worth \$3,700; and 25 barrels of tallow, worth \$100.

Productions Shipped Out of County.

	Amount.		Amount.
Barley	5,000 tons	Hops	36,000 lbs.
Hay	30,000 tons	Onions—Dried	2,000 sacks
Almonds	50,000 lbs.	Potatoes—Irish	2,000 sacks
Apples	1,000,000 boxes	Garden seeds	12,000 lbs.
Apricots—Dried	300,000 lbs.	Chile peppers	20,000 lbs.
Cherries	20,000 lbs.	Cattle	5,500
Peaches	1,500,000 lbs.	Hides	1,500
Pears	1,000,000 lbs.	Horses	400
Prunes—French	24,000 lbs.	Sheep	1,600
Strawberries	400 crates	Swine	1,600
Walnuts	20,000 lbs.	Cheese	1,000,000 lbs.
Chickens	5,502 doz.	Brandy	1,000 gals.
Turkeys	36,000 lbs.	Wine—Sweet	1,000 gals.
Eggs	870,525 doz.	Wine—Table	70,000 gals.
Sugar beets	9,000 tons		

SAN BERNARDINO COUNTY.

San Bernardino is not only the largest county in California, but it is the largest in the United States. It is larger than New Hampshire, Vermont, and Rhode Island combined; larger than New Jersey, Delaware, Massachusetts, and Rhode Island combined; very nearly as large as Massachusetts, Connecticut, and New Jersey. There are eight states whose area is less than that of this county.

San Bernardino County is in the southeastern part of the State, there being but two counties between it and the Mexican line. The greater portion is desert. In the north is the Mojave Desert; and in the east, the northern end of the Colorado Desert; the only arable portion being confined to the southwestern part—the San Bernardino Valley. This valley forms an almost perfect amphitheater, encircled by mountains and hills, open only on the west, allowing the sea breeze from the ocean to sweep its entire length.

Mount San Gorgonio is perpetually snow-capped, and from it is derived much of the water used for irrigation in the summer in the valley below, the remainder coming from the mountain range, giving a bountiful supply for the irrigators. The combined waters of the streams, springs, and artesian wells make this valley one of the best watered in Southern California.

The forests on the mountain ranges furnish the supply of lumber and timber used in the valley, and also a large supply of fuel.

Mount San Bernardino, from its distinctive cone, has been adopted by the United States surveyors as the initial point for land surveys in Southern California, both base and meridian starting from its peak.

The northern and eastern parts of the county are almost absolutely sterile. Yet, along the Mojave River where it debouches from the mountains to the desert, and for many miles, the land on both sides is fertile, easily worked, and produces abundantly as long as the water supply is available.

The soil of San Bernardino Valley varies greatly with locality. In the eastern part it is a sharp gravel or sand, with a large admixture of alluvial deposits. West the soil changes to a heavy, dark loam, with occasional patches of adobe. Still farther west, the soil is of a lighter character, and possesses much more of the soda and potash constituents. Immediately about the City of San Bernardino the soil is a strong adobe, with appearances here and there of soda salts. Along the river bottoms the soil is a heavy clay, and in some places a black adobe. It is cold and damp, and not as suitable for fruit-culture as for grazing and the growing of hay.

The rainfall varies a great deal, as does the climate. Passing from the lower levels to the high altitudes the rainfall increases. On the north and east of the mountain ranges, on the Mojave and Colorado deserts, the larger portion of the rainfall comes in July and August,

with no rains during the winter. The rains are short, sharp, and heavy, frequently accompanied by thunder and lightning, which latter is almost unknown south of the mountains.

In the number and character of irrigation enterprises, the county stands in the front rank. It has been justly called the "Mother of Irrigation," because here was dug the first irrigation ditch in the State, and here were raised the first crops by irrigation. It is over a hundred years since the mission fathers of San Gabriel established an outlying post, or sub-mission, just west of Redlands, and employed Indian labor to dig what is known as the zanja. This ancient ditch is still in use and within the same banks that were first thrown up by Indian labor almost a century ago.

There are hundreds of miles of canals and pipe-lines, with thousands of miles of laterals and individual pipe-lines. In addition to this, hundreds and hundreds of wells have been bored, each producing a flowing stream without other or further expense, which volume is sufficient not only to irrigate many thousands of acres, but also furnishes the magnificent supply which fructifies and renders fertile the great plain on which the city of Riverside stands. The Arrowhead Reservoir Company is a gigantic institution which furnishes water to many thousand acres of land in the western part of the valley.

Almost every variety of fruit can be produced in some part of this county. The only exceptions are those strictly tropical. In the mountain valleys and upon the upper plateaus, apples and cherries are grown. On the lower levels, all the deciduous fruits are produced, the principal varieties being peaches, apricots, prunes, and grapes. The production of oranges, lemons, and pomeloes is large, these fruits being grown to perfection. It is more than forty years since the first orange trees were planted in this valley, although the production of citrus fruits on a commercial scale dates back only about twenty years. The production of oranges has increased rapidly during the last few years. The first planting of orange trees were two set out by Anson Van Leuven in his dooryard in Old San Bernardino in the early sixties, and by M. H. Crafts at Crafton, at about the same time or a little later.

In the western part, in the Rialto, Etiwanda, and Cucamonga neighborhoods, there is produced a large quantity of raisins, which rank equal in quality and appearance with the best. Another section of the county especially adapted to the culture of grapes is that about Hesperia, which lies along the Mojave River.

In the southwest corner of the valley is located the Chino Ranch, on which is the third largest beet-sugar factory in the world. The acreage devoted to sugar-beet culture is in the neighborhood of 20,000. The factory has a capacity of about 12,000 tons of refined sugar annually. The culture of sugar-beets has been a profitable industry for the farmers. On this ranch are fattened thousands of head of cattle upon the beet pulp, which is siloed for that purpose.

Along the slope of the mountains, and in the mountain valleys and cañons, are numerous bee ranches, from which is produced a large amount of honey, which commands a high price in the Eastern markets.

The raising of cattle and sheep is carried on along the mountain ranges and in the upper mountain valleys. Several large bands of sheep are grazed on the ranges. Dairying is carried on in both the upper and lower valleys. Pure-bred or grades of high-class dairy cattle

are in general use. A stock company for the breeding of the most desirable classes of horses has a large ranch at Victor to be devoted exclusively to their raising.

Wheat, oats, and barley are grown in considerable quantities, and alfalfa is raised with profit.

Vegetables of nearly all descriptions are raised, the yield being large, and a growing shipping trade to outside markets has been established.

The northern and eastern portions are heavily mineralized, and although prospecting has been carried on for fifty years, new and greater finds are being made every year. Almost every known mineral has been discovered. Gold, silver, copper, iron, tin, lead, borax, soda, and nitrates are found in abundance and scattered over a wide area. Some of the richest silver mines in the State are in this county. Copper exists in great abundance, and recent developments have shown some of these properties to be of extraordinary richness. The high cost of freight, the scarcity of water, which renders the life of the prospector precarious as well as interfering with the working of the mines, the scarcity and high cost of fuel—all combined have limited prospecting and retarded mining development. The building of railroads across the desert has partially removed some of these obstacles, and mining recently has been prosecuted with more vigor. New mines are being opened, new mills being built, new finds being made, and the outlook for the mining industry is bright.

STATISTICS OF SAN BERNARDINO COUNTY FOR 1905.

General.

Area, 20,160 square miles, or 12,902,400 acres		Irrigating ditches—miles, 110½;	
Number of farms.....	3,849	cost.....	\$366,442
Number of acres assessed.....	460,372	Railroads, Steam—miles, 489.70;	
Value of country real estate.....	\$7,206,535	assessed value.....	\$5,131,580
Of improvements thereon.....	\$2,582,420	Electric—miles, 39¾; assessed	
Of city and town lots.....	\$2,055,045	value.....	\$73,045
Of improvements thereon.....	\$2,956,875	Electric power and light plants,	
Of personal property.....	\$1,582,924	5; assessed value.....	\$241,745
Total value of all property.....	\$16,383,799	Electric power and light lines—	
Amount expended on roads.....	\$84,603	miles, 193½; assessed value.....	\$112,610
Amount expended for bridges.....	\$25,438	Number of acres irrigated.....	38,690
Number of miles of public roads.....	1,270	Oiled road.....	239 miles
Road levy per \$100, 1905.....	50 cts.	Graded road.....	165 miles
Value of county buildings.....	\$418,500	Macadam road.....	11 miles

Cereal Products and Hay.

	Acres.	Tons.	Value.		Acres.	Tons.	Value
Barley.....	18,460	7,730	\$154,600	Grain hay.....	8,526	15,000	\$153,000
Alfalfa hay....	2,900	17,300	190,300				

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.		Bearing.	Non-Bearing.	Total.
Apple.....	13,000	1,000	14,000	Pear.....	17,500	1,800	19,300
Apricot.....	45,200	1,600	46,800	Almond.....	1,750	300	2,050
Cherry.....	9,800	2,300	12,100	Walnut.....	4,000	300	4,300
Fig.....	1,700	900	2,600	Raisin grapes.....	10,300	2,500	12,800
Lemon.....	175,200	28,300	203,500	Wine grapes.....	13,400	3,200	16,600
Olive.....	60,200	10,000	70,200	Blackberries.....	35	---	35
Orange.....	1,170,300	525,000	1,222,800	Raspberries.....	25	---	25
Peach.....	12,600	600	13,200	Strawberries.....	100	---	100

Poultry and Eggs.

	Dozen.	Value.		Dozen.	Value.
Chickens.....	4,208	\$18,936	Turkeys.....	220	\$3,960
Ducks.....	35	175	Eggs.....	384,000	9,600
Geese.....	20	200			

Number of poultry farms, 6.

Fruit, Vegetables, Nuts, Etc.

<i>Green.</i>	Pounds.	Value.	<i>Green—Continued.</i>	Pounds.	Value.
Apples.....	3,793,300	\$75,866	Raspberries.....	150,000	\$7,500
Apricots.....	200,000	6,000	Strawberries.....	600,000	30,000
Blackberries.....	210,000	10,500	Walnuts.....	145,000	1,760
Corn.....	600,000	6,000	Olives.....	402,000	8,040
Cherries.....	843,000	31,870	Melons.....	----	3,050
Grapes.....	41,912,000	251,472			
Lemons (boxes).....	271,500	678,750			
Onions.....	300,000	3,000	<i>Dried.</i>	Pounds.	Value.
Oranges (boxes).....	3,529,500	4,694,235	Apricots.....	1,633,333	\$122,500
Pears.....	616,000	12,320	Peaches.....	330,000	23,100
Peaches.....	20,000	700	Raisins.....	2,920,000	73,000
Plums.....	180,000	2,700			
Potatoes—Irish.....	1,330,000	16,625	<i>Canned.</i>	Cases.	Value.
Prunes—French.....	400,000	8,000	Apricots.....	20,000	\$40,000

Wines, Brandies, Etc.

Number of wineries, 8; number of distilleries, 1.

	Gallons.	Value.		Gallons.	Value.
Wine—Angelica.....	232,200	----	Wine—Port.....	119,000	\$20,894
Burgundy.....	500	\$75	Riesling.....	5,300	953,000
Claret.....	1,067,500	107,269	Sherry.....	3,000	650
Hock.....	200,000	20,000	Zinfandel.....	109,500	16,745
Muscatel.....	4,800	1,200	Brandy.....	200	450

Livestock Industry.

	Number.	Value.		Number.	Value.
Cattle—Beef.....	5,000	\$200,000	Horses—Thoroughbred.....	63	\$64,175
Stock.....	3,950	98,750	Standard-bred.....	524	81,440
Thoroughbred.....	200	30,000	Sheep—Imported.....	100	10,000
Dairy Cows—Graded.....	1,230	43,050	Common.....	10,000	35,000
Calves.....	2,400	19,200	Lambs.....	5,000	10,000
Swine.....	3,600	36,000	Wool (pounds).....	40,000	4,000
Colts.....	250	5,000			

Dairy Industry.

There are 21 dairies in the county and 2 skimming stations, with an output of 219,000 pounds of butter, worth \$65,700; and \$22,000 worth of cream.

Products of Forest.

There are 120,000 acres of timber land, worth \$1,200,000, and 4 sawmills, worth \$90,000. The cut of lumber is 13,200,000 feet, worth \$271,000; fuel wood, 11,250 cords, worth \$67,500; railroad ties, 6,000, worth \$2,160.

The sawmills are run by steam.

Miscellaneous Products.

There are 16,967 bee hives, worth \$59,385; they turn out 1,012,000 pounds of honey, worth \$51,000, and 6,000 pounds of beeswax, worth \$1,500.

The flowering plants are valued at \$21,310. The output of beets is 35,000 tons, worth \$148,750.

The borax and boracic acid output is 28,600 tons, worth \$2,574,000.

There is an oil refinery in the county, but it declines to give its output.

Productions Shipped Out of County.

	Amount.		Amount.
Barley—Rolled.....	10,280 tons	Beeswax.....	6,000 lbs.
Corn—Cracked.....	423 tons	Beets.....	35,000 tons
Bran.....	4,403 tons	Honey.....	1,012,000 lbs.
Corn meal.....	260 tons	Onions—Dried.....	3,000 sacks
Graham flour.....	80 tons	Potatoes—Irish.....	13,300 sacks
Apricots—Dried.....	1,759,233 lbs.	Cattle.....	5,000
Cherries.....	800,000 lbs.	Hides.....	353,400 lbs.
Grapes.....	41,912,000 lbs.	Wool.....	60,000 lbs.
Lemons.....	271,500 boxes	Cream.....	\$22,000
Olives.....	402,000 lbs.	Brandy.....	200 gals.
Oranges.....	3,529,500 boxes	Wine—Sweet.....	559,500 gals.
Peaches—Dried.....	424,800 lbs.	Wine—Table.....	1,182,300 gals.
Prunes, French—Dried.....	400,000 lbs.	Flour.....	31,750 bbls.
Raisins.....	2,920,000 lbs.	Lime.....	85,815 bbls.
Walnuts.....	14,500 lbs.		

Manufactories.

	Number.	Number of Employés.	Quantity Produced.	Value of Product.
Boxes—Wood	--	20	1,314,000	\$165,820
Brick	--	24	2,150,000	15,112
Cement (factory in operation only 6 mos.)	--	40	50,000 bbls.	122,943
Confectionery	5	7	137,818 lbs.	15,600
Flouring-mills	2	30	----	----
Flour	--	--	45,737 bbls.	228,685
Bran	--	--	4,563,415 lbs.	59,324
Cracked corn	--	--	942,872 lbs.	13,199
Graham flour	--	--	185,547 lbs.	4,453
Corn meal	--	--	285,395 lbs.	6,174
Rolled barley	--	--	16,206,728 lbs.	203,731
Foundries and iron works	2	10	1,500 tons	50,000
Leather goods	3	10	----	15,000
Lime	--	--	85,815 bbls.	71,793
Machinery	3	215	----	197,477
Meat products	--	61	5,406,000 lbs.	342,065
Hides	--	--	353,400 lbs.	35,700
Lard	--	--	46,000 lbs.	4,140
Tallow	--	--	172,000 lbs.	6,880
Planing-mills	8	32	----	203,000
Stone—Artificial	--	--	----	12,279
Granite	--	--	317,377 tons	794,492
Paving blocks	--	--	240,000	90,000
Marble	2	--	----	27,782
Crushed rock	--	--	21,500 tons	15,118
Marble dust	--	--	3,675 tons	12,475
Tin and galvanized iron	7	21	----	101,000
Wood turning and carving	3	3	----	5,000
Ice plants	5	20	43,627 tons	152,184
Orange marmalade	1	4	----	4,000
Gold	--	--	----	760,000
Silver	--	--	----	41,000
Copper	--	--	210,965 lbs.	23,206

SAN DIEGO COUNTY.

San Diego County occupies the southern part of the State, and has an area slightly larger than Massachusetts. The Pacific Ocean washes its shores for upward of 75 miles. The land rises gently from the ocean for a distance of about 50 miles to a chain of peaks forming the backbone of the county, descending again quite rapidly to the Colorado River Valley, the greater part of which is below sea-level.

The arable portion of the western slope is divided into a series of irregular terraces or plateaus. The lower or coast terrace comprises a number of valleys with the intervening mesas. This large acreage is practically frostless. Next come a series of higher valleys, Poway Valley, varying in elevation from 400 to 500 feet. The third terrace, the altitude of which ranges from 1,000 to 2,500 feet, comprises the foothill region, with numerous smaller intervening valleys, nooks, and glens. Next comes the mountain region. The area of tillable land in these valleys and mesas is approximately 600,000 acres, a still larger area being suited to pasturage and grazing. The elevation of the mountain valleys varies from 2,500 to 4,500 feet. They are chiefly devoted to stock-raising, but many of them are well adapted to the growing of small fruits and vegetables and to diversified farming.

The arable soil of the county may be classed under two heads: granitic and adobe; though there is often a mixture of both, resembling adobe.

To the east of the mountains, in the delta of the Colorado, is the famous Imperial Valley. After many months of labor, and a large expenditure of money, a generous share of the flow of the Colorado River has been diverted into this great valley, the first delivery of water for irrigation being made in June, 1901, and so rapidly have the main canals and laterals been extended that more than 75,000 acres are now under cultivation, this rapid development affording employment and resulting in the building of homes for many thousands of settlers, thus adding millions to the wealth of the county. The center of this wonderfully fertile section is reached by a spur from the main line of the Southern Pacific Railroad. The central town is Imperial. There is a good hotel, an ice factory, creamery, and other evidences of prosperity. What until recently was described in our geographies as the dreaded Colorado Desert, bids fair to soon become the leading stock and dairy section of the great Southwest.

The intermountain region, the hills and valleys between the plains of Imperial and the western slope of the county, is rich in minerals and affords excellent pasturage for several thousand cattle. The mineral wealth of San Diego County, though known to be great, is largely undeveloped, and offers an excellent field for the prospector and capitalist. A partial list of the minerals found in this region is as follows: Gold, silver, copper, lead, galena, zinc, iron, lepidolite, ambylg-

onite, kaolin, cement, kunzite, tourmaline, garnets, crystals of epidote, chalcedony, rutile crystals, aluminum, asbestos, fire clay, fuller's earth, gypsum, limestone, manganese, marble, mineral paint, mineral soap, mica, graphite, sulphur, salt, mineral waters. Lepidolite and amblygonite, containing lithia and other valuable products, exist in greater quantities than in any other known deposit in the world. San Diego is producing the finest tourmaline in the United States. There are two big deposits. The crystals are of exceptional hardness, possess exquisite delicacy of coloring, and when cut form gem-stones of great brilliancy. Kunzite, a new gem, not found in any other part of the world, was recently discovered at Pala and is attracting a great deal of attention. Gem experts are manifesting a deep interest in the remarkable crystallizations found in San Diego County.

According to a bulletin on the "Climatology of California," recently published by the U. S. Department of Agriculture, San Diego County has the heaviest and most reliable rainfall of any part of Southern California. The rainfall increases, and greater extremes of temperature occur, as you leave the coast, the higher mountain peaks being often covered with snow to quite a depth during a part of the winter.

Water is impounded mainly for the citrus orchards of the coast section, the higher valleys requiring but little or no irrigation for their crops of cereals, deciduous fruits, olives, vegetables, etc.

As an evidence that education keeps pace with the population, there are more than one hundred and fifty school houses distributed through the county, the instruction in which is up to the usual high standard found throughout California.

The Board of Supervisors has done and is doing good work in the way of road-building, the most distant and mountainous places being readily reached over excellent highways.

The orange, lemon, and pomelo, or grape-fruit, do well. The largest single lemon grove contains about 800 acres.

Raisin grapes are a profitable crop, and the industry has a bright future. The wine industry is large and growing.

Olive-growers are making money. An olive grove, to be a commercial success, should be set out with a view to supplying pickling fruit, oil olives being treated as a by-product. The demand for pickled ripe olives is already in excess of the supply, and steadily growing. San Diego County olive oil has taken gold medals at many expositions in competition with oils from other parts of America and Europe.

Peaches, apricots, pears, quinces, plums, cherries, and other deciduous fruits do well. The mountain region around Julian has attained a special reputation for the crisp, finely flavored apples grown there, and samples from this district were awarded a gold medal at the St. Louis Exposition.

A good walnut orchard, properly located with reference to soil and water, is a safe investment. Small areas well suited to this crop may be found in different parts of the county—notably in the Tia Juana Valley. Almonds do well, and there are some thriving orchards.

San Diego County is celebrated for its deliciously perfumed and fine-flavored honey, which always finds a ready market at top prices. The apiaries are located for the most part among the hills and valleys back from the coast.

There is reason to believe that the cultivation of the silkworm may

hold a most important part in the industrial development of San Diego County—the climatic conditions are so perfectly adapted to the delicate constitution of the worm, and the foliage of the mulberry may be had in such wholesome condition practically during the entire year. Many acres have been set out to mulberry trees, and those interested feel greatly encouraged over the outlook.

The dairy industry has shown a healthy growth, having trebled in the past four years.

The modern city of San Diego was founded by A. E. Horton, in 1867. The situation is not only sanitary and attractive, but it is also admirably adapted for a large ocean commerce. Numerous wharves extend into deep water, and in their neighborhood may be found lumber yards, planing-mills, warehouses, foundries, etc. The electric street railway system is equipped with modern cars and complete in every respect. Water is provided in abundance, the supply and distribution being controlled by the municipality. The streets of the city are well lighted by electricity. The schools, private and public, have an excellent reputation. A fine, large opera-house, perfect in its appointments, is on the circuit of the very best theatrical and operatic companies. There are also several smaller theaters. The different religious organizations worship in attractive edifices; secret societies and benevolent associations have their lodge-rooms, and numerous musical and literary clubs are supported by an active membership. There are several strong banking institutions. The hotel accommodations are excellent, and there are a number of sunny modern lodging-houses. San Diego is thrown into special prominence as being the first port of call on the Pacific Coast of the United States north of Panama, and the magnificent bay, around the shores of which the city is built, will soon become an important naval rendezvous. The Government has concluded arrangements for the erection of a large coaling station here, and is fast completing the building of a modern military post at Fort Rosecrans, the big guns of which command the entrance to the bay.

Just across the bay from San Diego, ten minutes by ferry, is the peninsular city of Coronado, with its world-famous Hotel del Coronado and many beautiful homes. The attractions of this place as an ideal summer and winter resort are well known from Maine to Hawaii.

National City, the second largest city, is situated on the southeast shore of the bay. The land here rises gently from the water-front, and is admirably suited for the location of manufacturing establishments or other plants requiring a comparatively large area of level ground with good water frontage. There are a number of attractive homes within the city limits and nestling among the lemon and orange groves in the fertile valleys near-by. The church and school facilities of the place are excellent. A large manufactory of citrus products is in successful operation, turning out citric acid, oil of lemon, lemon extracts, etc. There is also an olive oil factory, and its product is equal to the best.

Passing through Old Town, you come to Pacific Beach, a very attractive suburb of San Diego. The land is quite level near the ocean, affording one of the widest, smoothest, hardest and most attractive beaches along the coast.

Escondido is some 35 miles northeast of San Diego, being connected by a spur with the main line of the Southern California Railway. A large area of productive country is tributary to Escondido, from which

shipments are made of hay, grain, cattle, hogs, oranges, lemons, raisins, wine, honey, chickens, eggs, butter, etc. The school and church accommodations of the place are excellent.

STATISTICS OF SAN DIEGO COUNTY FOR 1905.

General.

Area, 8,500 square miles, or 5,440,000 acres	Value of county buildings	\$325,250
Number of farms	Irrigating ditches — miles, 740; cost	\$3,050,000
Number of acres assessed	Railroads, Steam—miles, 334½; assessed value	\$2,625,381
Value of country real estate	Electric — miles, 19; assessed value	\$78,283
Of improvements thereon	Electric power plants, 1; assessed value	\$27,800
Of city and town lots	Gas and electric power lines—assessed value	\$39,215
Of improvements thereon	Number of acres irrigated	153,668
Of personal property		
Total value of all property		
Amount expended on roads and bridges		
Number of miles of public roads		
Road levy per \$100, 1905		

Cereal Products and Hay.

	Acres.	Tons.	Value.		Acres.	Tons.	Value.
Wheat	25,000	4,375	\$161,500	Barley hay	137,702	137,702	\$1,377,020
Barley	135,000	50,240	1,256,250	Wheat hay	15,000	15,000	180,000
Oats	15,000	3,054	79,392	Oat hay	20,000	20,000	200,000
Corn	12,500	3,125	78,125	Wild oat hay	6,900	8,000	40,000
Alfalfa hay	21,415	85,660	856,600				

Number of Fruit Trees and Vines.

		Non-				Non-		
	Bearing.	Bearing.	Total.		Bearing.	Bearing.	Total.	
Apple -----	51,362	12,841	64,203	Prune -----	74,124	8,235	82,359	
Apricot -----	42,134	3,772	45,906	Pomelo -----	10,346	6,974	17,320	
Cherry -----	3,744	1,604	5,348	Almond -----	6,500	2,274	8,774	
Fig -----	14,672	2,590	17,262	Walnut -----	6,000	2,734	8,734	
Lemon -----	212,042	78,064	290,106	Grapes—5,720	} acres			
Olive -----	129,283	24,625	153,908	Raisin 4,500		1,690,000	110,000	1,800,000
Orange -----	87,485	21,867	109,352	Table 570		108,000	120,000	228,000
Peach -----	62,559	41,706	104,265	Wine 650		120,000	80,000	200,000
Pear -----	8,415	8,414	16,829	Strawber's 45	140,000	40,000	180,000	
Plum -----	4,720	2,108	6,828					

Fruit, Vegetables, Nuts, Etc.

<i>Green.</i>		Pounds.	Value.	<i>Dried.</i>		Pounds.	Value.
Apples		2,400,000	\$60,000	Cantaloupes		2,140,000	\$42,800
Apricots		1,000,000	25,000				
Grapes		456,000	11,400	Apricots		250,000	\$15,000
Lemons (boxes)		275,000	453,750	Peaches		250,000	15,000
Oranges (boxes)		75,000	112,500	Prunes		350,000	17,500
Peaches		750,000	18,750	Raisins		2,500,000	87,500

The county packed 48,600 packages, worth \$12,050.

Wines, Brandies, Etc.

	Gallons.	Value.		Gallons.	Value.
Wine—Angelica	5,000	\$1,500	Wine—Riesling	2,000	\$700
Claret	75,000	13,750	Beer (barrels)	45,760	386,080
Muscatel	2,000	600	Brandy	5,000	10,000
Port	10,000	3,000			

Livestock Industry.

	Number.	Value.		Number.	Value.
Cattle—Beef	8,500	\$25,500	Swine	26,426	\$184,982
Stock	47,300	946,000	Colts	975	10,110
Dairy Cows—Graded	7,990	239,700	Sheep—Common	9,000	45,000
Calves	7,225	57,800	Lambs	600	1,200
Horses—Thoroughbred	48	4,800	Goats—Common	2,700	5,400
Standard-bred	875	35,000	Mules	948	29,871
Common	6,983	172,098	Jacks and jennies	44	308

Poultry and Eggs.

	Dozen.	Value.		Dozen.	Value.
Chickens	350,000	\$157,500	Turkeys	1,500	\$30,000
Ducks	1,500	8,250	Eggs	1,381,260	345,315
Geese	600	5,400			

Dairy Industry.

In the county are 195 dairies, 4 creameries, and 4 skimming stations.

The output is 500,000 pounds of butter, worth \$12,500, and 4,500 gallons of cream worth \$4,500.

Miscellaneous Products.

The fish output is 1,986,600 pounds, worth \$794,640; lobsters, 62,370 pounds, worth \$2,495.

There are 56,250 bee hives, worth \$168,750; output, 110,000 pounds of beeswax, worth \$27,500, and 600,000 pounds of honey, worth \$36,000.

The output of alfalfa seed is 100,000 pounds, worth \$10,908.

Manufactories.

	Number.	Number of Employés.	Quantity. Produced.	Value of Product.
Bookbinderies	2	7	---	\$9,000
Brick	7	62	7,700,000	64,450
Roman brick	---	---	150,000	3,750
Tiling	---	---	60,000	2,280
Cigars	2	42	2,380 M	123,200
Flouring-mills	1	---	2,500 bbls.	11,250
Citric products	1	10	60,000 lbs.	21,000
Foundries and Iron Works	5	73	1,916,800 lbs.	88,920
Lapidaries	5	16	45,944 tons	235,690
Hides	1	6	37,500 lbs.	112,500
Lard	---	---	15,000 lbs.	1,500
Olive oil	---	---	10,000 gals.	25,000
Olives	---	---	25,000 gals.	12,500
Planing-mills	4	81	18,005,000 ft.	226,080
Salt	2	60	22,000 tons	110,000
Soap	1	6	6,000 cases	18,000
Stone—Artificial	3	25	140,500 sq. ft.	42,525

Productions Shipped Out of County.

	Amount.		Amount.
Barley	25,000 tons	Beeswax	110,000 lbs.
Alfalfa hay	10,000 tons	Honey	550,000 lbs.
Apples	30,000 boxes	Cattle	12,500
Apricots—Dried	150,000 lbs.	Hides	37,500
Lemons	209,040 boxes	Swine	5,000
Oranges	65,520 boxes	Beer	5,000 bbls.
Peaches—Dried	150,000 lbs.	Fresh fish	1,202,100 lbs.
Prunes—French	250,000 lbs.	Salt fish	674,500 lbs.
Raisins	2,500,000 lbs.	Lobsters	50,000
Chickens	5,788 dozen	Cigars	10,800 C
Turkeys	15,000 lbs.	Semi-precious gems	25,000 carats
Eggs	241,050 dozen		

SAN FRANCISCO.

Something more than a year ago Charles Sidwick Aiken wrote of San Francisco, as follows:

"No city in the country is to-day more wideawake than San Francisco. None offers greater opportunities for residence, for business, for investment. The Pacific Ocean is the present stage of the world's progressive drama. San Francisco is in her place on the world's highway. Before and behind, and all around, the demands of trade and of modern civilization are crowding. The city is the metropolis of a State that is an empire in its resources. In its harbor, the ships of war of all the nations of the world could float and be scarcely within hailing distance of one another. The climate of State and city welcomes the health-seeker and the man who would live out of doors all the year round. Ten millions instead of barely two millions of people as at present could live in California in comfort. The trend of population is steadily westward. San Francisco has grown from 342,780 (census of 1900) to 500,000, according to estimate from figures of the city directory for 1905. Every one of the fifty-seven counties of the State reports advances in population and in prosperity. Every new resident of California helps San Francisco. It is the heart through which flows the life of the State. Real estate sales, and clearing-house figures, assessor's valuations, the words of wise men, all show the city's progress. Still westward across the Pacific to the Philippines, to Japan, to the Orient, southerly to Hawaii, to Tahiti, Australia, northerly to British Columbia, the Alaskan archipelago, Cape Nome and the gold region of the Klondike, the advancing movement trends. Everywhere American capital and American enterprise are pushing their way. The transpacific steamship service has more than doubled its proportions since Dewey captured Manila, and ships in both directions are filled every voyage with passengers and freight, while direct lines to European ports are doing a thriving trade. San Francisco, the Pacific Coast, the isles of the sea, are sending their call to young America to-day.

"Here is a city of destiny. The outlook promises, and facts help prove, that here is established one of the cities of the ages that will take its place in the roll-call with Carthage, Constantinople, Rome, Venice, London, New York.

"San Francisco is unique among cities, a study among the municipalities of the world. Here are many characters of older places, adjusted to cosmopolitan demands. On this peninsula has grown up a city, eighth in size among the cities of the nation. Qualities of West and East, and North and South, are here mingled and developed. Practical and poetical sides of life here meet in equal and harmonious growth. Painter and musician, stockbroker and merchant, are shoulder to shoulder. Progress in commerce and literature has been conspicuous. Critics remark to see such lines of endeavor, of parallel

growth in the same community. Here is the soft air and blue sky of Italy, the marine outlook of Naples, with Mount Tamalpais personating Vesuvius; the hills of Rome, the winter climate of the Riviera, and people who possess the attributes of New England energy and Oriental luxury. And then there's the sea—ever the sea. The open-air life that is possible the year through, coupled with the coming hither, in the search for riches or for health, of the world's best brain and brawn, have found here, on the Nation's western shore, a community that stands for untrammelled individuality."

This was San Francisco before the 18th day of April, 1906. On the morning of that day the peninsula on which that beautiful, unique, and marvelously prosperous city stood was visited by an earthquake which damaged some of the less substantial buildings and, worst of all, rent apart the main through which flowed most of the city's supply of water. Cracked chimneys and disarranged live electric wires caused fire to break out simultaneously in many parts of the downtown district. The firemen responded with usual alacrity, but on connecting to the hydrants found to their horror that there was no water. They were helpless. The fires burned and spread and they could not stop them. Dynamiting was resorted to, but in spite of these desperate measures the flames rolled on and on, and block after block of the beautiful city fell a prey to their fury. Panic seized the people and the scenes and the situation became indescribable. All day the fires burned. By night they were bigger and fiercer than ever. Great rows of massive buildings made of brick and terra cotta and steel and stone could not resist the seething flames. The heart of the city was being consumed, and with extended wall the insatiable cracking and roaring flames rose higher and higher, relentlessly destroying and consuming everything in their path. This frightful scene lasted until the evening of the third day, when from exhaustion or the lack of fuel on which to feed in some directions and the free use of dynamite in others, the flames were subdued. But oh, what destruction was there! The terror and awful plight of the half million of people huddled in outside vacant lots and in the parks we can not describe, and shall not attempt it. Their city consumed, their business destroyed, their homes in ashes, their fortunes gone, and no food available only as dealt out by the hand of charity.

But in this case charity was prompt and generous, and, considering the awful condition, suffering was reduced to a minimum. Some lives were lost, comparatively few, however, but the destruction of the business part of the city by fire and hundreds of acres of the residence portion was complete. The reader can appreciate the awful extent of the disaster when he realizes that the flames swept over an area of about 7,500 acres and included all the best and most densely built and thickly populated portion of that once beautiful city.

The damage from the earthquake was not so great but it might have been easily repaired and soon forgotten, but the destruction by fire was the most appalling and complete of anything in modern times.

But the ocean is still there inviting ships on its bosom; the harbor, wharves, and docks are there from which to load those ships; the growing trade of the Pacific is still growing; the climate and scenic features still remain. The natural indestructible advantages that have always belonged to San Francisco are hers still, and are undiminished,

and the will and courage and enterprise of her people, always indomitable, seem to have taken on additional strength in the face of disaster, for out of the midst of the ruin they gave notice to the world that on that scene of desolation, on those serried but sightly hills, they propose to build a city better and more beautiful than ever. Mr. Aiken's prediction will come true, for this city of destiny, just now staggered and hurt, but not discouraged, will rise from its ashes and become a city of the ages and yet take its place in the roll-call of the great cities of the world. Cities are built on lines of trade, and thrive in proportion to the prosperity of the country on which they feed. As a trade center San Francisco's location is ideal, and the marvelously rich country on which it feeds is unimpaired.

SAN JOAQUIN COUNTY.

San Joaquin County lies at the lower end of the San Joaquin Valley. The two great rivers that drain the State, the Sacramento from the north and the San Joaquin from the south, have their junction near the northwest corner of the county and pour their united waters into Suisun Bay. The San Joaquin River intersects the county, and is navigable to its southern boundary the year round. The area of the county is, generally, level valley land. In the northwest, along the rivers, is a region of reclaimed tule land and marshes, through which the San Joaquin and its tributaries flow in many channels to their junction with the Sacramento.

That part of the delta of the San Joaquin lying within the county embraces an area of 300,000 acres. Originally this entire area was covered with water during the late winter and early spring. The receding waters left it a marsh threaded with many navigable channels. Within the county, the number of miles of this navigable channel is 263. For centuries prior to the reclamation, this delta produced a crop of tules. For hundreds of years these tules have thus died down, annually forming a compact, spongy mass of decayed vegetable matter, which, were it not mixed with sediment, would be purer than the peat in the bogs of Ireland. The flood waters covering this delta in the centuries gone by have been heavily charged with sediment washed from the mountains and foothills. This sediment was deposited with the layer of decayed vegetable matter, thus forming a mixture of peat and sediment soil. The soil thus formed is wonderfully rich in all those chemical elements essential to plant growth, and contains the proper proportion of grit which all arable land must contain. The chemical analyses of these soils have demonstrated that the amount of pure humus contained ranges all the way from 10 to 24 per cent.

The solution of the problem of reclaiming these lands came with the invention of the clamshell dredge, a machine capable of handling two tons of earth at a bucketful. These dredges were sent through the navigable channels of the delta, taking the muck and clay from the bottom of the channels and depositing it upon the bank. Whenever a sufficient levee had been built around any given tract the next succeeding high water would not get over the land, and the work of reclamation was temporarily completed. The cost of the work of reclaiming any given tract varies greatly, according to the extent of the levee necessary.

The irrigation problem upon these reclaimed delta lands is the cheapest and simplest known to agriculture. The surface is slightly lower than the surface of the water in the neighboring channels at high tide; consequently, all that is necessary is to tap the levee, and, by means of a floodgate, let the water flow in on the land as needed. As the water in the channel is navigable and belongs to the Government it can be taken without cost by the farmer. Surface irrigation on

these lands is not practiced. The lands are watered by the method known as "sub-irrigation." Lands so irrigated yield wonderfully.

Of all the industries upon these lands, that which promises most for the future is dairying. Australian rye grass, mixed with alsike, white and red clover and orchard grass, makes a pasture peculiarly suited to these moist delta lands. If cut, this grass will yield from eight to ten tons of splendid hay per acre, and makes excellent pasture in the fall and winter. If pastured throughout the season, three acres will support four cows eight months in the year, and one cow during the four winter months. The pasture furnishes green feed all the year. Beef stock are sent to the butcher right from the grass in prime condition.

Dairy cattle that have no feed other than the grass make world's records in milk and butter. The greatest herd of Holstein-Friesians in the world, presumably, is located upon these delta lands several miles west of the city of Stockton. Since its organization, less than six years ago, it has had three world-record cows in its ranks. One of these, Juliana de Kol, holds the world-record for a two-year-old with her first calf over all breeds, both for milk and butter, in seven, thirty, sixty and one hundred days. She produced ninety-two pounds seven and one-half ounces of butter in thirty days. She produced her own weight in milk every fourteen days. In one hundred days the milk that she has given will weigh three tons. No cow of her age in the world with first calf ever made such a record as she has made. This cow was sent to the Louisiana Purchase Exposition at St. Louis as a delegate to the National Butter-makers' Association Convention. Her mission was to bear silent testimony to the character of dairy stock produced on the delta lands of California, and to use that testimony as an inducement to the association to hold its next convention in California. In this mission she was successful. Every dairyman knows that the greatest quantity of milk is produced from green feed, and that the best results are obtained where the season of green feed is the longest. On these delta lands the season lasts from January to January.

The delta lands to the west of Stockton are known to produce-men as producing the heaviest yields of vegetables in the United States, if not in the world. Potatoes yield an average of 250 bushels per acre. The crop reports show that San Joaquin County produces one-fourth of all the potatoes grown in California. Of the 2,744 counties in the United States it stands fifth in yield per acre, and first in value of crop per acre.

In the matter of onions San Joaquin County stands sixth in the United States in the yield per acre, and fourth in value of crop per acre. The returns from certain favored sections of the delta are phenomenal. The yield has gone as high as 1,500 bushels per acre. The harvest of onions in the delta is over by the middle of June, long before the Eastern onions are ready to be gathered. This gives the California onion a practical monopoly of the market at good prices.

According to the Federal census of 1900, San Joaquin County's bean crop the preceding year showed the greatest yield per acre of any county in the United States, and it also led all other counties in the gross returns in cash per acre, they being stated at \$55.03.

San Joaquin County is, area considered, the largest asparagus producer in the world.

San Joaquin was among the first of California counties to raise wheat, and some of its lands have been growing wheat almost continuously for

fifty years. Yet, notwithstanding the diversification of products, it remains the leading wheat county of the State. Some others plant a larger area to this cereal, but none approach it in production. Among the ten leading counties of the United States it is least in wheat acreage, seventh in production, second in yield per acre, and first in value per acre for its crop.

California is the leading State in the Union in the production of barley. Its production in 1899 was over 25,000,000 bushels. Of the ten leading counties of the United States in the production of barley, five of them are in California. Of the 2,744 counties of the United States the only one that had over 100,000 acres in barley was San Joaquin County. Not only is it the leading barley county in the State in area and production, but also in the United States.

In the production of rye, San Joaquin County ranks seventh in gross production, fourth in area, and eighth in yield per acre, in the United States.

Both wine and table grapes are profitably grown in all parts of the county, and thousands of acres are devoted to their cultivation; an acreage fast increasing. Nearly all the vines are non-resistant, but quite an acreage is planted every season in resistant stock whose permanency is assured. The cost of planting and growing a vineyard depends entirely upon local conditions, and upon the character of the work done; but when once in bearing, the cost of cultivation and care does not vary much from \$15 per acre per annum. A farmer owning a vineyard in connection with general farming, is out of pocket only a very small sum in cash, for the reason that the work in his vineyard is done by himself when nothing else could be done.

San Joaquin is one of the leading orchard fruit counties. First in importance is the peach. Apricots come next. Other fruit are: Prune, pear, cherry, olive, almond, apple, fig, orange, walnut, lemon.

San Joaquin County is an important stock section.

The year 1905 opened with an organized effort looking toward the establishment of the varied flax, linen, and linseed oil industries in San Joaquin County. This work was taken up in 1904 under the direction of Justin Kay Toles, an expert of recognized ability and experience, on some of the island lands near Stockton. In spite of late sowing and extreme weather conditions, the showing made was a good one and led to the calling together of a number of representative men of Stockton and vicinity. Plans were made to extend the experiments throughout the county. A flax-fiber association was formed, a committee appointed, and funds provided for the carrying on of the work. This committee is known as the Flax-Fiber Association Committee.

The climate of the county is even and healthful, being practically the same as that of Southern California and of the countries of southern Europe bordering on the Mediterranean. Under the influence of the prevailing westerlies the winters are mild, while in summer the local sea breezes calm all extremes of temperature. The nights are always cool. Within a radius of five miles from Stockton may be found practically all products of both temperate and sub-tropical countries. The orange and the cherry, the grape and the pear, the fig and the hardy grains, the palm and the prune, are growing equally well side by side. Flowers are in bloom in the open air all the year.

STATISTICS OF SAN JOAQUIN COUNTY FOR 1905.

General.

Area, 1,360 square miles, or 870,400 acres	Value of county buildings.....	\$490,000
Number of farms	Irrigating ditches—miles, 30; cost	\$26,430
Number of acres assessed	Railroads, Steam—miles, 200.93; assessed value	\$2,770,079
Value of country real estate	Electric—miles, 5½; assessed value	\$29,860
Of improvements thereon	Electric power plants, 3; assessed value	\$311,307
Of city and town lots	Electric power lines—miles, 112½; assessed value	\$100,000
Of improvements thereon	Number of acres irrigated	1,000
Of personal property		
Total value of all property		
Amount expended on roads		
Amount expended for bridges		
Number of miles of public roads		
Road levy per \$100, 1905		40 cts.

Cereal Products and Hay.

	Acres.		Acres.
Wheat	86,762	Corn	1,908
Barley	126,707	Buckwheat	20
Oats	29,572	Alfalfa hay	11,794
Rye	8,406	Grain hay	49,991

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.		Bearing.	Non-Bearing.	Total.
Apple	9,295	3,385	12,680	Pear	24,086	3,305	27,391
Apricot	73,621	11,368	84,989	Plum	15,314	4,392	19,706
Cherry	21,141	13,256	34,397	Prune—French	28,270	297	28,567
Fig	5,502	1,619	7,121	Other kinds	19,161	1,238	20,399
Lemon	778	783	1,571	Quince	2,573	219	2,792
Nectarine	767	801	1,568	Table grapes	8,299	3,098	11,397
Olive	38,947	9,242	48,189	Wine grapes	7,340	2,562	10,902
Orange	2,950	5,323	8,273	Blackberries	155	1	156
Peach	109,103	89,736	198,839	Currants	2	—	2
Nuts—Almond	112,723	37,400	150,123	Gooseberries	3	—	3
Chestnut	98	5	103	Raspberries	11	8	19
Pecan	90	9	99	Strawberries	37	9	46
Walnut	3,172	1,309	4,481	Loganberries	38	9	47
Other nuts	37	—	37				

Vegetables, Etc.

Asparagus, 1,822 acres; beans, 13,176 acres; beets, 6 acres; cabbage, 42 acres; celery, 2 acres; watermelons, 760 acres; pumpkins, 578 acres; onions, 724 acres; Irish potatoes, 17,823 acres; sweet potatoes, 861 acres; tomatoes, 96 acres.

Wines, Brandies, Etc.

	Gallons.		Gallons.
Wine—Angelica	85,000	Wine—Riesling	4,300
Claret	546,975	Sauterne	1,000
Hock	100,080	Sherry	95,500
Madeira	75,000	Tokay	160
Muscatel	29,000	Brandy	19,100
Port	230,250		

The value of the wine and brandy is not given.

There are 2 breweries; the value of the output is estimated at \$100,000.

Livestock Industry.

	Number.		Number.
Stock	20,820	Swine	27,904
Thoroughbred	107	Horses—Thoroughbred	3,574
Dairy Cows—Graded	12,511	Standard-bred	111
Devon	6	Common	19,406
Guernsey	5	Colts	2,862
Herefords	2	Sheep—Imported	195
Holsteins	598	Common	43,923
Jersey	272	Lambs	4,191
Polled Angus	3	Goats—Angora	140
Red Polled	1	Common	219
Shorthorns	464	Wool (pounds)	148,780
Calves	15,335		

Values are not given.

Poultry and Eggs—Dairies.

	Dozen.		Dozen.
Chickens	16,399	Turkeys	948
Ducks	237	Eggs	983,810
Geese	165		

Values are not given.

There are 40 dairies, 13 creameries, and 52 skimming stations; output of butter is worth \$398,000.

Miscellaneous Products.

Bee hives, 3,046; beeswax, 2,105 pounds; honey, 48,903 pounds; chicory, 152 acres.

Manufactories.

	Number.	Number of Employés.	Value of Product.		Number.	Number of Employés.	Value of Product.
Bookbinderies .	4	124	\$221,500	Bakeries	7	68	\$220,000
Boats	4	61	105,500	Foundries and			
Fuel briquettes	1	22	250,000	Iron works..	11	454	1,400,000
Carriages and				Furniture	3	10	50,000
wagons	7	58	134,229	Jewelry	4	9	30,000
Cigars	3	9	12,300	Leather	1	80	300,000
Ice	1	7	18,750	Machinery	10	300	1,000,000
Insect powder.	1	8	30,000	Olive oil	1	9	27,000
Soda water . . .	1	2	22,000	Planing-mills..	10	110	280,650
Mineral water .	1	3	10,000	Soap	1	9	30,000
Confectionery .	5	14	24,300	Tanneries	1	80	300,000
Flouring-mills .	3	133	3,730,894	Woolen mills..	1	160	175,000
Mealalfalfa . .	1	6	182,000	Wire fence . . .	1	10	40,000
Beer	1	25	100,000	Extension lad-			
Macaroni	2	6	16,500	ders	1	3	6,000
Gloves	2	55	68,000	Window glass .	1	60	350,000
Canneries . . .	1	250	283,500	Tombstones . .	2	15	50,881

SAN LUIS OBISPO COUNTY.

Bordering the Pacific Ocean for a distance of 90 miles northward from the point where its area is divided from that of Santa Barbara, lies the county of San Luis Obispo. Its area extends from the sea-line over height and valley until its eastern border is well up toward the summit of the Mount Diablo range, which separates the county from the great basin of the San Joaquin. From northwest to southeast it is divided by the mountains of the Sierra Santa Lucia, which, with their elevation of 2,500 feet, are the distinguishing line between the two sections, each of which presents entirely different characteristics in both climate and production. To the south and west, that portion of the county which opens upon the sea, presents attractions rivaling those of any part of the State. Here grow, in a climate truly semi-tropical and under skies even bluer than those of Italy, all of those products that have made California famous. The orange, lemon, lime, pomegranate, and nectarine, the grape and the olive, the walnut and the prune, all thrive on the broad mesas and in the sheltered valleys which break the southern slopes of the Sierra Santa Lucia.

One great factor in the development of this prolific area lies in the amount and quality of the water which finds its way to the valleys from the heights of the Santa Lucia. At extremely short distances along the entire southern slope of the mountains are perennial streams, many of them large enough to be successfully used for irrigation, although so far the development of irrigation possibilities is in its infancy. Allied to this is an average annual rainfall of 21 inches, as recorded at San Luis Obispo, the county seat, which, combined with the precipitation from ocean fogs, as noted along the seacoast, effectually solves the water question for southwestern San Luis.

On the southern border lies Arroyo Grande Valley, noted for the perfection of its crops of all classes of fruits and vegetables. The soil is wonderfully fertile, and particularly adapted to the raising of seeds and bulbs—in fact, several large seed farms are in operation, and their product finds its way to every corner of America. In the Arroyo Grande there is an abundant water supply, and a climate of agreeable mildness.

It is, however, to the district directly surrounding the city of San Luis Obispo that the county owes its climatic reputation. In a beautiful valley, hemmed in on all sides by rugged foothills, lies this most attractive city. Like all the principal population centers of the Southland, the site was first chosen by the padres who founded the Mission of San Luis Obispo de Tolosa one hundred and thirty-three years ago. Of the old mission there remains only the little church and one adjoining building occupied as the parochial residence.

The population of San Luis Obispo lives under an excellent municipal system, which has done much to beautify and improve the city. There are banking institutions carrying large deposits. Light is supplied by both electric and gas plants, and there is furnished an unfailing supply of excellent water.

Commercially, San Luis Obispo occupies a position of importance. Nine miles to the westward lies the harbor of Port Harford, which the

Government is making, by means of an extensive breakwater, one of the safest and most commodious anchorages on the Pacific. This port is connected with San Luis Obispo by the Pacific Coast Railway, whose lines, extending on beyond into the Arroyo Grande Valley and the northern part of Santa Barbara County, render this whole section tributary to San Luis and her seaport at Port Harford. The main transportation artery is the coast line of the Southern Pacific system, of which San Luis is a division headquarters. This coast line cuts through the county north and south, giving daily communication with the great centers of California.

To the north and west of the county seat, in the great angle formed between the Santa Lucia range and the coast, lies an area which is among the most productive in the county. Its principal industries are cattle and dairying, both of which are carried on with a full measure of success. Possessing several little ports where calling steamers give direct outlet to their products, this section is independent of transportation problems, which assertion applies to the whole southern section of the county; for the great waterway of the Pacific can never be closed to San Luis, and thereby the transportation question ceases to be a factor when considering possibilities of market.

Still farther north than the dairying section, and well up in the mountains, lies one of San Luis Obispo's several mining districts, noted for its quicksilver deposits. This is only one of the sections of San Luis where there is mineral in paying quantities. The mines of the county produce gold (both quartz and placer), copper, asphalt, manganese, salt, and iron, while of building materials there are lime, alabaster, onyx, and building stone in great variety.

To the northeast of the Sierra Santa Lucia, and between that range and the crests of the Diablo, lies a section drained by the Salinas River and its tributary creeks. Possessing a much higher altitude than the country to the south of the mountains, its climate varies accordingly, the winters bringing more chill and the summers a greater degree of heat. The horticulture of this section, while limited to deciduous fruits, is none the less attractive, the lands to the west of the Salinas River showing many successful examples in this industry. The greater portion of this area is, however, given over to the production of cereals, in which it is particularly fruitful. To the east of the Salinas the land slopes gradually up to the foothills of the Diablo range, and is less valuable from an agricultural standpoint, but specially adapted to grazing, thousands of cattle being fed upon the native grasses of these plateaus.

The principal town of this northern section is Paso Robles. It is noteworthy for its thermal springs and their accompanying baths. Another noted mineral spring lies 9 miles from San Luis and less than 2 miles from the beach at Port Harford. Those known as the San Luis Hot Springs are noted for their wonderful cures of rheumatic complaints. Excellent accommodations in the way of a hotel and cottages have been erected, making the spot intensely attractive.

San Miguel, another of the sites selected by the padres for the founding of a mission, lies north of Paso Robles, on the banks of the Salinas.

With its diversity of climate and variety of productions, San Luis Obispo County presents an inviting field excelled by no other county.

Area of the county is 3,500 square miles, or 2,240,000 acres.

SANTA BARBARA COUNTY.

Santa Barbara County lies in the angle formed by the eastward trend of the coast from Point Concepcion. Parallel with the southern coast, and distant from 2 to 5 miles, is the rugged range of the Santa Ynez Mountains, from 3,000 to 4,000 feet in altitude. The eastern part north of this range is occupied by the San Rafael Mountains, forming one of the Government forest reserves. The western part north of the Santa Ynez is broken into several valleys, separated by ranges of hills. That portion lying south of the Santa Ynez range and along the channel is the Santa Barbara Valley. The channel islands of San Miguel, Santa Rosa, Santa Cruz, and Anacapa are also included in the county.

Traversed by mountains, there must be waste land, but there is a total of 1,088,000 acres available for practical uses.

Santa Barbara Valley lies between the Santa Ynez Mountains and the sea. It has a world-wide celebrity for fertility of soil and healthfulness of climate.

Santa Ynez Valley, between the Santa Ynez and San Rafael ranges, comprises about 120,000 acres of excellent arable land, mostly rolling. Santa Ynez River runs the whole length of the valley, which is also watered by numerous creeks. The climate differs from that of Santa Barbara, being warmer in summer and cooler in winter.

Los Alamos Valley comprises about 40,000 acres of rich agricultural land, and as much more of excellent grazing land in the hills that are tributary.

Santa Maria, the largest and northernmost, lies along the river of that name. This valley, including its upper extension, the Sisquoc, is 30 miles from the foothills to the sea. Many tributary cañons break into it through the hills, mostly small, but containing rich, protected, and generally well-watered land, adapted to all kinds of deciduous and citrus fruits. The beet-sugar industry is now assuming large importance in this valley, a sugar plant, costing \$1,000,000, having been built in 1898, and employing 500 hands in the sugar-making season.

The oil development about Santa Maria is attracting much attention. Many wells have been drilled, and the oil is found at a great depth, showing its permanent and inexhaustible character. The wells are from 2,000 to 3,000 feet deep, and in some instances the stratum of oil sand is 1,000 feet thick. Several gushers have been struck. The product is of good quality, running from 22 to 32 degrees gravity. Indications are that there is here one of the greatest oil fields in the world.

Lompoc is the center of a fertile farming and dairying section. It is on a branch of the Southern Pacific, 9 miles from the main line at the ocean, and is an up-to-date town. The section tributary is well adapted to dairying, and the people are justly proud of their creamery, the product of which is the most popular butter made in this section of the State. Lompoc seems the natural home of the apple, and its exhibit

took the first prize at the great fair at New Orleans, and at Chicago was awarded a diploma for excellence. Another production of which Lompoc has a monopoly for the United States is English mustard, which is grown on a large scale.

The arable soils of the county are mostly alluvium and adobe. The alluvial soil is generally deep and rich, and will grow all kinds of field crops, such as beans, potatoes, corn, vegetables, strawberries, and all other varieties of small fruits. In addition to the fruits usually grown in the Eastern States, this soil will produce prunes, figs, olives, peanuts, English walnuts, grapes, plums, lemons, limes, oranges, loquats, guavas, persimmons, cherimoyers, dates, bananas, and other semi-tropical fruits. In fact, nearly every tree, shrub, or plant that grows in the world can be grown out of doors in the southern part of the county. The adobe soil is rich, but more difficult to work. It produces large crops of oats, wheat, barley, flax, and mustard, and affords the richest of pasturage. The principal crops are hay, barley, wheat, English mustard, apples, olives, lemons, walnuts, beans, and sugar-beets. The principal mineral productions are asphaltum and petroleum. A large portion of the county, especially that of a hilly or broken character, is devoted to stock-raising.

The decided improvement in the industrial and commercial conditions in the county, which began in 1901, continues unabated; every line of effort shows improvement. Not only has the wonderful oil development made the northern part most prosperous, but Santa Barbara City and the contiguous valleys are going ahead at a satisfactory rate.

STATISTICS OF SANTA BARBARA COUNTY FOR 1905.

General.

Area.....	2,630 square miles	Number of miles of public roads.....	800
Number of farms.....	1,052	Road levy per \$100, 1905.....	40 cts.
Number of acres assessed.....	1,079,802	Value of county buildings.....	\$175,000
Value of country real estate.....	\$7,982,744	Irrigating ditches.....	20 miles
Of improvements thereon.....	\$1,004,955	Railroads, Steam—miles, 158.69;	
Of city and town lots.....	\$3,436,115	assessed value.....	\$1,897,287
Of improvements thereon.....	\$2,767,700	Electric — miles, 6; assessed	
Of personal property.....	\$2,224,180	value.....	\$19,000
Total value of all property.....	\$17,505,694	Electric power plants. 5; assessed	
Amount expended on roads.....	\$81,379	value.....	\$33,960
Amount expended for bridges.....	\$8,200	Number of acres irrigated.....	6,000

Cereal Products and Hay.

	Acres.	Tons.	Value.		Acres.	Tons.	Value.
Wheat.....	18,000	11,000	\$210,000	Corn.....	2,280	4,560	\$5,700
Barley.....	29,480	14,740	294,800	Grain hay.....	20,940	31,400	314,000
Oats.....	10,540	.....	.....		

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.		Bearing.	Non-Bearing.	Total.
Apple.....	32,220	11,000	43,220	Prune—French.....	1,520	490	2,010
Apricot.....	8,000	5,000	13,000	Other kinds.....	1,340	370	1,710
Cherry.....	250	100	350	Quince.....	527	160	687
Fig.....	1,000	520	1,520	Almond.....	200	.....	200
Lemon.....	84,120	37,290	121,410	Walnut.....	24,000	17,420	41,420
Nectarine.....	750	120	870	Grapes.....	270	85	355
Olive.....	21,370	11,440	32,810	Blackberries.....	112	14	126
Orange.....	3,210	1,221	4,431	Raspberries.....	5	2	7
Peach.....	5,315	1,800	7,115	Strawberries.....	42	6	48
Pear.....	7,211	521	7,732				

Fruit, Vegetables, Nuts, Etc.

<i>Green.</i>	Pounds.	Value.	<i>Green—Continued.</i>	Pounds.	Value.
Apples.....	1,842,000	\$63,000	Persimmons.....	78,840	\$3,200
Apricots.....	3,876,500	---	Raspberries.....	32,000	2,240
Blackberries.....	33,600	16,800	Strawberries.....	280,000	20,800
Grape-fruit (boxes).....	300	800	Walnuts.....	2,000,000	240,000
Lemons (boxes).....	81,744	163,438			
Onions.....	70,000	8,500			
Oranges (boxes).....	634	1,460	<i>Dried.</i>	Pounds.	Value.
Potatoes—Irish.....	6,532,400	65,324	Almonds.....	6,000	\$15,000
Sweet.....	30,000	520	Apricots.....	646,888	---
			Beans.....	9,293,394	248,801

Livestock Industry.

	Number.	Value.		Number.	Value.
Cattle—Beef.....	18,760	\$284,940	Horses—Thoroughbred.....	25	\$7,250
Stock.....	37,200	569,880	Standard-bred.....	152	13,380
Dairy Cows—Graded.....	11,340	216,040	Common.....	10,062	402,480
Ayrshire.....	50	1,000	Colts.....	920	15,040
Jersey.....	1,050	78,720	Sheep—Common.....	72,500	145,000
Polled Angus.....	75	7,500	Lambs.....	28,000	48,000
Shorthorns.....	225	16,875	Wool (pounds).....	116,000	13,920
Calves.....	3,200	32,000	Mules.....	2,648	105,740
Swine.....	12,069	60,345			

Poultry and Eggs.

	Dozen.	Value.		Dozen.	Value.
Chickens.....	5,950	\$49,790	Turkeys.....	600	\$14,400
Ducks.....	520	4,160	Eggs.....	583,000	116,600
Geese.....	960	11,520	Pigeons.....	3,200	9,600

Dairy Industry.

	Production.	Value.		Production.	Value.
Dairies (number)...	52	\$271,770	Cheese.....	192,500 lbs.	\$20,212
Creameries (number)	3	6,000	Cream.....	60,000 gals.	62,000
Butter.....	320,000 lbs.	64,000			

Miscellaneous Products.

The output of forest products are: Fuel wood, 2,400 cords, worth \$24,000; piles, 2,000, worth \$20,000.

There are 50 acres of flowering plants, worth \$20,000; honey, 131,400 pounds, worth \$13,140; potatoes, 940 acres, yield 5,640,000 pounds, worth \$65,324.

Beet sugar is a large industry of the county, but no returns are given of the beets grown or sugar made.

Manufactories.

	Number.	Number of Employés.	Quantity Produced.	Value of Product.
Bookbinderies.....	1	4	---	\$4,000
Brick.....	3	---	1,000,000 M	50,000
Cigars.....	4	10	240,000 M	8,000
Flouring-mills.....	1	6	---	10,000
Foundries and iron works.....	3	12	---	21,000
Olive oil.....	3	12	10,500 gals.	42,000
Planing-mills.....	2	21	---	75,000

Exports.

The exports from the county are: Mustard, 600 tons; apples, 52,000 boxes; grape-fruit, 300 boxes; lemons, 81,744 boxes; oranges, 634 boxes; walnuts, 2,000,000 pounds; beans, 9,293,394 pounds; honey, 131,400 pounds; dried onions, 600 sacks; cattle, 4,500 head; horses, 350 head; sheep, 5,500 head; swine, 3,200 head; wool, 116,000 pounds; crawfish, 900,000 pounds; olive oil, 4,500 gallons.

SANTA CLARA COUNTY.

Santa Clara County is near the geographical center of California, and immediately south of San Francisco. Its eastern boundary is the summit of the Coast Range, and its western the crest of the Santa Cruz Mountains. It extends southward 52 miles, and has an average width of 34. The principal valley is the Santa Clara, which is 34 miles broad at the north, and has an average width of 15 miles. Encircling the level lands of the valley is a wide region of rolling hills, beyond which rise the mountains, culminating at the western side in Mount Bache, 3,780 feet, and on the east in Mount Hamilton, 4,250 feet. Of the total area it is estimated that 800,000 acres are suitable for the cultivation of fruits and vines; of these something more than 250,000 acres are in the valley and 300,000 in the foothills. In what is now, or recently has been, the lower portion of the valley, the soil is a black, tenacious, adobe clay. While productive, it requires care as to the time and manner of cultivating it, and is well adapted to hay and grain, apples, pears, and all vegetables. The higher lands of the valley are a light, loamy, and sometimes gravelly soil. This is easily cultivated, and adapted to all kinds of cereals and most varieties of fruits. The "warm belt" is a tract upon the slopes of the hills which environ the valley. It has an altitude of from 600 to 1,500 feet. It is generally, and in some localities wholly, free from frost. In this belt, to the east of Milpitas, potatoes, peas, tomatoes, asparagus, strawberries, etc., are grown through the winter for the San Francisco market.

Upon the Los Gatos and Guadalupe rivers, in the immediate vicinity of the city of San José, are hundreds of acres, formerly dense willow thickets, but now in the highest state of cultivation. These lands, known by the general name of "The Willows," are regarded as among the most desirable in the valley. They are dotted with lovely homes, surrounded by splendid orchards. The soil is a sedimentary deposit, easily cultivated, requiring but little irrigation, and producing every variety of fruit and vegetable common to California. In the southern portion of the valley the soil is especially productive, and some of the most successful dairies in the State are established there. The more elevated portions are well adapted to fruits and vines. So wide is the divergency in the character of soil in different localities that agriculturists are reluctant to express an opinion as to comparative merits, each section having demonstrated its fitness for growing some of the almost endless varieties of fruits and vines, which are cultivated at almost fabulous profits. While there is no better soil in the world for the production of wheat and barley, the area devoted to the cultivation of these cereals is yearly decreasing, owing to the much greater remuneration obtainable from the growing of fruits, grapes, berries, and vegetables.

The valley is drained by a number of streams. In summer these watercourses greatly diminish, and the smaller ones wholly disappear. Having their sources in the surrounding hills, and sinking as they

approach the valley, they augment the subterranean supply of the artesian wells. These are all over the valley, usually from 60 to 100 feet in depth, though some find a larger and more permanent supply at a much greater depth. The water is raised by windmills into tanks, furnishing an ample supply for household and gardening purposes. The cities and larger towns are provided with reservoirs and waterworks.

Santa Clara is preëminently the horticultural county of the State. Every variety of fruit grown in California is produced, but the chief of all its horticultural pursuits is prune-growing. Of the prune crop of California, this county produces nearly two thirds. With improved facilities for marketing, this industry has, within the last ten years, assumed marvelous proportions. The largest fruit canneries in the world are operated at San José, the leading city of the county.

Olive-growing is assuming prominent proportions, and it is only a question of a few years when it will become one of the leading industries.

Almond culture is extensively followed, and the nut grows to perfection in both size and flavor.

Pears do exceedingly well, and grow in any part of the county. Large quantities are shipped East, and a considerable portion of the crop is canned or dried.

Apples, especially those raised in the foothills or on the mountain sides, are of a very superior flavor and size. The Alviso, Sunnyvale, and Mountain View sections, near the bay, in the artesian belt, are producing apples of splendid quality.

Apricots are grown and reach a high standard. The bulk of the crop is canned or dried, but a large quantity is shipped green, and, next to prunes, is the important fruit industry.

The peach is largely cultivated, and much of the crop is canned or dried, though a considerable portion is shipped green.

The cherry grows in profusion. It is one of the best shipping fruits in the county, and is profitable.

While the culture of citrus fruits is not extensively carried on, those grown compare favorably, as to flavor and size, with any in the State.

Grapes flourish, particularly the wine varieties, and many new vineyards have been planted. The outlook for this industry is bright. The product of the vineyards finds a ready sale to the numerous wineries throughout the county.

Berries of every description are grown, and the crop is prolific.

Vegetable farming is increasing, and great quantities of all kinds are shipped to the San Francisco market. Asparagus, in particular, is one of the most profitable vegetables grown. Many tons are shipped green, and several hundred tons are canned directly for the Eastern market.

The raising of seed, both flower and vegetable, is on a very extensive scale, and large quantities are shipped to all parts of the world. Santa Clara has upward of 9,000 acres in seed farms, over 3,000 acres being devoted to the growing of onion seed alone.

The dairy interest is worthy of mention. The butter and cheese yield is of a high standard, and the product is of superior quality. There are several up-to-date creameries in operation.

Poultry-raising, in all its branches, receives considerable attention, and is a profitable industry. Some of the finest chicken yards, stocked with the choicest birds, are located in the county.

The raising and feeding of cattle for market is not, owing to the

increased value of land, carried on as extensively as in former years. Natural grasses are on the remaining ranges, and very nutritious pasturage can be obtained the year round.

San José is the county seat; it has fine educational establishments. Palo Alto is a rapidly growing town. The Leland Stanford Junior University is located there. Sunnyvale, between Palo Alto and Santa Clara, is a growing town, and is a coming industrial city, having been selected for one of the best equipped medium-heavy and light machinery manufactories in the world, and also for the Western branch of one of the largest breakfast manufacturing concerns in the United States. Gilroy, Santa Clara, Mayfield, Los Gatos, and Saratoga are prosperous, as are many other of the smaller towns.

STATISTICS OF SANTA CLARA COUNTY FOR 1905.

General.

Area, 1,355 square miles, or 867,200 acres	Road levy per \$100, 1905	40 cts.	
Number of farms	23,000	Value of county buildings	\$833,050
Number of acres assessed	727,906	Irrigating ditches — miles, 96; cost	\$14,400
Value of country real estate	\$21,873,405	Railroads, Steam—miles, 112.6; assessed value	\$1,565,738
Of improvements thereon	\$7,166,755	Electric—miles, 48.90; assessed value	\$365,975
Of city and town lots	\$12,596,750	Electric power plants, 1; assessed value	\$175,600
Of improvements thereon	\$8,098,125	Electric power lines — miles, 1,967; assessed value	\$33,085
Of personal property	\$5,577,590		
Total value of all property	\$55,285,625		
Amount expended on roads	\$129,114		
Amount expended for bridges	\$14,234		
Number of miles of public roads	930		

Cereal Products and Hay.

	Acres.	Tons.	Value.		Acres.	Tons.	Value.
Wheat	600	300	\$9,000	Corn	70	100	\$2,800
Barley	10,800	8,000	168,800	Grain hay	8,000	12,000	96,000
Oats	625	300	78,000				

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.		Bearing.	Non-Bearing.	Total.
Apple	16,900	38,100	55,000	Plum	10,000	625	10,625
Apricot	527,950	9,675	537,625	Prune—			
Cherry	127,400	21,540	148,940	French	3,890,100	357,220	4,247,320
Fig	1,345	579	1,924	Other kinds	48,450	38,220	86,670
Lemon	365	705	1,070	Quince	2,320	420	2,740
Nectarine	755	415	1,170	Almond	15,190	5,140	20,330
Olive	9,370	4,825	14,195	Walnut	9,325	2,720	12,045
Orange	930	875	1,805	Grapes (acres)	2,668	2,725	4,393
Peach	572,400	38,100	610,500	Table (acres)	213	205	418
Pear	122,220	15,850	138,070	Wine (acres)	2,455	2,520	4,975

Fruit, Vegetables, Nuts, Etc.

Green.			Dried.		
	Pounds.	Value.		Pounds.	Value.
Apples	300,000	\$56,250	Almonds	120,000	\$3,680
Apricots	55,000,000	550,000	Apricots	7,500,000	562,500
Asparagus	1,200,000	40,000	Beans	3,000,000	75,000
Cherries	4,800,000	240,000	Onions	2,625,000	16,250
Figs	137,500	4,125	Peaches	6,000,000	420,000
Grapes—Table	1,200,000	60,000	Walnuts	233,125	6,990
Lemons (boxes)	910	800			
Nectarines	3,770	377			
Oranges (boxes)	2,325	1,160			
Olives	460,000	10,350			
Pears	12,000,000	160,000			
Peaches	30,000,000	300,000			
Peas	600,000	15,000			
Plums	325,000	7,500			
Potatoes—Irish	1,725,000	17,250			
Prunes—French	100,000,000	1,350,000			
Quinces	200,000	2,000			
Tomatoes	9,750,000	30,000			

Canned.		
	Cases.	Value.
Apples	7,000	\$21,000
Apricots	200,000	400,000
Asparagus	5,000	15,000
Blackberries	12,000	24,000
Cherries	12,000	42,000
Grapes—Table	20,000	40,000
Pears	170,000	525,000
Peaches	300,000	600,000
Peas	7,000	28,000
Plums	100,000	200,000
Tomatoes	175,000	262,500

Poultry and Eggs.

	Dozen.	Value.		Dozen.	Value.
Chickens	18,550	\$55,650	Turkeys	200	\$3,600
Ducks	2,000	8,000	Eggs	60,000	9,000
Geese	200	2,400			

Dairy Industry.

	Production.	Value.
Butter	192,380 lbs.	\$38,476
Cheese	832,625 lbs.	66,610
Cream	26,225 gals.	32,780

Dairies, 54. Creameries, 5. Cheese factories, 15.

Livestock Industry.

	Number.	Value.		Number.	Value.
Cattle—Beef	2,000	\$70,000	Swine	4,550	\$10,200
Stock	16,250	254,000	Horses—Thoroughbred	97	19,400
Thoroughbred	380	19,000	Standard-bred	230	32,200
Dairy Cows—Graded	1,755	70,200	Common	11,900	357,000
Herefords	70	3,500	Colts	2,050	30,750
Holsteins	75	3,750	Sheep—Common	1,525	4,575
Jersey	40	2,000	Lambs	340	680
Shorthorns	195	9,750	Goats—Angora	105	525
Calves	4,065	32,500	Common	345	345

Manufactories.

	Number.	Number of Employees.	Quantity Produced.	Value of Product.
Bookbinderies	2	40	---	\$58,000
Boxes—Wood	3	41	7,500,000 ft.	167,000
Brick	4	150	30,000 M	225,000
Brooms	1	1	780 dozen	2,730
Carriages and wagons	13	72	---	103,000
Cigars	9	49	1,780 M	69,120
Coffee, spices, etc.	2	7	---	100,605
Confectionery	11	23	---	83,230
Cooper-shops	3	19	14,000	28,500
Olive oil	---	---	11,000 gals.	33,000
Slaughter-houses	21	63	---	900,000
Hides	---	---	600,000 lbs.	66,000
Lard	---	---	25,000 lbs.	2,000
Tallow	---	---	22,500 lbs.	675
Furniture	5	10	---	11,340
Leather goods	13	17	---	55,690
Planing-mills	11	600	---	1,000,000
Potteries	1	14	---	25,000
Soap	1	1	42,000 lbs.	1,520
Stone—Artificial	1	10	287,000 sq. ft.	91,000
Granite and marble	6	48	---	220,000
Sandstone	1	80	100,000 sq. ft.	50,000
Tanneries	2	125	---	391,500
Tin and galvanized iron	4	45	---	134,670
Wood turning and carving	1	1	---	2,000
Woolen-mills	1	90	---	150,000
Ice	2	20	30,000 tons	180,000
Petroleum	1	12	59,450 bbls.	18,000
Quicksilver	2	---	3,880 flasks	155,200
Other manufactories	49	392	---	3,287,955

Products of Forests.

The forest area is 60,000 acres, divided as follows: 50,000 acres oak, valued at \$500,000; 10,000 acres redwood, valued at \$30,000. The output is fuel wood, 5,000 cords, worth \$25,000; shingles, 1,000,000, worth \$1,500; sash and door factories, 6, with an output worth \$70,000.

Wines, Brandies, Etc.

In the county are 50 wineries, 11 distilleries, and 6 breweries, with an output of 250,000 bottles of champagne, worth \$250,000; dry wines, 750,000 gallons, worth \$187,000; sweet wines, 25,000 gallons, worth \$25,000; brandy, 25,000 gallons, worth \$27,500; alcohol, 1,500,000 gallons, worth \$1,850,000; and 98,569 barrels of beer, worth \$690,053.

Miscellaneous Products.

There are 102 acres of flowers and plants, valued at \$53,000; garden and flower seed farms, 5,000 acres, output 2,800,000 pounds, valued at \$500,000; sugar beets, 2,000 acres, output 36,000 tons, valued at \$180,000.

The figures giving exports from the county are not reported.

SAN MATEO COUNTY.

San Mateo County is 5 miles wide where it adjoins the City and County of San Francisco. To the southward it rapidly widens, and attains a width of 20 miles in the center, and much over that distance at its southerly line. Its length is 42 miles on a straight center line. It has a frontage of 65 miles on the Pacific Ocean, and 35 miles on the bay of San Francisco. Its frontage on the bay is a gradual slope from the foothills of the Santa Morena range to tidewater. San Mateo County covers the larger part of the peninsula which bounds the bay of San Francisco on the southwest, being separated from the Golden Gate only by the city of San Francisco. The Coast Range, which runs through the west of the county, has at the southern line a width of fully 9 miles of broken and semi-detached ranges, and an average altitude of about 2,500 feet.

The topography governs the climate. The Santa Cruz Mountains continue their course through the county. They trend to the northwest, and at a point 14 miles from the straits through which the waters of the Pacific Ocean flow into the bay of San Francisco, they rapidly fall in height, and seem to lose themselves in the ocean. From this point to the south side of the Golden Gate the face of the ground is broken into low, rolling hills and sand dunes of variable heights. South of the point of the peninsula the mountains rise rapidly, attaining a height of 2,500 feet above the level of the sea. This range turns the current of the sea breeze, and holds back the fog which crawls up the slope and banks itself along the summit, as though it had become entangled in the trees and shrubs which crown the crest. This mountain fog bank is the condensed freshness of the sea, out of which a cool breeze flows down the easterly slope of the range to the bay shore, cooling the atmosphere without the inconvenience of the propelling winds or actual contact with the fog. In other words, the air, warmed by the morning sun, rises up and checks the fog, while a cool breeze flows down the slope to replace it.

The soil is generally a warm, sandy loam, with an admixture of adobe in some places. There are about 23,000 acres of salt-marsh land on the bay side.

The great interests are dairying and vegetable-growing for the San Francisco market. Orchards, up to within a few years ago, were confined practically to the "family orchard" for home use, but are now being set out, and fruit is grown for market, being found very profitable. Berries are coming to the front as a good paying crop, and the acreage is being increased very materially. Owing to the nearness to market, and adaptability of soil and climatic conditions, they are one of the best paying crops.

The olive has passed the experimental stage and been proven a paying product, and olive oil has been on the market for some time, and is considered equal to the best imported grade.

Cut flowers and potted plants yield a good revenue. This county is now furnishing the major portion of the cut flowers to the florists of San Francisco. Raising of flowers is not confined to greenhouses, but, owing to mildness of climate, they are successfully cultivated out of doors.

A large amount of butter and cheese is manufactured for the San Francisco market, and thousands of gallons of milk are daily shipped to that city. There are a number of large dairies famous for their output. Most of the dairying and manufacture of butter and cheese is carried on in the coast section, and the products shipped to the metropolis by sea. Creameries are in successful operation at Pescadero and Halfmoon Bay, and in other portions of the county.

Stock-raising, on the grazing lands of the mountain ranges, is another profitable industry. There is practically no export of stock raised, as the packing works at South San Francisco, in the county, buy up the supply and it is exported as a finished product.

Considerable capital is invested in the raising of high-class light-harness and superior carriage horses.

Poultry-raising pays. Heretofore this industry had been merely an adjunct to the general farm and orchard, but the returns have been so satisfactory that poultry ranches are being started in several places, and past experience and future outlook fully warrant capital being invested in this enterprise.

It is surprising to find as extensive a tract of virgin timber so near a large city as exists in this county. In the extreme southwestern portion, in what is termed the Big Basin, there are estimated standing 100,000 acres of redwood, of great size, rivaling, in some cases, the gigantic sequoias of the Sierra Nevada.

Oil has been discovered in paying quantities near Halfmoon Bay; it is of high grade, with a paraffine base.

STATISTICS OF SAN MATEO COUNTY FOR 1905.

General.

Area.....	477 square miles, or 305,280 acres	Number of miles of public roads	721
Number of farms.....	638	Road levy per \$100, 1905.....	49.2 cts.
Number of acres assessed.....	295,540	Value of county buildings.....	\$21,000
Value of country real estate.....	\$8,583,580	Railroads, Steam—miles, 25.1;	
Of improvements thereon.....	\$3,017,090	assessed value.....	\$376,500
Of city and town lots.....	\$2,333,145	Electric—miles, 14; assessed	
Of improvements thereon.....	\$1,197,640	value.....	\$153,100
Of personal property.....	\$2,790,495	Electric power plants, 2; assessed	
Total value of all property.....	\$17,921,950	value.....	\$36,500
Amount expended on roads.....	\$73,856.21	Electric power lines—miles, 30;	
Amount expended for bridges.....	\$25,978.23	assessed value.....	\$15,000

Cereal Products and Hay.

	Acres.	Tons.	Value.		Acres.	Tons.	Value.
Wheat.....	1,115	837	\$25,110	Corn.....	132	55	\$1,650
Barley.....	4,208	3,156	75,744	Grain hay.....	13,400	28,000	252,000
Oats.....	6,354	4,764	135,392				

Fruit, Vegetables, Nuts, Etc.

	Pounds.	Value.		Pounds.	Value.
<i>Green.</i>			<i>Green—Continued.</i>		
Apples.....	710,950	\$14,219	Potatoes—Irish.....	2,706,600	\$27,066
Apricots.....	800	40	Prunes—French.....	300	15
Asparagus (boxes).....	950	665	Quinces.....	540	11
Blackberries.....	1,000	150	Strawberries (cases).....	4,000	40,000
Beets.....	2,400,000	8,400	Tomatoes (boxes).....	1,840	1,104
Cabbage.....	2,500,000		Walnuts.....	600	30
Corn.....	168,000	14,200			
Pears.....	1,800	36	<i>Dried.</i>		
Peaches.....	1,325	40	Beans.....	1,294,540	\$51,362
Peas (boxes).....	2,400	960	Corn.....	70,000	1,050
Plums.....	300	9	Onions.....	19,000	570

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.		Bearing.	Non-Bearing.	Total.
Apple	32,500	4,000	36,500	Prune—French	30,000	—	30,000
Apricot	12,500	—	12,500	Other kinds	500	150	650
Cherry	1,350	200	1,550	Almond	600	—	600
Pig	1,000	—	1,000	Walnut	750	20	770
Lemon	110	40	150	Other Nuts	250	—	250
Olive	9,550	—	9,550	Grapes	250	—	250
Orange	200	—	200	Table	50	—	50
Peach	1,200	—	1,200	Wine	200	—	200
Pear	4,000	150	4,150	Blackberries	25	—	25
Plum	200	50	250	Currants	12	—	12
Quince	50	10	60	Strawberries	120	—	120

Livestock Industry.

	Number.	Value.		Number.	Value.
Cattle—Beef	840	\$25,200	Swine	6,145	\$36,870
Stock	3,526	88,150	Horses—Thoroughbred	18	9,000
Dairy Cows—Graded	14,960	374,000	Common	2,146	128,760
Holsteins	460	18,400	Colts	320	6,400
Jersey	240	7,200	Sheep—Common	1,630	8,150
Shorthorns	240	7,200	Lambs	320	800
Calves	8,760	43,800	Wool (pounds)	7,856	1,347

Poultry and Eggs.

	Dozen.	Value.		Dozen.	Value.
Chickens	6,470	\$25,870	Turkeys	64	\$896
Ducks	161	729	Eggs	159,426	31,885
Geese	50	600			

Number of poultry farms, 23.

Dairy Industry.

	Production.	Value.		Production.	Value.
Butter	249,629 lbs.	\$49,925	Cream	47,165 gals.	\$11,791
Cheese	789,354 lbs.	78,935	Milk	1,781,500 gals.	231,595

Dairies, 169. Creameries, 3.

Forest Products.

	Amount.	Value.		Amount.	Value.
Area of timber lands—			Pickets (pieces)	21,000	\$420
Redwood (acres)	25,000	\$1,250,000	Posts (pieces)	30,000	3,000
Sawmills (number)	5	75,000	Shakes	60,000	660
Fuel, wood (cords)	1,850	8,345	Shingles	13,500,000	27,000
Lumber—Redwood (ft.)	15,000,000	180,000			

Power used—Steam, 16; electrical, 14.

Manufactories.

	Number.	Number of Employés.	Quantity Produced.	Value of Product.
Confectionery	2	3	9,000 lbs.	\$2,700
Cigars	3	4	291,000	12,400
Leather goods	4	199	—	1,197,845
Hides	—	283	3,349,000 lbs.	200,940
Lard	—	—	6,700,000 lbs.	536,000
Meat packed	—	—	2,313 tons	—
Tallow	—	—	7,237 bbls.	140,035
Slaughtering and meat-packing plant	1	450	—	—
Sewer pipe, etc.	—	—	450,000	60,000
Planing-mills	3	32	18,000,000 ft.	140,000
Potteries	1	100	450,000 ft.	60,000
Salt	4	72	19,500 tons	39,000
Tanneries	4	199	237,489 sides	1,197,845
Paint and white lead works	1	250	—	—
Steel works	1	100	—	—

Productions Shipped Out of County.

	Amount.		Amount.
Asparagus	720 boxes	Packed meats and by-	
Beans	1,700,000 lbs.	products	2,000 tons
Cabbage	1,170 tons	Swine	4,362
Onions—Dried	14,500 lbs.	Butter	190,409 lbs.
Green	1,750 boxes	Cheese	788,254 lbs.
Potatoes—Irish	20,000 sacks	Barley	876 tons
Tomatoes	1,250 boxes	Hay	3,712 tons
Apples	17,500 boxes	Oats	14,350 tons
Blackberries	75 cases	Wheat	865 tons
Prunes—French	150,000 lbs.	Wine—Table	10,000 gals.
Strawberries	4,000 cases	Lumber	11,500,000 ft.
Cattle	250	Chickens	3,800 doz.
Hides	2,800,000 lbs.	Eggs	125,000 doz.
Horses	60	Cigars	145,000

SANTA CRUZ COUNTY.

Santa Cruz County fronts its entire length on the Pacific Ocean. It lies midway between Oregon and Lower California, and is in the heart of Central California. It is separated from San Mateo and Santa Clara counties by the Santa Cruz Mountains, and from Monterey by the Pajaro River. It is one of the smallest counties, and comprises a narrow strip of mountainous land about 40 miles long and 18 broad, forming a vast amphitheatre, and sloping from the summits of the Santa Cruz range, whose highest elevation, Loma Prieta, is 4,000 feet, southward and westward to the bay of Monterey.

The curving line of shore and the corresponding curve of the mountain line inclose an irregular, crescent-shaped tract of country, with an average width of 20 miles, which for grandeur, beauty, and variety of scenery equals any expanse of similar size in the world. The sides of the mountains are closely set with forests of pine, redwood, madrone, and other trees, the redwoods having, in many cases, attained gigantic growth. A number of streams rise in these hills, and bring down the rich alluvial loam into the valleys, which, in their normal condition, teem with native grasses and flowers, and when cultivated yield phenomenal results. These streams are, agriculturally as well as topographically, an important feature, watering as they do every section of land. Besides these, natural springs are innumerable. Nearing the coast, there are many interesting topographical features. The leagues of wide, high, wind-swept grassy plateaus which form remarkable grazing and dairy lands; the succession of chalk terraces; the broad amphitheatrical valley of the Pajaro; the salt lagunas, picturesque in configuration and surrounded by park-like groves of live oaks; the high sandstone cliffs along the shore; the magnificent ocean drives—all are materials for pleasant investigation.

Along the coast line, a series of raised benches form a strip of elevated land. This widens to the south of the city of Santa Cruz, and affords a large area of fruitful soil, which has been brought into a high state of cultivation. From Santa Cruz City south the soil consists of a light loam, abounding in lime, potash, and phosphoric acid. In the Pajaro Valley there is a great variety, from the rich sedimentary alluvial wash to the light sandy soil of the foothills. In the lower part of the valley a clayey loam predominates. This is followed by a heavy adobe higher up, and then the dark, reddish loam of the plains. The latter is the favorite with fruit-growers, and it is here that flourish the best orchards.

The average annual rainfall, taken from a record of thirty-two consecutive years is 25.26 inches, showing that this is a well-watered district.

The charm of Santa Cruz is her infinite variety. In lumber products she ranks third in the State. Her butter, cheese, and cream might well win her a place in the dairy districts. Hay, grain, potatoes, and the whole range of cereals and vegetables give enormous yields, and

while she does not claim to wear the citrus belt, yet oranges are raised for home consumption, and the cultivation of the lemon is a profitable business, since the immunity from frosts and the equable seasons favor its arriving at fine maturity. But her deciduous fruits, large and small, her table and wine grapes, her fine wines, are winning renown. From the summits of the range, more than 2,000 feet above the sea, down to the wide and fruitful valleys along the coast, grow and flourish delicious fruits. Prunes, pears, apricots, lemons, peaches, cherries, Japan and native plums, figs, walnuts, persimmons, olives, and nectarines thrive, but the crop of the largest profit is that of apples. The quality and size are astonishing, and the yield as much so. From Bellflowers in September to Newtown Pippins in December the supply is steady. From two depots, in a late season, there were shipped to Eastern points, exclusive of other sales, 420,000 boxes of apples, weighing 21,000,000 pounds. The market for apples extends to England and the Continent, Germany being a large buyer. The especial home of the apple, as well as of the strawberry, is the fertile valley of the Pajaro River, and the flavor and color of the foothill apples are renowned.

Of the small fruits, the strawberry is most widely grown, and furnishes a practically continuous crop. Raspberries, blackberries, Japanese wineberries, and the loganberry, which originated in Santa Cruz, yield unfailing crops. The loganberry is a cross between the wild blackberry and the Antwerp raspberry, and fruits in two varieties, red and black. The berry is large and luscious, and is grown widely in the Eastern-Southern States, as well as in California.

The wines of this county are winning the place they deserve, and the product of our vineyards is shipped to the heart of the wine countries of Europe.

The sugar-beet industry is profitable. A large acreage in the southern part of the county is devoted to the growth of the beets.

Potatoes yield phenomenally in the rich bottom lands; asparagus is grown for outside markets; hops and beans are each good enough in results for farmers to give them special attention.

Market gardening is profitable, and many comparatively small industries are making a good living for those who follow them. Among these are cucumber-growing for San Francisco and Eastern cities; seeds, bulbs, and cut flowers for metropolitan markets.

Dairying is a flourishing and profitable interest, and the fifty thousand and more acres of grazing lands have for years supported herds of well-selected stock. The grasses are rich, and the county's products of cream, milk, butter, and cheese have a good repute at home and abroad. A typical dairy and creamery farm lies just north of the city of Santa Cruz.

The poultry interest needs fostering all over California. While Santa Cruz produces and ships many eggs, the business might easily be increased many hundred per cent, especially as not enough chickens and turkeys are raised to supply the home market.

The deep-sea fisheries are important factors, and here again is room for indefinite expansion. The waters of the bay teem with food fish, the pools and rocks along the shore support quantities of shell-fish, and the streams that come down to the ocean and bay are the home of the mountain trout.

Many industries have developed to the profit-producing point, and the general air of thrift and prosperity is satisfactory. Redwood lumber is durable, not inflammable, and capable of receiving a rich finish for interior and cabinet work. The output has been large for many years, but great tracts of forest remain, and the redwood is rapidly reproductive, giving promise that the supply shall be continuous. Many of the trees are giants of ancient growth, and it is not uncommon to see 35,000 feet of clear lumber cut from a single tree. The by-products of shakes, shingles, railroad ties, piles, telegraph poles, fruit-box shooks, pickets, posts, etc., are manufactured in large quantities. Eight varieties of oak grow, among them the chestnut oak, which supplies tanbark for the making of superior leather. The manufacture of powder, besides requiring redwood and oak for fuel, utilizes willow, alder, and madrone. Redwood, laurel, and madrone are all practically used as cabinet woods, and this industry is susceptible of an indefinite development, so numerous and varied are these products. Naturally, wood is the fuel in general use, and it is of the best quality and cheaper in Santa Cruz than in any Central California county. "Big Tree Grove" is but five miles from town, on the line of the railway in the cañon of the San Lorenzo. This is an ancient grove of giants, not the *Sequoia gigantea* of the Sierras, but the *Sequoia sempervirens*. It covers twenty acres, and numbers scores of trees from 10 to 20 feet in diameter, and a dozen or more which exceed that diameter and reach a height of 300 feet.

In the mountains near the coast there were discovered years ago deposits unique and strange in substance, which, under the name of bituminous rock, have proved of untold value as a natural pavement material. It has been used on the streets and sidewalks of Santa Cruz and other places for years, and when laid on a proper foundation is durable, clean, and elastic. It is a natural combination of bitumen, sand, and crude petroleum. It is shipped to all nearby cities, and goes as well to Salt Lake, Tacoma, Seattle, Phoenix, and to Honolulu.

Similar conditions exist regarding the vast deposits of high-grade lime rock throughout the mountains. Five kilns are in active operation, and many cargoes per month are shipped to distant points. The employes and their families, like those of the lumber mills, constitute populous little settlements.

Santa Cruz, Watsonville, Soquel, Aptos, Felton, Glenwood, and Boulder Creek are the principal towns.

STATISTICS OF SANTA CRUZ COUNTY FOR 1905.

General.

Area, 500 square miles, or 320,000 acres		Number of miles of public roads	458
Number of farms	1,765	Road levy per \$100, 1905	45 cts.
Number of acres assessed	258,926	Value of county buildings	\$162,500
Value of country real estate	\$4,117,85	Railroads, Steam—miles, 55.64;	
Of improvements thereon	\$1,491,610	assessed value	\$711,629
Of city and town lots	\$3,064,865	Electric—miles, 20½; assessed	
Of improvements thereon	\$2,212,505	value	\$39,985
Of personal property	\$1,569,415	Electric power plants, 2; assessed	
Total value of all property	\$12,455,780	value	\$45,320
Amount expended on roads	\$69,096	Electric power lines, assessed	
Amount expended for bridges	\$30,556	value	\$1,260

Cereal Products and Hay.

	Acres.	Tons.	Value.		Acres.	Tons.	Value.
Wheat	317	240	\$7,200	Corn	325	499	\$13,473
Barley	2,900	5,670	113,400	Alfalfa hay	225	1,188	9,170
Oats	2,700	3,221	64,420	Grain hay	7,420	17,035	170,350

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.		Bearing.	Non-Bearing.	Total.
Apple	286,810	285,630	572,444	Prune—French	105,914	11,097	117,011
Apricot	36,711	42,417	79,129	Other kinds	22,102	4,356	26,458
Cherry	18,016	37,019	55,035	Walnut	2,837	4,640	7,480
Fig	225	152	377	Table grapes	550	52	602
Lemon	102	81	183	Wine grapes	943	234	1,177
Olive	638	252	890	Blackberries	105	.....	105
Orange	140	89	229	Raspberries	23	.....	23
Peach	17,042	1,328	18,370	Strawberries	400	.....	400
Pear	15,853	3,196	19,049	Loganberries	211	.....	211
Almond	145	267	412				

Fruit, Vegetables, Nuts, Etc.

	Green.	Pounds.	Value.		Green—Continued.	Pounds.	Value.
Apples, merchantable	172,571,300	\$1,725,713		Peaches	1,551,800	\$26,380	
Apricots	3,137,500	47,000		Potatoes—Irish	12,214,500	122,145	
Asparagus	40,000	3,000		Prunes	456,600	9,132	
Blackberries	1,200,000	36,000		Raspberries	214,800	23,000	
Beans	2,260,700	48,400		Strawberries	8,754,600	262,620	
Beets—Sugar	32,000,000	72,000					
Cherries	1,660,700	70,852					
Grapes	2,533,000	61,478					
Onions	4,800,000	53,000					
Pears	858,950	8,589					

Wines, Brandies, Etc.

	Gallons.	Value.		Gallons.	Value.
Wine—Claret	304,150	\$45,622	Cider	41,000	\$6,150
Riesling	40,350	6,052	Vinegar	54,500	4,360
Beer (barrels)	6,200	37,200	Mineral water	44,422	22,236
Beer (bottles)	23,400	9,672			

Number of wineries, 12. Number of breweries, 3.

Livestock Industry.

	Number.	Value.		Number.	Value.
Cattle—Beef	920	\$18,400	Colts	234	\$4,355
Stock	1,746	22,295	Sheep—Common	1,529	4,500
Dairy Cows—Graded	4,422	110,550	Goats—Angora	970	2,710
Calves	273	1,365	Common	300	370
Swine	1,239	6,335	Mules	134	2,960
Horses—Thoroughbred	14	2,800	Jacks	10	.....
Standard-bred	3,449	104,615	Wool (pounds)	6,100	1,525
Common	1,301	27,220			

Poultry and Eggs.

	Dozen.	Value.		Dozen.	Value.
Chickens	3,230	\$16,150	Turkeys	180	\$360
Ducks	140	70	Eggs	310,100	77,525

Number of poultry farms, 14.

Dairy Industry—Fish.

In the county are 16 dairies, with an output of 338,000 pounds of butter, worth \$97,000; cheese, 335,000 pounds, worth \$33,500; cream, 4,500 gallons, worth \$9,000.
The fish output amounts to 2,652,034 pounds, worth \$79,562.

Manufactories.

	Number.	Number of Employees.	Quantity Produced.	Value of Product.
Boxes—Wood .....	.....	.....	550,000	\$32,800
Berry drawers .....	.....	.....	446,000	8,850
Cigars	2	10	670,000	26,800
Powder mills	1	201	279,840 lbs.	313,181
Lime	3	250	11,276,196 kegs	437,524
Paper	1	20	265,000 bbls.	291,500
Planing mills	3	45	1,200,000 lbs.	360,000
Soap	2	4	.....	220,000
Tanneries	1	50	165,900 lbs.	6,636
Limerock .....	.....	.....	1,250,000 lbs.	300,000
Bitumen .....	.....	.....	3,250 tons	4,062
Wood turning and carving	1	12	33,000 tons	74,250
			.....	11,000

Forest Products.

	Amount.	Value.		Amount.	Value.
Sawmills (number).....	9	-----	Posts (pieces).....	302,000	\$24,160
Fuel, wood (cords).....	66,659	\$299,961	Shakes.....	1,225,000	13,475
Lumber (feet).....	30,727,000	522,379	Shingles.....	8,161,000	13,058
Grape stakes.....	462,500	7,400	Tan bark (cords).....	3,646	58,336
Pickets (pieces).....	290,000	8,700			

Miscellaneous Products.

Santa Cruz County has 234 bee hives, worth \$729; hops, 120 acres, yield 180,000 pounds, worth \$36,000; sugar beets, 1,326 acres, yield 16,000 tons, worth \$72,000.

Productions Shipped Out of County.

	Amount.		Amount.
Apples.....	2,406,625 boxes	Butter.....	175,750 lbs.
Apricots.....	125,502 boxes	Cheese.....	290,000 lbs.
Blackberries.....	1,200,000 lbs.	Wine—Table.....	319,500 gals.
Cherries.....	165,000 boxes	Lumber.....	20,000,000 ft.
Grapes.....	2,413,000 lbs.	Shingles.....	3,150,000 ft.
Peaches.....	60,000 boxes	Shakes.....	979,000 ft.
Pears.....	12,950 boxes	Posts.....	220,000 ft.
Prunes—French.....	900,000 lbs.	Wood.....	25,000 cords
Other kinds.....	443,000 lbs.	Tanbark.....	946 cords
Raspberries.....	200,000 lbs.	Fish.....	2,150,000 lbs.
Strawberries.....	8,600,000 lbs.	Cigars.....	60,000 C.
Chickens.....	400 doz.	Lime.....	260,000 bbls.
Eggs.....	265,100 doz.	} Powder.....	805,366 lbs.
Beans.....	2,200,000 lbs.	} 285,237 kegs	
Sugar beets.....	32,000,000 lbs.	Leather.....	1,250,000 lbs.
Hops.....	100,000 lbs.	Limerock.....	3,250 tons
Onions—Dried.....	4,200,000 sacks	Bitumen.....	33,000 tons
Potatoes—Irish.....	54,180 sacks		

SHASTA COUNTY.

Shasta County is at the head of the Sacramento Valley. Its greatest length from east to west is 90 miles, and its greatest breadth from north to south 60 miles.

The mountains of the Sierra Nevada and Coast Range cover a large portion of the county on all sides except the south. They are rugged and lofty, rising more than 5,000 feet above the sea. On the east there are four peaks of special prominence. Lassen Peak, altitude of 10,577 feet, is timbered for two thirds of the way up; the others are bald, and usually covered with snow. Other peaks and buttes are numerous, and all indicate volcanic origin, as shown by extinct craters, cones, sulphur deposits, beds of lava, etc. Hot and boiling springs are of frequent occurrence. In the southern portion is a foothill region, half circular, forming the northern end of the Sacramento Valley proper, and embracing about 500,000 acres, the altitude of which is from 500 to 2,500 feet above sea-level. The southwestern portion of this region is a succession of rounded hills, varying in height from 50 to 200 feet, and the central and southern portion consists of table lands, varying in altitude from 500 to 700 feet. It has many narrow valleys.

Shasta is noted for the number and beauty of its streams. First in importance is the Sacramento River, flowing through the county from north to south; all but 20 miles is through a rocky cañon. The McCloud River, bursting from Mount Shasta's side, rushes through the mountains of the north in a southerly direction and empties into Pitt River. The most beautiful stream of the northeast is Fall River. In its meanderings it is 40 miles in length, and empties into the Pitt. Besides these larger streams there are a score of tributaries, while springs abound in the foothills and mountains.

The soil of the valleys is an alluvium, a rich sedimentary deposit, largely intermixed with disintegrated rock, and in some parts with a gravel. The usual color is light red or reddish brown. It is very fertile, and excellent for plums, prunes, pears, figs, and small fruits. The mesa lands bordering the valleys are of a sandy loam, with a large percentage of clay, and carrying in many portions, especially in the higher parts, considerable gravel and boulders. Fruit does well on these mesa lands. On the foothills is a red loam or clay, productive and adapted to berries. On the elevated plateaus of the north and northwest the soil varies from a black, sandy loam to a red loam or clay, while to the southwest the soil is generally adobe, productive of grain and rich in natural grasses.

Irrigation is unnecessary for most crops, as the rainfall is sufficient. The rainy season begins in September and extends, at intervals of two or three weeks, from that time until May. During this time the ground is thoroughly saturated with moisture, and the rainy period covers the entire growing season. At the end of the wet season grains, grasses, etc., are ready for the harvest, and fruits, grapes, etc., are beginning to ripen.

Beautiful resorts and health-giving springs abound. The high mountains are heavily timbered with sugar pine, cedar, fir, and other valuable timbers. There are some large valleys and extensive plateaus, mostly devoted to general farming, stock-raising, and wool-growing. The foothills are more or less timbered with oak and pine, and their higher portions yield all kinds of minerals and stone—gold, silver, copper, iron, platinum, quicksilver, lead, marble, sandstone, limestone, coal, onyx, etc.—affording also opportunities for lovely homes to the small farmer, fruit-grower, stock-raiser, poultryman and gardener. The climate is pleasant; not extremely hot in summer nor cold in winter. The valleys are fertile and capable of producing all things grown in the temperate or semi-tropical regions. At certain altitudes, crisp and luscious apples are produced, and the quantity and quality can not be surpassed.

Shasta orchards are a success, producing heavy crops and of the best quality. The prune, peach, pear, plum, apple, apricot, almond, fig, lemon, orange, and olive thrive. Grapes of wine, table, and raisin varieties have proven a success in the valley portions, and many gallons of wine are made and shipped to different parts of the country; so with raisins. Wheat, grass, and alfalfa are grown successfully. The markets are the best, as there is home consumption for everything produced except fruit, and hundreds of carloads in addition to the products raised here are shipped in annually, consisting mostly of grain, hay, butter, eggs, and vegetables. The homeseeker will find land adapted to grain-growing, hay-making, poultry-raising, or gardening at less prices than in the older settled portions of the State.

Stock-raising is an important factor. The mild winters in the lower altitude obviate the necessity of feeding, while the summer ranges in the mountains make it possible for the stock-raiser to keep his herd upon green feed the greater portion of the year.

The sawmills annually distribute thousands of dollars for labor. The Terry Lumber Company's mills are the largest in the county. They are connected with Bella Vista by flume, and there have planing-mills, yards and dryhouses, and a railway to the main line at Anderson. The wood camp is in the big bend of the Pitt, and has been sending thousands of cords of wood annually down the Pitt to the smelters. In the Shingletown country there are several large sawmills, and there have been graded about twenty-five miles of road for traction-engine work. Over this road, with engines, they transport their lumber to the railroad. At or near Whitmore there are also a number of sawmills. There are some large flouring-mills.

The resorts are numerous and easy of access.

Redding, the county seat, is one of the most beautifully located places on the Pacific Slope, commanding a view of both the Sierra and Coast ranges, with their lofty, snow-clad peaks, and an equally beautiful view of the Sacramento south and cañon north.

The next town in importance is Keswick, at the smelters of the Iron Mountain Company, six miles from Redding.

Shasta, once the county seat, is famous the State over for its former glory.

Anderson, on the California & Oregon Railroad, 12 miles south from Redding, is the chief shipping point for the fruit industry of the county.

The country surrounding the town is largely valley land, and thousands of acres of bearing orchards are tributary to it.

From a modest yield of \$623,000 in 1896, the value of the mineral product has increased to \$4,898,033 in 1904. When we take into consideration that but one other county is credited with a production of \$2,000,000 per year, and that no metal-mining county reaches even that figure, the preponderance of Shasta is at once apparent, and the county is classed with such districts as Butte, Montana, or Cripple Creek, Colorado.

While Shasta's preëminence in mineral production is largely due to the development in copper, her output in the more precious metals is very large; and the production of these metals as a by-product of the copper sulphide ores will, with the extension of the industry, exceed the present output many times.

With her production of about \$50,000,000 a year, it is reasonable to assume that within ten years' time Shasta County alone will produce as much in value as is credited to the entire State at present.

STATISTICS OF SHASTA COUNTY FOR 1905.

General.

Area, 4,050 square miles, or 2,592,000 acres	Number of miles of public roads	1,000
Number of farms	Road levy per \$100, 1905	40 cts.
Number of acres assessed	Value of county buildings	\$110,000
Value of country real estate	Irrigating ditches—cost	\$2,500
Of improvements thereon	Railroads, Steam—miles, 117.54;	
Of city and town lots	assessed value	\$1,753,595
Of improvements thereon	Electric power plants, 2; assessed	
Of personal property	value	\$90,000
Total value of all property	Electric power lines—miles, 119½;	
Amount expended on roads	assessed value	\$44,000
Amount expended for bridges	Number of acres irrigated	3,000

Cereal Products and Hay.

	Acres.	Tons.	Value.		Acres.	Tons.	Value.
Wheat	2,552	1,394	\$35,000	Alfalfa hay	912	2,300	\$16,000
Barley	12,000	8,065	193,000	Grain hay		3,000	30,000
Oats	315	120	4,000	Grass hay		5,000	60,000

Number of Fruit Trees and Vines.

	Bearing.		Bearing.
Apple	15,900	Plum	1,000
Apricot	500	Almond	3,000
Cherry	500	Walnut	250
Fig	800	Grapes (acres)	1,000
Lemon	250	Raisin (acres)	250
Olive	9,000	Table (acres)	100
Orange	800	Wine (acres)	650
Peach	25,000	Blackberries (acres)	25
Pear	26,926	Currants (acres)	15
Prune—French	70,000	Raspberries (acres)	8
Other kinds	6,500	Strawberries (acres)	40

Fruit, Vegetables, Nuts, Etc.

Green.	Pounds.	Value.	Green—Continued.	Pounds.	Value.
Apples	100,000	\$2,000	Strawberries	270,000	\$13,000
Apricots	15,000	300	Tomatoes	80,000	1,200
Blackberries	40,000	2,000			
Cabbage	100,000	2,000	Dried.		
Corn	125,000	935	Almonds	20,000	2,000
Cherries	12,500	600	Apples	10,000	1,000
Figs	100,000	1,000	Apricots	3,000	300
Grapes	500,000	5,000	Beans	30,000	1,050
Pears	1,000,000	18,000	Figs	10,000	400
Peaches	2,500,000	50,000	Onions	1,000	200
Plums	55,000	750	Pears	50,000	5,000
Potatoes—Irish	250,000	2,500	Peaches	200,000	14,000
Prunes—French	750,000	7,000	Prunes—French	500,000	9,000
Raspberries	3,000	300	Raisins	20,000	1,000
Raisins	30,000	600			

Wine, Etc.

There are 8,500 barrels of beer made in the county, worth \$34,000.
The output of wine is about 1,200 gallons, worth \$1,200.

Livestock Industry.

	Number.	Value.		Number.	Value.
Cattle—Beef	1,000	\$25,000	Colts	350	\$4,000
Stock	14,000	168,000	Swine	7,500	22,000
Dairy Cows—Graded	60	2,400	Sheep—Imported	10	80
Herefords	5	300	Common	20,000	40,000
Calves	3,000	16,000	Lambs	8,000	12,000
Horses—Thoroughbred	2	1,500	Goats—Common	11,500	23,000
Standard-bred	57	5,700	Wool (pounds)	140,000	14,000
Common	2,600	80,000			

Poultry and Dairy Industries.

In the county are 200 dozen chickens, worth \$800; 400 dozen turkeys, worth \$5,000; yield of eggs, 4,000 dozen, worth \$800.

Six dairies turn out 20,000 pounds of butter, worth \$5,000.

Forest Products.

	Amount.	Value.		Amount.	Value.
Area of timber lands (acres)	350,000	\$4,100,000	Lumber—Cedar (feet) ..	100,000	\$1,500
Sawmills (number)	11	40,000	Fir (feet)	8,000,000	60,000
Charcoal (tons)	1,080	-----	Sugar pine (feet)	5,000,000	120,000
Fuel, wood (cords)	1,600	3,200	Yellow pine (feet)	26,000,000	260,000
Laths (thousand)	100	250	Posts (pieces)	10,000	1,000
			Shakes (thousand)	300	1,200

Manufactories.

One brickyard, 40 employés; output, 3,500,000 brick, worth \$25,000.

Three cigar factories; 6 employés; output, 300,000 cigars, worth \$14,000.

Three flouring-mills; output, 12,000 barrels, worth \$48,000.

One iron foundry; 18 employés; output, 312 tons, worth \$25,000.

One limekiln; 20 employés; output, 7,510 barrels, worth \$7,750.

One match factory; 1 employé; output, 1,000 cases, worth \$900.

Hides, 150,000 pounds, worth \$6,000; lard, 32,000 pounds, worth \$2,240; tallow, 200 barrels, value not given.

Olive oil, 10,000 gallons, worth \$15,000.

Two planing-mills; 60 employés; output and value of same not obtained.

The county reports 45 acres of hops; output, 70,000 pounds, worth \$8,750.

Productions Shipped Out of County.

	Amount.		Amount.
Almonds	19,715 lbs.	Tomatoes	700 boxes
Apples	12,285 lbs.	Cattle	1,500
Blackberries	700 cases	Hides	12,000
Grapes	21,695 lbs.	Horses	750
Olives	4,000 lbs.	Sheep	5,000
Peaches	55,000 boxes	Swine	800
Pears	20,000 boxes	Wool	140,000 lbs.
Plums	49,910 lbs.	Beer	1,500 bbls.
Prunes	29,210 lbs.	Lumber	39,000,000 ft.
Raspberries	1,700 lbs.	Brick	3,200,000
Strawberries	16,000 lbs.	Cigars	3,500
Turkeys	15,000 lbs.	Lime	7,000 bbls.
Hops	70,000 lbs.	Olives—Pickled	12,000 gals

SIERRA COUNTY.

Sierra County has an area practically all mountainous. The altitude ranges from 2,000 to 8,600 feet, the highest elevation being that of the Sierra Buttes; but the bulk has an elevation of from 4,000 to 5,000 feet.

The main ridge of the Sierra Nevadas crosses the eastern part from south to north. Several spurs traverse the county from east to west, forming the watersheds of the four principal streams which make the drainage system of the western part. These streams consist of the Middle Yuba River on the south, the North Yuba near the center, and Cañon Creek and Slate Creek on the north; and in the eastern end the many streams that form the headwaters of the Feather and Truckee rivers. Of the peculiar topographical features are the expansive valleys and lakes lying among the loftiest peaks of the Sierras. The lakes vary from one eighth of a mile to three or four miles in length, most of them circular, and, considering their small size, remarkable for their depth. The important body of agricultural land is Sierra Valley. It extends over the boundary line into Plumas County, and is the largest and the most elevated of the valleys of the Sierras, being 4,750 feet above sea-level. It is 30 miles in length and 10 in width. This valley is particularly adapted to stock-raising and dairy purposes, and a fine quality of timothy and alfalfa hay is raised. There are several creameries in the valley, and a superior quality of butter is made, of which most is shipped to the outside. Considerable beef cattle are fattened for San Francisco and other markets; besides large shipments of sheep. The soil is a deep, black loam, largely admixed with rich vegetable mold, the result of ages of forest growth.

Since 1849 the principal industry has been gold mining. One hundred and ninety millions of dollars have been taken from its rivers, gravel deposits and quartz veins.

The greater portion is practically covered with a virgin belt of soft timber. The lumber cut runs into many millions of feet. The Floriston Paper Mill Company owns timber lands, and uses a large amount of Sierra county timber.

Population, according to census of 1900, was 4,017.

Average temperature, winter 47°, summer 72°; summer nights are pleasantly cool.

Annual rainfall, about 60 inches.

Character of agricultural soil: black loam, very rich.

The principal towns are: Downieville, Forest City, Sierraville, Loyalton, Sierra City.

Natural products: white, yellow, and sugar pine, fir, spruce, and cedar, livestock, fruit, berries, and garden truck.

Manufactured products: lumber, boxes, sashes, doors, etc., creamery butter.

Minerals: gold, iron, copper, asbestos, and lime.

Irrigation and power facilities are unlimited.

Transportation facilities: Boca & Loyaltan Railroad, Central Pacific Railway, Nevada-California-Oregon Railway, and Hobart-Mills Railroad. Communication facilities: Sunset Telephone Company, Western Union Telegraph Company, and Sierra Valley Telegraph Company.

Educational facilities: first-class common and grammar schools.

Health resorts: Campbell's Hot Springs, Webber, Independence, and Gold lakes.

Hunting and fishing abundant—trout, mountain quail, grouse, duck, snipe, deer, and bear.

STATISTICS OF SIERRA COUNTY FOR 1905.

General.

Area, 1,000 square miles, or 640,000 acres	Amount expended for bridges ..	\$3,000
Number of farms	Number of miles of public roads	300
Number of acres assessed	Road levy per \$100, 1905	44 cts.
Value of country real estate	Value of county buildings	\$14,000
Of improvements thereon	Irrigating ditches—miles, 6; cost	\$1,270
Of city and town lots	Railroads, Steam—miles, 29.48;	
Of improvements thereon	assessed value	\$149,171
Of personal property	Electric power plants, 4; assessed	
Total value of all property	value	\$3,500
Amount expended on roads	Number of acres irrigated	20,000

Cereal Products and Hay.

	Acres.	Tons.	Value.		Acres.	Tons.	Value.
Wheat	190	48	\$1,680	Alfalfa hay	480	1,350	\$8,775
Barley	267	125	3,750	Grain hay	720	684	4,104
Oats	240	123	3,850	Grass hay	13,036	14,400	86,400
Rye	80	9	270				

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.		Bearing.	Non-Bearing.	Total.
Apple	4,500	1,500	6,000	Plum	300	50	350
Cherry	150	50	200	Chestnut	30	10	40
Peach	280	35	315	Walnut	25	20	45
Pear	210	53	263				

Fruits, Vegetables, Nuts, Etc.

	Pounds.	Value.		Pounds.	Value.
Apples	80,000	\$2,400	Pears	6,000	\$90
Cabbage	20,000	500	Plums	800	24
Cherries	500	25	Potatoes—Irish	480,000	7,200
Onions	4,000	80			

Livestock Industry.

	Number.	Value.		Number.	Value.
Cattle—Beef	4,800	\$120,000	Horses—Common	800	\$32,000
Stock	6,500	130,000	Colts	100	3,000
Thoroughbred	160	9,600	Sheep—Common	2,440	7,500
Dairy Cows—Graded	3,100	45,000	Lambs	2,500	7,500
Calves	1,500	14,000	Goats—Common	80	160
Swine	500	3,000	Wool (pounds)	17,500	2,600

Beer.

Number barrels of beer made in county, 315, worth \$3,870.

Poultry and Dairy Industries.

The poultry products are 400 dozen chickens, worth \$2,000; 15 dozen turkeys, worth \$300; 250,000 dozen eggs, worth \$6,000.

Dairies, 55; creameries, 4. Output. 260,000 pounds of butter, worth \$52,000.

Forest Products.

	Amount.	Value.		Amount.	Value.
Area of timber lands (acres)-----	212,000	\$650,000	Lumber—Cedar (feet).....	135,000	\$16,000
Cedar (acres)-----	1,000	3,000	Fir (feet)-----	3,675,000	36,000
Fir (acres)-----	16,000	48,000	Sugar pine (feet)....	700,000	14,000
Sugar pine (acres)-----	8,000	48,000	Yellow and white pine (feet)-----	40,300,000	480,000
Yellow pine (acres)....	187,000	450,000	Logs (feet)-----	29,000,000	285,000
Sawmills (number)-----	12	84,000	Railroad ties (pieces)...	30,000	13,500
Fuel, wood (cords)-----	18,000	36,000	Sash and door factories (number)-----	1	800
Laths-----	500,000	1,800			
Shingles-----	1,400,000	4,000			
Power used—steam, 8; water, 4.					

Miscellaneous Products.

In the county are 120 men employed getting out shooks; output, 15,000,000, worth \$270,000.

The output of hides amounts to 40,000 pounds, worth \$8,000; lard, 6,000 pounds, worth \$480; tallow, 135 barrels, worth \$1,400.

Exports.

The county exported 3,000 cattle, 2,000 hides, 2,500 sheep, 17,500 pounds of wool, 130,000 pounds of butter, 30,000,000 feet of lumber, and 29,000,000 feet of logs.

SISKIYOU COUNTY.

Siskiyou is one of the northern counties. Its north line joins Oregon for 80 miles. Of its area, 1,000 square miles are valley, the remainder mountainous; however, among the mountains are hundreds of upland farms and stock ranches, well wooded and watered. It contains a large area of farming, mining, desert, swamp, and timber lands. The so-called desert lands are fertile when water can be applied, and for this object the Legislature ceded to the Federal Government all the lake lands along the boundary of the county and Oregon, where hundreds of thousands of acres will soon be reclaimed, by lowering the level of the lakes, using the water for irrigating the arid districts, and draining the swamp lands. This land will be open to homestead entry, and will make homes for thousands of settlers.

The mining section comprises the west half, and produces nearly a million in gold annually. There are deposits of iron ore, marble equal to the best, and sandstone in vast quantities that, owing to the lack of lime, is regarded as the best on the coast. In Scott Valley are large deposits of limestone and of granite.

It has been demonstrated that sugar-beets grow to perfection in Scott and Shasta valleys. The agricultural district lies chiefly in the central and eastern parts of the county. Timber is everywhere. There are thousands of sections that will cut from ten to twenty million feet of yellow and sugar pine, from trees that will produce logs from five to eight feet clear. Besides there is much red fir and cedar.

The Sierra Nevada and Coast Range mountains meet here, forming the head of the Sacramento Valley. The altitude ranges from 2,000 feet in the valley to 14,000 on the mountain peaks. There is a climate in places where snow seldom falls, and regions of perpetual snow. Such conditions make it one of the most scenic of the counties.

Many of the waterfalls have been harnessed for electrical power. The notable one is the plant at Fall Creek, where the Siskiyou Light and Power Company has the third largest electric plant in California, and stretched aluminum wires to all parts of the county, supplying cheap and abundant power.

The principal river is the Klamath, which drains almost the entire county, and flows into the Pacific Ocean at the border line between Humboldt and Del Norte. This stream is not navigable. It is a natural dumping-ground for the placer mines, its swift current carrying the tailings out to the ocean. Placer mining has been carried on along its watershed for more than fifty years, and yet nowhere is there any indication of the channel filling up.

The Southern Pacific Railroad passes through the county from north to south, entering at Dunsuir, where are located its roundhouse and machine shops. Sisson is a popular summer resort, as also is the Shovel Creek Hot Springs and mud baths, at Beswick. Hornbrook, the

most northerly town in California, is 8 miles from the State line. It is located in a fertile valley, near the Klamath River, surrounded by mountains, which contain valuable placer and quartz mines.

Yreka, the county seat, is the principal town. The courthouse and jail are splendid buildings. Two electric plants furnish light and power. The city owns its water system, and it is equal to any in the State, the water being filtered through banks of gravel.

The electric light plants will be the means of opening a number of rich gravel mines lying along the low creeks, too deep for hydraulicking, and too wet for drifting. With plenty of cheap and convenient power, dredges are being built to work this ground.

There are three large lumber mills at McCloud, with railroad from the main line at Upton. The Weed Lumber Company is another large concern. It has a railroad into the timber region. Lumbering is the principal industry, with mining and livestock a close second and third.

The mountain districts furnish splendid range nine months in the year for thousands of cattle. New gold mines are being discovered, and the old ones continue good with depth. The timber will last for a hundred years; lime, building stone, and marble quarries are being opened; railroads have been built; swamp lands have been drained, arid plains irrigated, and pasture lands have been converted into hop fields. All this, added to our present prosperity, our temperate climate, and natural advantages, promises for Siskiyou County a bright future.

STATISTICS OF SISKIYOU COUNTY FOR 1905.

General.

Area	6,048 square miles	Amount expended for bridges ..	\$11,580
Number of farms	900	Number of miles of public roads ..	1,000
Number of acres assessed	1,857,538	Road levy per \$100, 1905	40 cts.
Value of country real estate	\$6,918,500	Value of county buildings	\$75,000
Of improvements thereon	\$1,094,040	Irrigating ditches	200 miles
Of city and town lots	\$247,135	Railroads, Steam—miles, 146; as-	
Of improvements thereon	\$716,604	sessed value	\$1,532,724
Of personal property	\$1,490,685	Electric power plants and lines ..	
Total value of all property	\$10,607,793	5; assessed value	\$50,000
Amount expended on roads	\$40,297	Number of acres irrigated	5,000

Cereal Products and Hay.

	Tons.		Tons.
Wheat	5,000	Rye	25
Barley	500	Alfalfa hay	75,000
Oats	100	Grain hay	5,625

Fruits, Etc.

The output of apples was 300,000 pounds, worth \$6,000; peaches, 10,000 pounds, worth \$250; Irish potatoes, 3,000,000 pounds, worth \$25,000.

Livestock Industry.

	Number.	Value.		Number.	Value.
Cattle—Beef	4,000	\$100,000	Horses—Standard-bred	1,000	\$50,000
Stock	18,500	280,100	Common	1,200	36,000
Thoroughbred	8	400	Colts	260	26,000
Dairy Cows—Graded ..	2,500	62,500	Sheep—Common	6,800	17,000
Calves	5,000		Wool (pounds)	40,000	
Swine	10,000	30,000			

Poultry and Dairy Industries.

Poultry, 10,000 dozen all kinds, worth \$25,000.

Creameries, 11; output, 500,000 pounds of butter, worth \$100,000, and 30,000 pounds of cheese, worth \$2,800.

Forest Products.

The area of timber land is 2,000,000 acres, worth \$10,000,000. There are 35 sawmills. value not given: lumber cut, 160,000,000 feet. Steam power generally used.

Miscellaneous Products.

There are 1,200 bee hives, worth \$1,200; honey, 50,000 pounds, worth \$5,000; hops, 2,500 pounds, worth \$500.

Manufactories.

Lumber and boxes are the chief manufactured products. There is one small cigar factory; also, one small foundry; and butcher establishments enough to turn out 9,000 pounds of hides.

Mount Shasta and the famous Shasta Springs are in this county. The output of mineral waters is 750,000 gallons, valued at \$50,000.

SOLANO COUNTY.

Solano County is midway between the northern and southern extremities of the State. It is not exactly square, but about 40 miles from north to south, and averages almost as much east and west.

Swamp lands border on the Sacramento River and on Suisun and San Pablo bays. A large portion of the county—about two thirds—is valley, the remainder being foothills. The slopes and smaller valleys are noted for their early production of fruit and vegetables.

The soil varies from red gravel to black sandy loam; from barren patches of alkali to rich alluvium; and all classes of soil may be found. That of the swamp and overflowed lands is largely composed of decayed vegetable matter, admixed with sedimentary deposits. In the trough of Vaca Valley the soil varies from a sandy to a clayey loam, and sometimes to adobe. Throughout the hilly land to the east and northeast of Ulattis Creek it varies from sandy to clayey, according to the character of the parent formation. Experience has proved that the heavier soils are the best for pears, and the more sandy for peaches and apricots. In wells dug in this district, the surface soil varies from 1 to 10 feet in depth, beneath which sandstone, interstratified with shale, exists to a depth of about 200 feet.

Solano ranks among the leading horticultural counties, and during the past ten years has made wonderful strides. In climate and soil Solano is eminently adapted to horticultural pursuits, and the earliness and superiority of her fruit products have given her a national reputation. In Vaca Valley fruit and vegetables ripen and find their way to market in the early season. This valley is 12 miles long and 2 wide, and owes its advantages to elevation, location, and surroundings—the encircling hills protecting it from chilling winds, and the slopes giving to it the full benefit of the spring sunshine, while the deep, rich, fertile soil gives all the required constituents for plant life. Fruit-trains leave daily during the season for the East. The earliness with which fruits ripen in the Vaca and Pleasant valleys is attested by the fact that cherries are shipped early in April, and apricots early in May, with all others proportionately. Vegetables are grown in large quantities, and find a ready sale in the San Francisco market.

The chief fruit sections are Suisun, Vacaville, and Laguna, and the principal varieties of fruits grown are apricots, peaches, pears, plums, prunes, and table grapes. A large proportion of the crop is shipped green for table use.

The livestock and dairying interests are extensive and profitable.

Poultry interests are quite large and increasing every year, and a profitable field is open to this industry.

The tule land itself is but the richest soil in process of slow formation, and throughout its broad area, particularly along its border, may be found some of the best dairying sections of the State. But in the wheat ranches of the Montezuma Hills may be found a part of the 45,000 acres which go to make up eastern Solano, and which are about evenly divided into lowland and upland. Here the yield is large, and the production certain.

The grain sections of the county are rich by nature's gifts, and by the accumulations of her people. It is not every locality which can boast millionaires whose lives have been devoted to wheat-growing, but they can be found in this county.

In manufacturing Solano County is prominent, with the location of the navy yard at Mare Island, opposite Vallejo. In Benicia, in addition to the Government arsenal, there is an extensive manufactory of agricultural implements, also extensive tanneries which are continually being enlarged. The Bay Counties power line, which traverses Solano County transversely from the northeast to the southwest, furnishes Dixon, Elmira, Vacaville, Suisun, Fairfield, Cordelia, Benicia, and Vallejo a potentiality that surpasses Holyoke or Fall River as manufacturing centers. It is being taken advantage of north of Suisun by an extensive plant for making cement. Benicia is a former State capital, as was Vallejo, has a population of several thousand, a climate that is cool and exhilarating, and is an attractive residence location tributary to San Francisco.

Vallejo is the metropolis of the county. It is a money city. It is a progressive city. Its people are up and doing. They have abundant faith in public utilities, and they practice it as well. The spirit of self-reliance predominates. It is coming to be a city of homes. Located on a magnificent waterway, and built on hills that lend grandeur to the view; with a climate that is balmy with the rigor of sea air, equable in its character, and practically free from fogs, Vallejo is an ideal residence city. There is an air of stability in its physical make-up. Ever since the Mare Island Navy Yard, its chief dependence, was taken from a political and placed upon a civil-service basis, thus insuring retention of employes regardless of changes in national administrations, Vallejo has been advancing. One good thing has led to another as the result of this policy, and not the least meritorious is the confidence it gives the people to engage in business for themselves. It owns and operates its own water works. The system is a gravitation one, the water being brought to the city from the mountains, 15 miles distant in a direct line. No city in the State has better results or better water. In the meantime, the city has constructed a most perfect sewer system, put down substantial sidewalks, has bituminized streets, and has many hundreds of new and modern cottages that make for attractiveness. Its latest move is to secure the construction of electric railroads that are to connect Benicia, in this county, and Napa and St. Helena, in Napa County. The large plant at Mare Island is to-day equipped with the finest machinery for the construction of men-of-war.

STATISTICS OF SOLANO COUNTY FOR 1905.

General.

Area.....	911 square miles, or 583,000 acres	Road levy per \$100, 1905	40 cts.
Number of farms.....	2,900	Value of county buildings	\$60,000
Number of acres assessed	518,777	Railroads, Steam—miles, 73.45; assessed value	\$1,101,750
Value of country real estate	\$9,869,554	Electric—miles, 350; assessed value	\$8,000
Of improvements thereon	\$1,692,649	Electric power plants, 6; assessed value	\$125,000
Of city and town lots	\$1,269,133	Electric powerlines—miles, 117½; assessed value	\$95,850
Of improvements thereon	\$2,715,929	Number of acres irrigated	1,000
Of personal property	\$2,359,950		
Total value of all property	\$19,022,984		
Amount expended on roads and bridges	\$75,380		
Number of miles of public roads	650		

Cereal Products and Hay.

	Acres.	Tons.	Value.		Acres.	Tons.	Value.
Wheat.....	134,560	21,467	\$601,076	Corn.....	635	200	\$6,400
Barley.....	55,840	30,047	450,675	Alfalfa hay.....		5,000	32,500
Oats.....	7,300	1,049	31,470	Grain hay.....	26,750	40,000	320,000

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.		Bearing.	Non-Bearing.	Total.
Apple.....	2,350	-----	-----	Prune—French	265,570	-----	-----
Apricot.....	34,175	-----	-----	Other kinds	101,540	-----	-----
Cherry.....	35,680	-----	-----	Almond.....	90,160	-----	-----
Fig.....	5,515	-----	-----	Walnut.....	3,870	-----	-----
Lemon.....	2,040	-----	-----	Table grapes	-----	-----	-----
Nectarine.....	3,540	-----	-----	(acres).....	500	-----	-----
Olive.....	2,960	-----	-----	Wine grapes	-----	-----	-----
Orange.....	335,640	-----	-----	(acres).....	1,280	365	1,645
Peach.....	204,730	-----	-----				

Fruit, Vegetables, Nuts, Etc.

<i>Green.</i>	Pounds.	Value.	<i>Dried.</i>	Pounds.	Value.
Apples.....	10,000	\$100	Almonds.....	1,718,300	\$214,787
Apricots.....	5,909,019	88,635	Apricots.....	9,526,000	762,080
Blackberries.....	175,000	7,000	Blackberries.....	6,906,250	207,187
Chestnuts.....	105,000	2,250	Figs.....	524,800	13,120
Cherries.....	828,200	124,230	Nectarines.....	33,000	3,960
Figs.....	5,000	250	Onions.....	20,600	500
Grapes—Table.....	2,553,618	153,216	Pears.....	456,000	36,480
Grapes—Wine.....	4,544,000	45,440	Peaches.....	5,118,000	409,440
Nectarines.....	6,000	450	Plums.....	44,000	3,520
Oranges (boxes).....	300	600	Prunes—French.....	4,353,835	152,384
Pears.....	16,100,822	503,151	Other kinds.....	761,500	22,845
Peaches.....	8,480,328	127,200	Apricot kernels.....	364,000	16,380
Peas.....	27,500	1,100			
Plums.....	11,106,104	222,120	<i>Canned.</i>	Cases.	Value.
Potatoes—Irish (sacks).....	40,600	31,362	Apricots.....	17,762	\$48,845
Tomatoes.....	100,000	4,000	Pears.....	2,148	6,444
Walnuts.....	1,000	125	Peaches.....	53,187	146,264
			Plums.....	960	2,640
			Tomatoes.....	20,669	56,840

Wines, Brandies, Etc.

In the county there are 3 wineries, 3 distilleries, and 3 breweries. The output of these institutions is: claret, 295,000 gallons, worth \$59,000; riesling, 268,000 gallons, worth \$53,600; brandy, 3,000 gallons, worth \$3,000; beer, 13,500 barrels, worth \$81,000; cider, 100 gallons, worth \$20.

Livestock Industry.

	Number.	Value.		Number.	Value.
Cattle—Beef.....	10,675	\$213,500	Horses—Thoroughbred	100	\$5,000
Dairy Cows—Graded.....	9,083	181,660	Standard-bred.....	124	6,200
Holsteins.....	192	9,600	Common.....	12,000	300,000
Jersey.....	100	5,000	Sheep—Imported.....	1,000	10,000
Shorthorns.....	263	13,150	Common.....	75,000	450,000
Calves.....	11,500	57,500	Lambs.....	56,000	168,000
Swine.....	15,000	90,000	Goats—Angora.....	825	4,950
Colts.....	1,350	20,250	Wool (pounds).....	1,750,000	350,000

Poultry and Eggs.

	Dozen.	Value.		Dozen.	Value.
Chickens.....	7,000	\$30,000	Turkeys.....	150	\$5,000
Ducks.....	50	250	Eggs.....	589,500	117,900

Dairy Industry.

There are 155 dairies, valued at \$350,000; 5 creameries, and 90 skimming stations.

	Production.	Value.		Production.	Value.
Butter.....	2,465,661 lbs.	\$453,132	Cream.....	133,315 gals.	\$106,652
Condensed milk.....	10,000 cases	20,000	Milk.....	496,475 gals.	\$4,612

The milk is sold at wholesale in San Francisco.

Fish Industry—Forest Products.

The fish output is 1,000,000 pounds of salmon, worth \$40,000; cured salmon, 424,000 pounds, worth \$53,000; cured codfish, 700,000 pounds, worth \$52,500.

Of forest products the county reports 5,415 cords of fuel wood, worth \$32,490.

Manufactories.

	Number.	Number of Employés.	Quantity Produced.	Value of Product.
Flouring-mills	2	100	315,000 bbls.	\$1,260,000
Feedstuffs	--	----	10,500 tons	253,200
Barley, rolled	--	----	12,040 tons	252,840
Foundries and iron works	1	200	3,130 tons	350,000
Lime	1	13	13,900 bbls.	27,800
Planing-mills	5	16	----	70,000
Tanneries	4	230	341,630 pieces	2,049,780
Stone—Artificial	1	8	80,000 cu. ft.	20,000
Crushed rock	1	125	72,000 tons	57,600
Tule factory	1	100	2,000 tons	412,500

Productions Shipped Out of County.

	Amount.		Amount.
Barley	25,000 tons	Cattle	3,000
Hay	6,784 tons	Hides	350
Oats	800 tons	Horses and mules	600
Wheat	16,467 tons	Sheep (carcasses)	30,600
Almonds	1,700,000 lbs.	Beef (carcasses)	100
Apples	46 boxes	Swine (carcasses)	1,200
Apricots	176,874 boxes	Wool	1,750,000 lbs.
Cherries	31,314 boxes	Sheep	20,000
Figs	5,000 lbs.	Swine	14,700
Grapes	2,553,618 lbs.	Butter	2,074,000 lbs.
Oranges	200 boxes	Cream	20,000 gals.
Peaches	339,212 boxes	Milk	496,475 gals.
Pears	332,016 boxes	Brandy	3,000 gals.
Plums	444,244 boxes	Wine—Sweet	250,000 gals.
Prunes—French	4,353,835 lbs.	Wine—Table	150,000 gals.
Other kinds	761,500 lbs.	Salmon	1,400,000 lbs.
Chickens	3,280 doz.	Other kinds of fish	700,000 lbs.
Eggs	260,000 doz.	Flour	312,000 bbls.
Beans	6,906,250 lbs.	Lime	13,900 bbls.
Onions—Dried	20,600 sacks	Leather	341,000 lbs.
Potatoes—Irish	40,600 sacks	Miscellaneous	157,130 lbs.
Tomatoes	5,000 boxes		

SONOMA COUNTY.

Sonoma County is bounded on the west by the Pacific Ocean, for more than 65 miles that boundary conforming to the irregularities of the shore, while on San Pablo Bay it has a frontage of 20 miles.

There is no sameness in the surface of the county. Variety is a leading characteristic. Valleys, and hills, and mountains appear to have been planned and distributed to give the best effect. The great central valley extends the entire length of the county from south to north, and commands attention by remarkable fertility. The area on which rough stone interferes with farming operations is small. Out of the area of land in the county at least 200,000 acres are valley land, the richest soil known, being a black loam; 200,000 acres are rolling or higher table land, of an exceedingly rich alluvial brown soil, with considerable sand. This is the best fruit land. We may class 200,000 acres as foothill lands, adapted to many kinds of agricultural and horticultural products and pasturage. At least 100,000 acres of mountain land are adapted to grazing, and about 80,000 are covered with redwood timber of a magnificent growth.

On the coast line are several small but valuable harbors, bays, and beaches.

Sonoma Valley is about 20 miles in length, with an average width of 8 miles. It lies parallel to Petaluma Valley, from which it is separated by a range of mountains.

The streams and watercourses of Sonoma County are numerous. Russian River, the largest stream, enters on the north, flows in a southeasterly direction for 20 miles, turns Fitch Mountain, and finds its way to the lowest depression in the Santa Rosa basin, from which it breaks through a gap in the Coast Range to the Pacific Ocean. This river gathers the waters from three fifths of the area of the county.

Sonoma County, together with her great wine, fruit, dairy, stock, and other large industries, produces as much poultry and eggs as all the balance of the State put together. The annual output is upward of \$2,000,000 in value. The advantages of the poultry and egg industry are its nearness to a reliable market, quick cash returns, and length of season. The vicinity of Petaluma is largely devoted to this industry; possibly one half of the poultry and eggs shipped from the county are from there. On an acre of ground can be raised and kept successfully 400 laying hens, the year round. These chickens, with ordinary care and attention, such as an intelligent and industrious man would give to any business, will net the owner from \$1 to \$1.25 a hen clear profit a year, over and above the cost of feed, which is all purchased and paid for, except such as vegetables, kale, and feed raised in the garden.

With a few acres well stocked with chickens a family can make a good, independent living. The poultry business is like the banking

business—cash on the spot; and there is no surer road to success than along the chicken route in Sonoma County.

Cattle are raised on a large scale, principally for dairying purposes. Our grazing land is unsurpassed. In the valley lands it requires about 5 acres per cow per year for dairying purposes; in the hill lands from 10 to 15 acres per cow. In the northern part of the county sheep-raising forms an important industry. Much of the coast region is devoted to pasturage purposes.

The moisture that rises from the ocean near the coast is absorbed by the ground, and from this fact the pastures are kept green nearly the year round, making this section the ideal spot for the dairyman and stock-raiser. The breeds of milch cows represented are mostly Jerseys, Holsteins, and Ayrshires, with some strains of Durhams, and fine American breeds. All milk used at the creameries is bought and sold by weight. In well-managed dairies the yield of butter per cow per annum is from 150 to 200 pounds.

The value of the growth of stock cattle is \$10 per head per year, until the limit is reached, and this without other feed than that obtained by grazing upon lands valued at from \$10 to \$40 per acre.

In the production of hops Sonoma County leads the world. There is no other country that can produce the quality equal to a choice Sonoma. Nearly all other hop-raising sections, outside of a few counties in this State, are subject to crop failures, caused chiefly by vermin, mold, honey-dew, rust, red spider, or severe storms. Such calamities are unheard of in this county. During the hop harvest the growers are favored with bright, sunshiny days. The very best quality of soil—and there is plenty of it—together with an excellent climate, is required for a successful culture of hops. In New York state hops grow on elevated land, while in Sonoma County the rich, sandy loam of the river and creek bottoms is employed. The richness of the soil, together with the adaptable climate, assures an average crop of about 1,800 pounds of dried hops to the acre.

Most of the hops are shipped to Eastern and European markets, but there is a growing demand for our product in Australia, New Zealand, and the Orient.

This county produces large quantities of wheat, oat, barley, and alfalfa hay, which runs all the way from 2 to 5 tons per acre. It costs from 90 cents to \$1 per ton for baling. Good hay can be raised wherever one can plow. It is harvested in May and June.

The soil is particularly adapted to oats, which many consider the most profitable of our grain crops. However, wheat, barley, and corn are extensively cultivated in every locality at a splendid profit. Corn is grown mostly on river-bottom land, and yields on an average 65 bushels to the acre.

One of the chief industries is fruit-growing. The estimated value of a fruit tree from the time it is planted to the time it comes into bearing is \$1 per year. The first cost of a tree for setting out is from 10 to 15 cents. The right season for planting is during February and March. While many fruit-driers are operated, many authorities prefer the sun-drying process, which involves no expense and can always be relied upon. The sun-dried product is of superior quality and flavor, and will bring a correspondingly higher price.

The peach is a great favorite, as the trees commence to bear the

second year after planting. The soil best suited to them is a sandy loam, and they may be cultivated with equal success either on the hill-sides or in the valleys. After the trees get into bearing the income will depend principally upon the care bestowed upon them. Peaches of standard size for the market are those that will fill a 2-inch hole. If larger they are called "extras," and if smaller, "seconds." The latter are mostly used for drying. All varieties of the peach thrive.

Prunes should have the best quality of soil, for the tree is a heavy bearer.

The growing of citrus fruits, though comparatively a recent industry, has gained a strong foothold, and present indications point to a steady increase in acreage. There are now about 10,000 orange and 1,000 lemon trees in the county.

While the olive requires a good, well-drained soil, there are many orchards that are planted around the rocky foothills. They come into bearing after five or six years. Olive culture is making rapid strides. The oil produced has established an excellent reputation, and is usually sold ahead of its production.

Sonoma County is the true home of the English walnut. It is only recently that the walnut has attracted the attention of growers in this county, but now that its possibilities as a money-maker are becoming more widely known the acreage devoted to its cultivation is rapidly increasing and it promises to become one of our great industries. Trees for planting cost usually about 15 cents, and they bear after six or seven years.

Sonoma is the greatest blackberry county. The blackberry season begins in the latter part of June, and runs into September. Raspberries are harvested in May, June, July, and August.

Gooseberries are a valuable product, and here are raised the largest and finest varieties.

Many strawberries are not shipped, most of the supply being used for home consumption, but those raised are of the very best quality.

Sonoma grows vegetables throughout the year, and often raises from two to three crops annually. Potatoes are grown in almost every section, attain large size, and are of the finest quality. Asparagus is particularly adapted to the soil and climate. Tomatoes are produced in great quantities for canning. String beans are also grown extensively for this purpose. Sonoma watermelons are of large size and fine flavor.

Sonoma is the largest and most important grape- and wine-producing county in the State. Her wines are justly famed throughout the world, and took first premium at the Genoa Exposition in Italy in 1892. A gold medal was awarded at the World's Fair in Chicago in 1893, and also at the Midwinter Fair in San Francisco in 1894; and the grand prize, the highest award, was given her wines at the St. Louis World's Exposition by a jury composed of twenty-one members, most of whom were French and German experts. In order to accommodate the enormous yield of its own section alone, one wine company has erected a wine tank with a capacity of half a million gallons, the largest in the world.

Tobacco-growing has made a fair start, and is one of the coming industries. The plant will thrive in almost every section, and is now quite extensively grown and manufactured in many localities, and the quality is excellent. David Hetzel has raised tobacco for many years near Guerneville.

The amount of lumber manufactured by the sawmills runs into millions of feet. A large amount of shingles, pickets, and shakes is made in the county.

John Schindler, near Melitta, has several hundred tea plants in his garden, and thinks he will be able to place his tea on the market in a year or so.

Labor commands good prices, especially competent and experienced farm hands.

Sonoma County has a large number of mineral springs.

The principal cities are: Santa Rosa, Sonoma, Petaluma, Healdsburg, Cloverdale, and Sebastopol.

The Japan current gives us unfailing rains, and regulates the temperature both summer and winter.

Compared with the East, our roads are more solid and permanent. This is due to the absence of excessive frosts, which crack and break up the hardest ground, of whatever material it is composed.

The many and varied health-giving mineral waters, fishing and hunting locations, and summer resorts, make this county a paradise for the pleasure-seeker. Thousands of visitors spend the summer living in tents pitched along the many beautiful streams and in the numerous picturesque spots.

STATISTICS OF SONOMA COUNTY FOR 1905.

General.

Area, 1,500 square miles, or 960,000 acres		Railroads, Steam—miles, 174.54;	
Number of acres assessed.....	876,394	assessed value.....	\$2,203,095
Value of country real estate.....	\$13,963,110	Electric—miles, 26.75; assessed	
Of improvements thereon.....	\$4,194,845	value.....	\$183,475
Of city and town lots.....	\$3,677,535	Electric power plants, 2; assessed	
Of improvements thereon.....	\$3,807,395	value.....	\$103,220
Of personal property.....	\$3,932,250	Electric power lines—miles, 40;	
Total value of all property.....	\$29,575,125	assessed value.....	\$37,000
Number of miles of public roads.....	1,500		

Cereal Products and Hay.

	Acres.	Tons.	Value.		Acres.	Tons.	Value.
Wheat.....	2,810	1,500	\$37,500	Corn.....	810	1,200	\$21,600
Barley.....	1,640	800	12,500	Alfalfa hay.....	200	1,000	8,000
Oats.....	5,960	2,550	51,000	Grain hay.....	37,090	74,000	555,000

Fruit, Vegetables, Nuts, Etc.

<i>Green.</i>			<i>Green—Continued.</i>		
	Pounds.	Value.		Pounds.	Value.
Apples.....	1,000,000	\$75,000	Strawberries.....	50,000	\$3,000
Asparagus.....	40,000	2,000	Tomatoes.....	140,000	1,500
Blackberries.....	1,400,000	21,000	Walnuts.....	5,000	1,000
Beans.....	3,000	2,000			
Cabbage.....	4,000	1,500	<i>Dried.</i>		
Celery.....	1,000	500	Apples.....	2,000,000	\$13,000
Corn.....	14,000	1,500	Apricots.....	2,000	150
Currants.....	2,000	100	Blackberries.....	40,000	3,200
Cherries.....	225,000	6,750	Pears.....	10,000	800
Gooseberries.....	2,000	—	Peaches.....	300,000	21,000
Lemons (boxes).....	100	400	Plums.....	80,000	4,800
Loganberries.....	200,000	40,000	Prunes—French.....	4,000,000	300,000
Onions.....	100,000	1,000			
Oranges (boxes).....	500	2,000	<i>Canned.</i>		
Pears.....	40,000,000	40,000	Apples.....	50,000	\$10,000
Peaches.....	10,000,000	200,000	Blackberries.....	15,000	40,000
Persimmons.....	1,000	50	Cherries.....	1,665	10,000
Plums.....	100,000	10,000	Pears.....	5,000	15,000
Potatoes—Irish (sacks).....	60,000	60,000	Peaches.....	6,665	30,000
Prunes—French.....	10,000,000	175,000	Plums.....	1,000	2,000
Quinces.....	10,000	2,000	Raspberries.....	6,650	2,000
Raspberries.....	80,000	4,000	Tomatoes.....	2,000	4,000

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.		Bearing.	Non-Bearing.	Total.
Apple	210,690	70,910	281,600	Quince	2,500	1,000	3,500
Apricot	19,010	24,020	43,030	Almond	7,110	2,980	10,090
Cherry	42,870	18,200	61,070	Walnut	4,290	1,110	5,400
Fig	4,080	1,240	5,320	Grapes	17,570	2,290	19,860
Lemon	750	200	950	Table	460	180	640
Nectarine	250	100	350	Wine	17,110	2,110	19,220
Olive	60,720	43,500	104,220	Blackberries	700	---	700
Orange	8,920	1,860	10,780	Currants	50	---	50
Peach	258,650	6,900	265,550	Gooseberries	20	---	20
Pear	77,850	22,250	100,100	Raspberries	100	---	100
Prune—French	501,650	92,580	594,230	Strawberries	150	---	150
Other kinds	44,920	4,710	49,630	Loganberries	250	---	250

Wines, Brandies, Etc.

Number of wineries, 77; number of distilleries, 44; number of breweries, 5.

	Gallons.	Value.		Gallons.	Value.
Wine—Angelica	288,000	\$43,200	Wine—Port	8,000	\$2,000
Burgundy	304,000	60,800	Riesling	528,000	105,600
Cabernet	400,000	60,000	Sauterne	384,000	76,800
Chianti	1,500	300	Sherry	168,000	42,000
Champagne	1,000	500	Zinfandel	7,080,000	1,062,000
Claret	4,224,000	633,600	Beer (barrels)	16,000	96,000
Hock	776,000	155,200	Brandy	83,200	16,640

Livestock Industry.

	Number.	Value.		Number.	Value.
Cattle—Beef	650	\$19,500	Horses—Thoroughbred	56	\$8,400
Stock	11,400	228,000	Standard-bred	40	4,000
Dairy Cows—Graded	21,210	424,200	Common	12,490	424,300
Ayrshire	20	1,000	Colts	1,750	26,250
Devon	30	1,500	Sheep—Imported	25	250
Holstein	30	1,500	Common	25,750	53,300
Jersey	100	5,000	Lambs	2,100	1,050
Red Polled	20	1,000	Goats—Angora	900	1,800
Shorthorns	320	16,000	Common	1,240	1,860
Calves	5,740	57,400	Wool (pounds)	125,500	12,550
Swine	2,860	8,580			

Poultry and Eggs.

	Dozen.	Value.		Dozen.	Value.
Chickens	42,535	\$212,775	Turkeys	500	\$6,000
Ducks	600	3,250	Eggs	4,797,321	959,465
Geese	400	3,600			

Dairy Industry.

In the county are 250 dairies and 10 creameries; output, 3,110,000 pounds of butter, worth \$466,500, and 96,000 pounds of cheese, worth \$9,600.

Forest Products.

	Amount.	Value.		Amount.	Value.
Sawmills (number)	10	\$70,000	Posts (pieces)	100,000	\$10,000
Charcoal (sacks)	100,000	2,500	Railroad ties (pieces)	50,000	15,000
Fuel, wood (cords)	500,000	1,000,000	Sash and door factories		
Lumber—Redwood (ft.)	46,900,000	469,000	(number)	7	---
Pickets (pieces)	200,000	5,000,000	Shakes (thousand)	100	1,200
Piles	4,000	12,000	Shingles (thousand)	15,000	37,500

Miscellaneous Products.

In the county are 2,000 acres of hops; yield, 2,000,000 pounds, worth \$240,000. There are 10 acres of tobacco.

Manufactories.

	Number.	Number of Employés.	Quantity Produced.	Value of Product.
Bookbinderies	4	10	-----	-----
Brick	3	100	2,500 M	\$20,000
Cigars	9	32	1,800 M	54,000
Confectionery	10	20	-----	-----
Flouring-mills	2	31	-----	-----
Flour	--	--	36,000 bbls.	149,400
Meal	--	--	150 tons	3,750
Bran	--	--	625 tons	15,625
Shorts	--	--	625 tons	15,625
Barley	--	--	5,200 tons	120,000
Foundries and iron works	3	--	-----	-----
Shoes	2	105	9,000 doz.	230,000
Olive oil	3	25	10,000 gals.	30,000
Tanneries	6	195	203,000 sides	963,500
Planing-mills	5	--	-----	-----
Woolen-mills	1	25	-----	50,000

Exports.

Hay, 60,000 tons; oats, 5,000 tons; apples, 100,000 boxes; apricots, 200 boxes; blackberries, 3,000 cases; cherries, 3,000 boxes; currants, 500 pounds; figs, 3,000 pounds; peaches, 30,000 boxes; pears, 20,000 boxes; plums, 1,000 boxes; prunes, 3,000 boxes; quinces, 2,000 boxes; raspberries, 1,000 pounds; chickens, 40,000 dozen; turkeys, 350 pounds; eggs, 475,000 dozen; butter, 3,095,000 pounds; cheese, 68,000 pounds; beer, 1,000 barrels; brandy, 81,000 gallons; lumber, 440,000,000 feet; brick, 500,000; cigars, 500,000.

STANISLAUS COUNTY.

Stanislaus County is one of the San Joaquin Valley group. It extends across the entire width of the valley, reaching from the summit of the Coast Range on the west well into the foothills of the Sierra Nevada on the east.

The San Joaquin River, a navigable stream for eight months in the year, flows across the county some miles west of the estimated geographical center. From that stream diverge two tributaries, the Stanislaus and Tuolumne, both leading eastward to the Sierras, and both navigable for from three to six months in the year. There are also several other streams of more or less importance.

The greater part of the county is an almost level plain, stretching away until it merges into the foothill and mountain region on the east and west.

The rainfall general average at Modesto is about $9\frac{1}{2}$ inches.

On the eastern side of the county the soil is of a sandy nature, merging into loam as the foothills are approached. That prevailing on the west side is a rich loam of indefinite depth, and which under water is wonderfully fertile. The San Joaquin River divides the county, and this is bordered by a belt of bottom land from 1 to 2 miles in width. The lands immediately adjoining this on the east side are principally adobe. The low lands adjoining the Tuolumne River are very sandy, while those along the Stanislaus are a dark, firm loam. In the central part the soil is of a sandy character, especially to the south of the Tuolumne River, changing northward and westward to grayish and blackish loams. Some alkali patches are found in the lower lands, but they are not extensive.

There are extensive systems that irrigate thousands of acres. These irrigation systems are comprised in the Turlock and Modesto irrigation districts; the former lying between the Tuolumne and San Joaquin rivers, and the latter lying between the Stanislaus and the Tuolumne rivers. The Tuolumne River is the source of supply for both districts. The stream has a watershed second only to that of one other river of the State, carries a vast volume of water and is never-failing, being fed by the perennial snows of the Sierras. The water is taken out of the stream, on either side, by means of a concrete dam constructed jointly by the districts at a cost of \$550,000. It is located just above the mining town of La Grange, well in the hills of the Sierras, 32 miles distant from the centers of the districts, and constitutes one of the greatest and most spectacular structures of the kind in the world. It is 327 feet in length, 97 feet through at the base, 12 feet through at the crest, and 127 feet in height, arching up-stream. The Turlock District canal system comprises 22 miles of main canal, 74 feet in width at the bottom, and designed to carry a maximum depth of 8 feet of water; two main laterals, aggregating 35 miles, 40 feet in width on the

bottom; and six sub-laterals, aggregating 80 miles in length, ranging from 18 to 30 feet in width, floor measurement. The main canal of the Modesto District system is 60 feet in width on the bottom, and will supply 90 miles of laterals ranging from 18 to 40 feet in width.

The horticultural interests have received comparatively little attention, wheat-growing being the general industry; but now that irrigation is available the production of fruit is rapidly assuming great proportions.

The sandy loam soil, of which a large portion of the area of the county is comprised, affords every advantage for intensive farming. Garden products are produced in abundance. Oranges, lemons, nuts, peaches, apricots, prunes, pears, nectarines, figs, olives, and table and wine grapes yield in gratifying quality and quantity; while alfalfa fields yield five crops annually, and afford pasturage after the curing season.

Dairying is a growing and very prominent industry, because of the favorable conditions and excellent profits. In addition to the butter product, her dairy interests are represented by large quantities of cream and cheese.

The famed Atwater sweet potato district adjoins the Turlock district, but the Turlock sweet potatoes are in as keen demand and bring as good prices as the Atwater product, and the yield is none the less heavy.

There are large bands of cattle and sheep, most of them being driven to the mountains of Tuolumne and Alpine counties for summer range. Much attention is paid to breeding fine horses, and excellent grades are the result.

Modesto, the county seat, has first-class county buildings, substantial business blocks, good hotels, schools, and churches.

Oakdale, on the Stanislaus River, 14 miles northeast of Modesto, is the center of a large fruit and grain region.

Knight's Ferry, in the foothills, has fine orange groves, vineyards, a winery, and flouring-mills.

Other towns are Waterford, Montpelier, La Grange, Ceres, Turlock, Grayson, and Newman—all produce- and grain-shipping places with large warehouses.

STATISTICS OF STANISLAUS COUNTY FOR 1905.

General.

Area ....1,486 square miles, or 965,900 acres	Road levy per \$100, 1905	40 cts.
Number of farms	Value of county buildings.....	\$70,000
Number of acres assessed.....	Irrigating ditches—miles, 300;	
Value of country real estate	cost.....	\$587,900
Of improvements thereon.....	Railroads, Steam—miles, 120.18;	
Of city and town lots	assessed value	\$1,628,445
Of improvements thereon.....	Electric power plants, 3; assessed	
Of personal property	value	\$18,000
Total value of all property.....	Electric power lines—miles, 64;	
Amount expended on roads	assessed value	\$18,560
Amount expended for bridges	Number of acres irrigated	46,080
Number of miles of public roads		

Cereal Products and Hay.

	Acres.	Tons.	Value.		Acres.	Tons.	Value.
Wheat	196,952	60,000	\$1,220,000	Corn	310	610	\$12,200
Barley	75,967	24,024	576,576	Alfalfa hay	32,720	260,760	1,303,830
Oats	21,365	8,340	178,920	Grain hay .....	.....	987,890	5,927,340
Rye	3,789	1,135	20,430				

Acres of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.		Bearing.	Non-Bearing.	Total.
Apple	79	19	98	Nuts—Almond	173	63	236
Apricot	157	63	220	Chestnut	34	12	46
Cherry	46	11	57	Peanut	63	...	63
Fig	83	611	694	Walnut	61	19	80
Lemon	43	19	62	Grapes	601	568	1,169
Nectarine	11	4	15	Raisin	199	98	297
Olive	149	31	180	Table	84	79	163
Orange	116	40	156	Wine	318	391	709
Peach	283	830	1,113	Blackberries	20	...	20
Pear	64	51	115	Raspberries	12	...	12
Plum	62	14	76	Strawberries	53	...	53
Prune—French	161	23	184	Loganberries	21	...	21
Quince	24	19	43	Watermelons	350	...	350

Fruit, Vegetables, Nuts, Etc.

<i>Green.</i>	Pounds.	Value.	<i>Green—Continued.</i>	Pounds.	Value.
Apples	987,896	\$49,795	Potatoes—Irish (sacks)	1,599	\$2,398
Apricots	2,544,900	25,450	Potatoes—Sweet (sacks)	90,847	113,558
Asparagus	5,678	283	Prunes—French	1,734,800	346,960
Blackberries	18,965	943	Quinces	518,300	20,732
Beans	36,000	2,880	Raspberries	54,600	2,760
Beets	80,000	1,600	Strawberries	175,890	8,794
Cabbage (sacks)	508	762	Tomatoes	28,994,500	579,890
Celery	60,000	6,000	Walnuts	494,000	4,940
Chestnuts	774,018	77,401	Beets,—Sugar (tons)	7,500	225,000
Corn	25,000	1,750	Carrots	19,450	583
Cherries	745,200	37,260	Turnips	28,950	600
Figs	98,765	9,876			
Grapes	37,865,600	378,640	<i>Dried.</i>	Pounds.	Value.
Watermelons (number)	59,000	5,000	Almonds	998,720	\$99,872
Limes (boxes)	217	651	Apples	87,452	6,121
Lemons (boxes)	13,838	13,838	Apricots	135,648	13,564
Nectarines	91,520	45,760	Beans	140,000	14,000
Onions	310	619	Corn	85,500	1,710
Oranges (boxes)	72,640	72,640	Figs	259,680	7,790
Pears	957,680	9,576	Grapes	165,700	8,275
Peaches	3,989,740	39,897	Onions	1,762	1,762
Peanuts	126,000	8,300	Peaches	89,740	7,179
Peas	64,000	1,920	Peas	20,000	1,000
Plums	40,700	8,014	Prunes—French	789,700	78,970

Wines, Brandies, Etc.

Number of wineries, 1; number of distilleries, 3.

	Gallons.	Value.		Gallons.	Value.
Wine—Claret	50,000	\$12,500	Wine—Tokay	310	\$310
Madeira	8,000	4,000	Brandy	8,000	20,000
Port	4,000	4,000	Cider—Apple	890	890
Sherry	2,000	2,000			

Livestock Industry.

	Number.	Value.		Number.	Value.
Cattle—Beef	6,375	\$127,440	Horses—Thoroughbred	8	\$12,000
Stock	20,986	626,880	Standard-bred	49	4,900
Thoroughbred	212	10,600	Common	7,419	296,760
Dairy Cows—Graded	10,620	318,600	Colts	2,020	40,400
Herefords	20	1,200	Mules	5,689	234,450
Holsteins	29	1,450	Sheep—Imported	120	480
Jersey	86	4,300	Common	43,780	87,560
Red Polled	18	900	Lambs	19,645	19,645
Calves	20,916	104,580	Goats—Common	1,596	3,192
Swine	31,706	190,236	Wool (pounds)	599,657	59,965

Poultry and Eggs.

	Dozen.	Value.		Dozen.	Value.
Chickens	26,351	\$105,404	Turkeys	309	\$4,985
Ducks	200	1,200	Eggs	368,000	36,800
Geese	51	357			

Number of poultry farms, 37.

Dairy Industry.

	Number.	Production.	Value.		Number.	Production.	Value.
Dairies	12	3,320,000 lbs.	\$666,000	Butter	-----	1,338,193 lbs.	\$267,638
Creameries	6	1,338,193 lbs.	267,638	Cream	-----	6,975,249 lbs.	2,002,574
Skimming stations	2	-----	-----	Cream de-pots	5	-----	-----

Forest Products.

There were 31,219 cords of fuel wood, worth \$156,092; and 9,487 cords of posts, worth \$94,870.

Miscellaneous Products.

There are 901 bee hives, worth \$901; honey, 34,000 pounds, worth \$1,700.

There are 10 acres of seed farms; output of garden seeds, 1,000 pounds, worth \$250.

Sugar beets, 2,599 acres; output, 7,500 tons, worth \$225,000.

Manufactories.

	Number.	Number of Employes.	Quantity Produced.	Value of Product.
Brick	1	8	160,000	\$16,000
Cigars	1	3	150,000	6,000
Confectionery	4	18	2,100 lbs.	210
Flouring-mills	1	15	25,000 bbls.	75,000
Packing-houses	1	14	-----	-----
Figs	-----	-----	148,925 lbs.	14,892
Raisins	-----	-----	100,000 lbs.	12,000
Dried fruit	-----	-----	200,000 lbs.	20,000
Hides	-----	-----	600,000 lbs.	60,000
Lard	-----	-----	730,000 lbs.	73,000
Tallow	-----	-----	3,700 bbls.	18,500
Olive oil	3	15	3,150 gals.	12,600
Olives	-----	-----	410 gals.	410
Planing-mills	3	21	1,760,000 ft.	176,000

Productions Shipped Out of County.

	Amount.		Amount.
Barley	10,654 tons	Beans	100,000 lbs.
Corn	40 tons	Beeswax	4,300 lbs.
Hay	485 tons	Beets	3,000 lbs.
Oats	5,064 tons	Sugar	150 tons
Wheat	9,488 tons	Cabbage	215 sacks
Rye	130 tons	Celery	110 crates
Almonds	740,000 lbs.	Honey	30,000 lbs.
Apples	340 boxes	Onions—Dried	340 sacks
Apricots	510 boxes	Green	56 sacks
Blackberries	12 cases	Peas—Dried	1,700 lbs.
Cherries	495 boxes	Green	6,200 lbs.
Figs—Dried	68,000 lbs.	Potatoes—Irish	500 sacks
Grapes	1,798,560 lbs.	Sweet	85,302 sacks
Lemons	1,420 boxes	Tomatoes	375 boxes
Limes	31 boxes	Cattle (live)	10,620
Nectarines	49 boxes	Cattle (carcasses)	1,987,480 lbs.
Olives	8,420 lbs.	Hides	590,000 lbs.
Oranges	31,000 boxes	Horses	980
Peaches	9,720 boxes	Sheep	7,895
Pears	1,990 boxes	Swine (live)	21,800
Plums	410 boxes	Swine (carcasses)	89,785 lbs.
Prunes—French	7,890 lbs.	Wool	590,500 lbs.
Quinces	8,900 lbs.	Calves	6,000
Raisins	160,700 lbs.	Butter	1,025,501 lbs.
Walnuts	94,000 lbs.	Milk	73,500 gals.
Watermelons	62 cars	Cream	4,132,250 lbs.
Chickens	9,287 doz.	Brandy	130 gals.
Turkeys	23,436 lbs.	Wine	3,000 gals.
Geese—Tame	20 doz.	Flour	20,000 bbls.
Ducks—Tame	56 doz.	Olive Oil	2,170 gals.
Eggs	256,520 doz.	Olives—Pickled	85 gals.
Asparagus	3,800 lbs.		

capital and a family can take twenty acres of orchard and make as much or more out of it than the grain-grower can on a half section.

The county has several large creameries, and is especially adapted to the growing of alfalfa.

For up-to-date, diversified farming and fruit-raising, thousands of acres of Sutter County lands have no superior, and hardly an equal in the entire country. Much attention is being given to the subdivision of heretofore large wheat farms into convenient tracts for homeseekers, and success has attended the effort.

Stock-growing and dairying have always been extensive industries. The Sutter Buttes furnish winter pasturage for large flocks of sheep and bands of cattle, while the tule provides summer feed. Along the Sacramento and Feather rivers are many alfalfa fields. Dairying has received quite an impetus from the establishment of creameries and skimming stations.

Sutter has never produced minerals to any extent, although gold has been found in the Buttes. Indications of oil are abundant. One shaft, sunk more than thirty years ago, has never ceased to furnish a supply of gas. No use has ever been made of it, nor has any attempt been made to search further.

The principal towns are Yuba City, the county seat; Live Oak, Sutter, Meridian, Nicolaus, Vernon, Tudor, Pleasant Grove, Marcuse, Pennington, and West Butte.

STATISTICS OF SUTTER COUNTY FOR 1905.

General.

Area.....	580 square miles, or 374,515 acres	Amount expended for bridges...	\$14,414
Number of farms.....	955	Number of miles of public roads.....	695
Number of acres assessed.....	373,000	Road levy per \$100, 1905.....	35 cts.
Value of country real estate.....	\$4,121,285	Value of county buildings.....	\$41,000
Of improvements thereon.....	\$703,230	Railroads, Steam—miles, 36.63; assessed value.....	\$600,487
Of city and town lots.....	\$76,145	Electric power lines—miles, 46.75; assessed value.....	\$23,375
Of improvements thereon.....	\$168,305	Number of acres irrigated.....	350
Of personal property.....	\$861,575		
Total value of all property.....	\$5,930,540		
Amount expended on roads.....	\$12,714		

Cereal Products and Hay.

	Acres.	Tons.	Value.		Acres.	Tons.	Value.
Wheat.....	35,315	8,335	\$250,000	Buckwheat.....	800	520	\$13,000
Barley.....	22,000	5,500	100,000	Alfalfa hay.....	2,000	6,000	24,000
Oats.....	5,700	1,710	25,650	Grain hay.....	6,450	9,675	37,700
Corn.....	950	1,187	29,687				

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.		Bearing.	Non-Bearing.	Total.
Apple.....	35,000	1,000	36,000	Prune—French.....	30,000	2,000	32,000
Apricot.....	9,190	700	9,890	Other kinds.....	1,500	...	1,500
Cherry.....	2,000	1,000	3,000	Almond.....	35,000	15,000	50,000
Fig.....	5,200	500	5,700	Walnut.....	100	50	150
Lemon.....	100	...	100	Grapes—			
Olive.....	1,500	...	1,500	Raisin.....	1,500	300	1,800
Orange.....	2,000	...	2,000	Table.....	75	...	75
Peach.....	100,000	15,000	115,000	Wine.....	650	80	730
Pear.....	20,500	...	20,500	Blackberries.....	4	...	4
Plum.....	500	...	500	Strawberries.....	2	...	2

Poultry and Eggs.

	Dozen.	Value.		Dozen.	Value.
Chickens.....	3,500	\$10,500	Turkeys.....	120	\$2,880
Ducks.....	30	150	Eggs.....	175,000	62,250

Fruit, Vegetables, Nuts, Etc.

<i>Green.</i>	Pounds.	Value.	<i>Green—Continued.</i>	Pounds.	Value.
Apples	35,000	\$350	Walnuts	2,000	\$250
Apricots	328,000	6,560			
Beans	1,800,000	54,000	<i>Dried.</i>	Pounds.	Value.
Cherries	60,000	7,500	Almonds	300,000	\$3,000
Grapes—Wine	2,600,000	18,200	Figs	1,400,000	31,500
Grapes—Table	380,000	3,800	Prunes—French	280,000	9,800
Lemons (boxes)	100	300	Other kinds	20,000	700
Oranges (boxes)	5,000	2,500	Raisins	1,050,000	84,000
Pears	630,000	9,820			
Peaches	13,200,000	181,500	<i>Canned.</i>	Cases.	Value.
Plums	38,000	285	Peaches	38,011	\$104,530
Potatoes—Irish	500,000	2,500	Tomatoes	15,000	15,000
Sweet	200,000	2,000			

Livestock Industry.

	Number.	Value.		Number.	Value.
Cattle—Beef	200	\$6,000	Swine	7,500	\$22,500
Stock	6,500	97,000	Colts	1,100	28,000
Thoroughbred	5	350	Sheep—Imported	652	1,956
Dairy Cows—Graded	2,630	78,900	Common	60,794	121,588
Calves	2,500	12,500	Lambs	25,000	12,500
Horses—Thoroughbred	5	2,560	Goats—Common	50	150
Standard-bred	62	4,055	Wool (pounds)	245,784	58,985
Common	12,920	118,495			

Dairy Industry.

The dairy output is given at 186,120 pounds of cheese, worth \$18,612.

Miscellaneous Products.

The county has 1,720 bee hives, worth \$2,580; yield of honey, 172,000 pounds, worth \$1,720; hops, 82,095 pounds, worth \$9,850.

Manufactories.

One flouring-mill; 4 employes; output, 18,780 barrels, worth \$84,510.
Olive oil, 500 gallons, worth \$750.

Exports.

The products exported are 5,000 tons of barley, 593 tons of corn, 1,000 tons of hay, 500 tons of oats, 4,000 tons of wheat, 300,000 pounds of almonds, 600 boxes of apples, 3,000 boxes of cherries, 1,400,000 pounds of figs, 2,900,000 pounds of grapes, 4,333 boxes of peaches, 280,000 pounds of prunes, 20,000 pounds of miscellaneous fruits, 1,050,000 pounds of raisins, 2,000 pounds of walnuts, 500 dozen poultry, 5,760 pounds of turkeys, 60,000 dozen eggs, 900,000 pounds of beans, 1,700 pounds of honey, 82,000 pounds of hops, 2,000 sacks of Irish potatoes, 1,000 sacks of sweet potatoes, 2,000 swine, 58,985 pounds of wool, and 186,120 pounds of cheese.

TEHAMA COUNTY.

Tehama County occupies the upper or northern portion of the Sacramento Valley. It is 200 miles north of San Francisco, and 120 miles north of Sacramento. Part of its eastern boundary follows the summit of the Sierra Nevada Mountains, and its western boundary lies along the summit of the Coast Range. Its greatest length is 78 miles; its width from north to south, 38 miles. Of its area, speaking roughly, 700,000 acres are agricultural lands, 800,000 grazing, and 500,000 timber. The tax rate is comparatively low.

Red Bluff is the county seat. It is a clean, modern little city, located upon an elevated plain, with superior drainage, and with the Sacramento River washing the foot of the bluffs at one side. Other towns are Corning, Tehama, Vina, Paskenta, and Kirkwood.

The county is easily reached, being on the line of the California and Oregon branch of the Southern Pacific Railroad. Two lines of this road converge at the town of Tehama, 12 miles below Red Bluff; one coming up the valley on the west side and the other on the east side of the Sacramento River. North of Tehama there is but one line of track. The Sacramento River is navigable to Red Bluff, and steamboats from San Francisco and Sacramento make weekly trips up and down during most of the year.

Telegraph and telephone lines follow the railroad, and several private lines are in operation.

The public school system is complete and excellent. A school is maintained wherever there is need of one.

The Sacramento River runs through the county from north to south. From this river there is a rise to the east and west until the summit of the mountain ranges is reached. South of Red Bluff and west of the river lie broad plains; beyond these rolling hills developing into the foothills of the mountains, and then the mountains themselves, which rise quite abruptly to a height of from 3,000 to 9,000 feet.

In the alluvial land along the river the soil is mainly a dark brown, almost black, sandy loam, rich and deep. The table land to the east is so rocky as to be of no use except for stock ranges. On the west of the river the loamy lands merge into clayey loam second bottom; farther west is the sandier soil of the plains, gray, brown, and red in color; then the hills with reddish soil and gravelly loam. The creek bottoms have generally a yellowish soil. North of Red Bluff, in the hilly country, it is chiefly reddish clay and gravelly loam.

Tehama County is well watered. Numerous creeks carry streams from the mountain snows to the river. Wells can be dug anywhere to reach water at a moderate depth.

Irrigation is really not necessary, but experience has shown that plenty of water means an increase in product and variety. It is practiced to some extent, but mostly for the cultivation of alfalfa. There is

a great deal of unappropriated water available for irrigation and the development of electric power, awaiting only the capital and energy to make it return a large profit.

The principal industries are horticulture, agriculture, stock-raising, and lumbering. There is practically no mining. A large deposit of chrome ore to the west, valuable sulphur springs to the east, some indifferent placer claims to the north, and the story of mining is told.

The fruit industry gives employment to a large number of people, who can engage in healthful outdoor work in summer. Several thousand persons are directly or indirectly engaged in some branch of the fruit business.

Olives are fast coming into favor as a crop and as a food. The tree grows readily and yields abundantly. The fruit brings a good price, and the demand is constant and growing. The fruit is pickled green or ripe.

Oranges and lemons do well and bear abundantly. No attempts were made to plant them in quantities until within the past few years. There are in yards all over the county numberless trees that bear profusely. Several small orchards have been planted within the last few years, but they have not yet come into bearing. The trees are healthy and vigorous.

Almonds are being grown with success.

Raisin grapes, and indeed all grapes, grow remarkably well. The raisins can be cured in the sun during the long summer days.

An immense winery is located on the Stanford ranch in the southern part of the county.

Peaches are the principal fruit. They are shipped green, and are canned and dried. The bulk of the crop is dried.

Prunes are readily cultivated and yield abundantly.

The apricot is the third fruit in importance. All the apricots are dried. The pits are sold for fuel, or for extracting the oil, which is used by druggists and confectioners.

Pears do well. The fruit is nearly all shipped green. The Bartlett is the favorite.

Figs are attracting more attention since the procurement of blastophaga, the insect which fertilizes the Smyrna fig. A great many of these trees are now being planted, and no doubt this fruit will assume a larger place in the output of the county hereafter.

Apples are grown only in the foothills. The chief apple-producing region of the county is at Manton, 35 miles to the northeast of Red Bluff, where very fine apples are raised.

Berries and all small fruits do well. They come into market early and sell readily.

In agriculture there has been a gradual change from the growing of wheat to fruit or other grains.

Hay is made from a mixture of wild oats and wheat grown together and cut when just on the point of turning. It is cured on the ground and then stacked.

Alfalfa, where water can be obtained, is the best of all forage crops. It is a splendid feed for cattle, hogs, and horses.

Experiments are being made looking toward the cultivation of hops and sugar-beets.

The stock business is carried on under conditions that differ from

those of the Eastern States, and are differing from those of former years here. The owner of cattle, sheep, and goats finds it necessary to own or control two ranges: one in the valley for the winter months, and one in the mountains for the summer season. Considerable land has been withdrawn into temporary forest reserves; the number of men engaging in the stock business has greatly increased, and range land has been in greater demand as a consequence.

Sheep-raising is easily the favorite branch of the stock business. This is the principal wool-producing county of Northern California, and indeed of the State. Twice each year the buyers come here, and there is a busy time until the wool is sold. It is sometimes bought before the sheep are sheared. The favorite breeds of sheep are Spanish Merino, French Merino, Southdown, and Cotswold for wool, and Shropshire more particularly for mutton.

The cattle business is conducted in much the same general way as the sheep business, except that the animals do not require constant care and herding; there is a further difference, that nearly every farmer has at least a few head of cattle, while but few of them have any sheep. The favorite breeds of cattle are Holstein, Hereford, Jersey, and Durham.

Of late years Angora goats have come into greater favor. They are hardy animals, readily adapting themselves to a mountainous and hilly country which no other animal can occupy. They will eat almost anything, can protect themselves from wild animals, and their wool or mohair is in demand and brings a good price.

There is everywhere plenty of timber of various kinds for fuel, posts, etc., for immediate local use. Oaks are the principal trees of the valley, except along the streams, where willows, cottonwoods, and sycamores abound. Oak wood is the favorite fuel. But in the Sierras there is a magnificent belt of timber containing a great preponderance of sugar pine, which is one of the finest of timber trees. Several sawmills are located in this timber belt and most of the land, if not all, is now owned by private individuals or corporations.

The wool, lumber, stock, fruit, hay, grain, etc., can all be sold at Red Bluff. A market is always available at San Francisco; and in Red Bluff, the county seat, there are local individuals and firms ready and willing to buy all of these products that are offered. There are two large packing-houses for fruit, warehouses for wool and grain, livery stables for hay, a flouring-mill for wheat, and railroad and river means of transportation.

The large land holdings are being broken into smaller tracts to encourage immigration and settlement. The outlook is most hopeful.

STATISTICS OF TEHAMA COUNTY FOR 1905.

General.

Area, 3,200 square miles, or 2,048,000 acres	Number of miles of public roads	500
Number of farms	Road levy per \$100, 1905	35 cts.
Number of acres assessed	Value of county buildings	\$81,500
Value of country real estate	Irrigating ditches—miles, 327;	
Of improvements thereon	cost	\$49,040
Of city and town lots	Railroads, Steam—miles, 54½;	
Of improvements thereon	assessed value	\$219,740
Of personal property	Electric power lines—miles, 55½;	
Total value of all property	assessed value	\$14,412
Amount expended on roads	Number of acres irrigated	3,000
Amount expended for bridges		

Cereal Products and Hay.

	Acres.	Tons.	Value.		Acres.	Tons.	Value.
Wheat	30,975	14,635	\$292,700	Corn	280	392	\$7,840
Barley	28,675	14,337	215,055	Alfalfa hay	1,720	8,600	68,800
Oats	1,500	810	20,250	Grain hay	36,215	36,215	443,634

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.		Bearing.	Non-Bearing.	Total.
Apple	18,200	1,050	19,250	Pear	47,950	15,100	63,050
Apricot	60,845	3,610	64,455	Almond	60,245	1,105	61,350
Cherry	4,270	870	5,140	Walnut	3,000	500	3,500
Fig	10,000	3,125	13,125	Grapes—			
Lemon	465	320	785	Raisin	200	—	200
Olive	59,350	77,360	136,710	Table	150	—	150
Orange	6,240	6,540	12,780	Wine	2,530	—	2,530
Peach	586,600	92,800	679,400	Blackberries	24	—	24
Prune—French	91,455	12,690	104,145	Strawberries	50	—	50
Other kinds	14,745	3,910	18,655				

Fruit, Vegetables, Nuts, Etc.

<i>Green.</i>	Pounds.	Value.	<i>Dried.</i>	Pounds.	Value.
Apples	186,650	\$4,399	Almonds	103,801	\$10,380
Apricots	149,390	561	Apricots	141,533	8,492
Blackberries	125,000	4,375	Beans—Bayo	75,000	1,500
Beans—String	300,000	18,000	Beans—Small white	75,000	2,250
Beets	4,800	192	Beans—Pink	90,000	1,800
Cabbage	100,000	900	Chestnuts	2,400	300
Celery (bunches)	9,840	295	Figs	30,000	900
Corn	90,000	2,700	Onions	440,000	3,520
Cherries	50,000	2,500	Pears	87,195	3,488
Grapes	14,569,421	291,388	Peaches	1,827,993	109,680
Onions	162,000	2,700	Peanuts	50,000	2,500
Pears	1,074,616	5,373	Plums	18,239	547
Peaches	928,227	3,481	Prunes—French	1,116,040	16,741
Peas	40,000	4,000	Raisins	7,000	420
Plums	52,240	261	Walnuts	3,000	300
Potatoes—Irish	990,000	6,750	Assorted nuts	9,385	938
Sweet	250,000	2,500	Popcorn	260	19
Prunes—French	66,320	332	Dates	210	12
Quinces	100,000	1,500			
Raspberries	10,000	500	<i>Canned.</i>	Cases.	Value.
Strawberries	65,000	5,200	Tomatoes	1,015	\$2,030
Tomatoes	250,000	5,000			
Pumpkins	175,000	219			

Wine and Brandy.

The wine output of the county is 1,985,000 gallons, valued at \$297,750; brandy, 114,510 gallons, worth \$28,629.

Livestock Industry.

	Number.	Value.		Number.	Value.
Cattle—Beef	40	\$1,200	Colts	600	\$10,440
Stock	24,503	392,050	Swine	8,400	25,200
Thoroughbred	172	5,170	Sheep—Imported	2,053	10,625
Dairy Cows—Thoroughbred	269	15,050	Common	235,610	471,220
Horses—Thoroughbred	24	9,725	Goats—Common	15,290	30,580
Standard-bred	1,093	52,105	Wool (pounds)	2,303,225	460,645
Common	2,779	73,430	Mohair (pounds)	58,925	15,321

Poultry and Dairy Industries—Fish.

The county reports 1,792 dozen chickens, worth \$4,480; turkeys, 3,308 dozen, worth \$87,340; eggs, 235,500 dozen, worth \$58,875.

There are 5 dairies in the county and 1 creamery, with an output of 50,000 pounds of butter, 83,182 pounds of cheese, 7,500 gallons of cream, and 78,200 gallons of milk. The total value of all dairy products is given at \$40,788.

The salmon catch is 463,000 pounds, worth \$23,500; salmon eggs, 50 pounds, worth \$2.

Forest Products.

In the county are 85,470 acres of timber land. There are 5 sawmills. The forestry output is 2,500 cords of fuel wood, worth \$12,500; 5,922,566 feet of sugar pine lumber, worth \$74,032; 11,123,067 feet of yellow pine lumber, worth \$139,038; 3,745,473 feet of spruce lumber, worth \$46,813; 28,000 posts, worth \$3,500; 140,000 shakes, worth \$840.

There is one sash and door factory, three steam power plants, and two water power plants.

Miscellaneous Products.

There are 465 beehives, worth \$465; honey, 1.110 pounds, worth \$67; hops, 97,614 pounds, worth \$11,714; syrup, 500 gallons, worth \$250.

Manufactories.

	Number.	Number of Employés.	Quantity Produced.	Value of Product.
Brick	15	8	650,000	\$4,550
Carriages and wagons	2	27	---	35,000
Cigars	2	5	160,000	6,500
Confectionery	3	6	34,100 lbs.	4,263
Flouring-mills	2	8	25,600 bbls.	115,200
Furniture and pictures	1	3	---	5,000
Foundries and iron works	1	3	---	1,200
Meat products	6	17	---	71,840
Hides	---	---	60,000 lbs.	7,200
Lard	---	---	20,000 lbs.	2,000
Meat packed	---	---	40 tons	10,000
Tallow	---	---	125 bbls.	2,125
Pickled olives	---	---	10,841 gals.	8,673
Planing-mills	1	125	---	---
Syrups and extracts	1	2	500 gals.	250

Productions Shipped Out of County.

	Amount.		Amount.
Barley	4,376 tons	Potatoes—Sweet	500 scks.
Hay	940 tons	Tomatoes	1,015 cases
Oats	40 tons	Assorted vegetables	19,205 lbs.
Wheat	6,232 tons	Melons	447,455 lbs.
Popcorn	260 lbs.	Fruit trees	70,000
Feed and mill stuff	1,440 tons	Cattle	5,650
Almonds	103,801 lbs.	Calves	43
Apples	179,450 lbs.	Hides—Green and dry	1,913
Apricots	190,923 lbs.	Horses	284
Figs	680 lbs.	Sheep	30,608
Dates	210 lbs.	Swine	4,825
Grapes	165,421 lbs.	Wool	1,511,338 lbs.
Olives	84,725 lbs.	Mules	73
Peaches	2,152,220 lbs.	Pelts	1,562
Pears	1,053,811 lbs.	Tallow	25 bbls.
Plums	40,479 lbs.	Mohair	56,425 lbs.
Prunes—French	538,360 lbs.	Butter	40,000 lbs.
Raisins	5,570 lbs.	Cheese	83,182 lbs.
Assorted nuts	9,385 lbs.	Cream	6,255 gals.
Chestnuts	2,400 lbs.	Brandy	14,510 gals.
Assorted fruits	5,191,404 lbs.		200 cases
Chickens	100 doz.	Wine	485,300 gals.
Turkeys—Dressed	285,000 lbs.	Lees (a grape product)	28,600 lbs.
Turkeys—Live	82,000 lbs.	Lumber	9,217,000 feet
Eggs	76,380 doz.	Salmon	413,113 lbs.
Beans—Dried	6,450 lbs.	Salmon eggs	50 lbs.
Beets	5,724 lbs.	Brick	31,250
Honey	1,110 lbs.	Flour	25,000 bbls.
Hops	97,614 lbs.	Pickled olives	10,591 gals.
Onions—Dried	900 scks.	Miscellaneous	60,000 lbs.
Potatoes—Irish	1,800 scks.	Copper ore	54,000 lbs.

TULARE COUNTY.

Tulare County, out of which three or four valley counties have been carved, is still one of the largest. It is about the size of Connecticut, and is almost square. It is remarkable for the height and beauty of its mountains, for its enormous groves of giant sequoia, for the fertility of its soils, for the abundance of watercourses, for the variety of products, for scenery that many declare to be superior to the Yosemite, for the highest mountain (Mount Whitney) in the United States on its eastern border, for the successful citrus territory, where are grown oranges that equal the finest produced, and for being the earliest section to be settled up and devoted to agricultural purposes. It is one of the greatest stock-raising counties. Cattle are raised for meat rather than for dairying, although the latter industry is keeping pace. The glory of Tulare is its deciduous fruit orchards, all along the channels of the Kaweah and Tule rivers. The soil is a deep alluvial loam, rich in nitrates and potash, and free from alkali.

Late frosts are rare. The spring is warm and early, which gives the fruit a perfect richness and sweetness.

While irrigation is general, at least to the extent of giving the trees one good drenching a year, there are many ranches where the underflow is only 6 to 12 feet from the surface, rising even higher in spring, and therefore no artificial watering is needed.

The principal town and the county seat is Visalia. It is the oldest city in the valley, having been founded in 1852 by the brothers Vice, for whom it was named. It is a modern, well-improved, prosperous city, with every prospect of continuous active growth. In the old days it was the starting point of the overland stage, and to-day it is said of Visalia that it represents more per capita wealth than any other city of like population. Visalia is midway between San Francisco and Los Angeles, but it was not until 1897 that it was connected with the main lines of the railroad. Electric power is supplied from a mountain watercourse.

Tulare City is the second in point of size; it is about 10 miles south of Visalia. The main line of the Southern Pacific, and the Tulare-Visalia line of the Santa Fé, pass through the city. In the surrounding country, cattle, hogs, and horses are raised, and there are flourishing orchards and broad wheat and alfalfa fields. It has substantial brick buildings, on broad, beautiful streets.

The famed citrus belt of Tulare lies about 12 miles east of Visalia, and includes a series of settlements, or districts, chief of which are Lindsay, Exeter, and Porterville. This land is practically frostless. The soil is shown to contain in exact proportions the elements needed for the growth of citrus trees. Freedom from fog gives immunity from insect pests, which need moisture in the air to prosper. The long, warm summer brings the fruit to maturity earlier than is the case farther south, and as a result Tulare fruit reaches the Eastern market in

November and the first weeks of December, in time for the Christmas trade.

Most of the district has a plentiful supply of water in the form of an underflow—a natural reservoir at a depth of from 50 to 75 feet. It is raised by pumping. Formerly the pumps were operated by gasoline, but electricity is now available at a reasonable price. Farm houses are lighted by electricity, and the cities of Visalia and Tulare and the towns of Exeter, Lindsay, and Porterville are supplied from the same plant.

The Porterville oranges have repeatedly carried off first prizes in the citrus fairs of the State.

In the Alta district, in the northwestern part, a considerable acreage is devoted to raisins, which do well in this county, although their cultivation has not been attempted on so extensive a scale as elsewhere.

Situated midway between the cities of Los Angeles and San Francisco, the dairyman is enabled to take advantage of varying market conditions to secure the highest prices. There has been a marked increase in the dairy interests. Another noticeable gain was made in horses and mules. There is a growing demand for draft-horses and large-boned, big-muscled mules, and these animals command good prices.

Soil and climate are generally adapted to diverse products. A crop of grain hay may be cut in May, and a harvest of potatoes, squashes, Indian or Egyptian corn taken from the same field in October. Alfalfa is one of the best honey plants. It supplies poultry with green feed the entire year. Its succulent shoots promote the rapid growth of young pigs and calves. The problem of meeting bills does not confront the diversified farmer. He has always something to sell. There is no waste. The hog gets what the reaper overlooks. The chicken in turn finds what the pig misses. A vast saving in labor is effected. With the aid of his family, daily tasks, trivial in themselves, accumulate in results that materially swell the income. Nor is there either drudgery or monotony on a farm of this kind. Varied interests and changing occupations give zest to life and rob labor of its burden.

Alfalfa hay has a broad market for shipment. Squashes, onions and beans command good prices. Honey has an unlimited market, it being shipped East in carload lots. Poultry and eggs are higher than in the East, and their production cheaper. Berries of all kinds thrive, and meet with a ready demand in the local markets.

STATISTICS OF TULARE COUNTY FOR 1905.

General.

Area, 4,863 square miles, or 3,112,320 acres	Road levy per \$100, 1905	35 cts.
Number of farms	Value of county buildings	\$119,925
Number of acres assessed	Irrigating ditches—miles, 654;	
Value of country real estate	cost	\$760,000
Of improvements thereon	Railroads, Steam—miles, 193.38;	
Of city and town lots	assessed value	\$2,774,260
Of improvements thereon	Electric power plants, 2; assessed	
Of personal property	value	\$81,175
Total value of all property	Electric power lines—miles, 150;	
Amount expended on roads and	assessed value	\$39,740
bridges	Number of acres irrigated	90,352
Number of miles of public roads		1,800

Cereal Products and Hay.

	Acres.	Tons.	Value.		Acres.	Tons.	Value.
Wheat	143,118	31,338	\$835,910	Alfalfa hay	31,581	51,444	\$248,120
Barley	20,868	6,008	119,720	Grain hay	24,325	23,019	167,946
Oats	158	25	500	Egyptian corn	3,167	1,090	---
Corn	3,041	1,869	35,670				

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.		Bearing.	Non-Bearing.	Total.
Apple	35,361	8,023	43,375	Grape-fruit	612	87	699
Apricot	38,937	3,919	42,856	Banana	---	12	12
Cherry	20	---	20	Almond	11,745	---	11,745
Fig	9,170	2,210	11,380	Chestnut	---	16	16
Lemon	43,089	5,246	48,335	Walnut	922	16	938
Nectarine	5,969	---	5,969	Grapes	6,279	1,470	7,749
Olive	4,874	---	4,874	Raisin	3,544	1,041	4,585
Orange	422,622	323,693	746,315	Table	2,062	139	2,201
Peach	314,197	21,553	335,750	Wine	673	290	963
Pear	21,853	460	22,313	Blackberries	33	---	33
Plum	4,630	18	4,648	Currants	4	---	4
Prune—French	227,803	14,585	242,388	Raspberries	3	---	3
Simoni	4,425	711	5,136	Strawberries	17	---	17
Other kinds	28,545	---	28,545	Loganberries	4	---	4
Pomegranate	1,006	---	1,006				

Fruit, Vegetables, Nuts, Etc.

<i>Green.</i>	Pounds.	Value.	<i>Green—Continued.</i>	Pounds.	Value.
Apples	1,607,450	\$48,604	Raspberries	1,000	\$100
Apricots	710,200	9,886	Strawberries	6,000	600
Blackberries	65,000	3,900			
Beans	8,000	160			
Beets	1,000	20	<i>Dried.</i>	Pounds.	Value.
Cabbage	16,000	320	Almonds	7,330	\$840
Corn	4,000	80	Apples	2,000	160
Grape-fruit	30,000	600	Apricots	328,000	20,487
Lemons (boxes)	61,460	76,000	Figs	74,600	5,840
Nectarines	15,500	700	Pears	6,000	300
Onions	8,000	60	Peaches	1,421,500	73,583
Oranges (boxes)	468,566	675,232	Prunes—French	2,158,010	84,837
Pears	123,200	2,359	Other kinds	406,250	10,678
Peaches	12,184,000	156,101	Raisins	5,183,000	206,375
Plums	168,200	15,868	Walnuts	13,470	1,147
Potatoes—Irish	79,800	800			
Sweet	40,000	300	<i>Canned.</i>	Cases.	Value
Prunes—French	2,446,625	24,319	Peaches	200,000	\$550,000
Simoni (crates)	1,000	250	Strawberries	---	32
Other kinds	29,375	2,903			

Wines, Etc.

	Gallons.	Value.		Gallons.	Value.
Wine—Angelica	200	\$50	Wine—Zinfandel	30	\$45
Claret	2,555	530	Sweet	1,800	360
Port	101,200	30,300	White	400	60
Riesling	200	60	Vinegar	800	80
Sherry	25,100	7,525			

Number of wineries, 5.

Livestock Industry.

	Number.	Value.		Number.	Value.
Cattle—Beef	12,996	\$352,205	Horses—Thoroughbred	5	\$4,700
Stock	55,239	924,360	Standard-bred	22	3,805
Thoroughbred	100	5,000	Common	16,314	533,335
Dairy Cows—Graded	7,799	252,290	Colts	1,867	33,805
Holsteins	1,011	55,220	Sheep—Imported	1,500	5,750
Jersey	517	21,450	Common	50,736	157,209
Shorthorns	249	11,160	Lambs	19,649	49,977
Calves	17,510	87,550	Goats—Angora	268	1,072
Swine	40,848	95,006	Common	607	1,510
Mules	409	251,525	Wool (pounds)	391,996	60,552

Poultry and Eggs.

Tulare reports 19,941 dozen chickens, worth \$79,964; ducks, 57 dozen, worth \$342; geese, 32 dozen, worth \$444; turkeys, 726 dozen, worth \$10,890; eggs, 755,799 dozen, worth \$151,160.

Dairy Industry.

In the county are 176 dairies, 7 creameries, and 1 skimming station; output, 1,648,679 pounds of butter, worth \$427,302, and 60,000 pounds of cheese, worth \$7,200.

Forest Products.

	Amount.	Value.		Amount.	Value.
Area of timber lands			Sawmills (number)	5	\$16,500
(acres)	191,620	\$850,620	Fuel, wood (cords)	11,019	32,768
Cedar (acres)	1,000	10,000	Lumber—Fir (feet)	720,000	18,000
Fir (acres)	2,750	45,000	Sugar pine (feet)	200,000	2,000
Oak (acres)	161,940	485,820	Yellow pine (feet)	680,000	50,000
Sugar pine (acres)	1,880	25,800	Redwood (feet)	3,000,000	76,000
Yellow pine (acres)	10,600	113,000	Posts (pieces)	60,400	5,140
Redwood (acres)	13,450	171,000			

The power plants in the county equal 23,787 horse-power steam, 26,415 horse-power electricity, and 76 horse-power water.

Miscellaneous Products.

There are 3,858 bee hives, worth \$6,077; honey, 556,000 pounds, worth \$33,360; alfalfa seed, 140,420 pounds, worth \$15,442.

Manufactories.

	No.	Number of Employés.	Quantity Produced.	Value of Product.
Brick	1	10	2,000,000	\$16,000
Flouring-mills	3	15	5,400 bbls.	270,000
Foundries and iron works	1	5	-----	50,000
Hides	---	---	72,000 lbs.	5,760
Tallow	20	---	-----	360
Pelts	---	---	1,100	770
Granite	1	---	24,000 cu. ft.	24,000
Planing-mills	1	8	-----	20,000
Tin and galvanized iron	3	6	-----	15,000
Pickled olives	---	---	13,350 gals.	5,340

Productions Shipped Out of County.

	Amount.		Amount.
Barley	500 tons	Turkeys	50,000 lbs.
Hay	2,700 tons	Eggs	550,000 doz.
Wheat	4,300 tons	Honey	200,000 lbs.
Almonds	5,000 lbs.	Onions—Dried	640 sacks
Apples	10,000 boxes	Cattle	12,367
Apricots	11,000 boxes	Hides	2,600
Figs	72,000 lbs.	Horses	1,700
Grape-fruit	1,920 boxes	Sheep	11,600
Grapes	1,000,000 lbs.	Swine	20,000
Lemons	60,260 boxes	Wool	391,996 lbs.
Nectarines	420 boxes	Pelts	1,100
Oranges	460,000 boxes	Tallow	20 bbls.
Peaches	20,000,000 lbs.	Butter	360,000 lbs.
Pears	120,000 lbs.	Cheese	60,000 lbs.
Plums	160,000 lbs.	Lumber	2,000,000 ft.
Prunes—French	4,000,000 lbs.	Oakwood	3,535 cords
Other kinds	600,000 lbs.	Olive Oil	1,000 gals.
Raisins	4,500,000 lbs.	Pickled Olives	5,000 gals.
Chickens	10,000 doz.		

TRINITY COUNTY.

Trinity County is oblong in shape, its greatest length running north and south for 90 miles, while its width from east to west at its widest part will not exceed 55 miles. Mountain barriers inclose it on three sides. The entire surface is, in consequence, broken, rugged and precipitous. To this formation the section is indebted for its abundant moisture, as it is watered by numerous streams, all having their sources in the county, and flowing eventually into the ocean. Trinity River, the largest of these, rises in the north, flows south for about 40 miles, and then turns sharply to the northwest, receiving in its course the waters of many tributaries. The southern part has also many streams, and is a mass of high, rugged mountains.

Weaverville, the county seat, has an altitude of 2,000 feet, and its climate differs little from that of other places similarly located. Owing to the altitude of the county, the atmosphere is dry and pure, and the extremes of heat and cold do not cause so much discomfort as they would in less elevated regions.

Trinity is essentially a mining county, and but little attention has been paid to agriculture. Some fruit is grown for home consumption, and apples, pears, and plums do well. Berries of all kinds thrive and yield abundantly.

It is not a fruit-growing county, but along the streams and rivers in the mining towns, and on stock ranches, are small family orchards, the chief of which are at Weaverville, Junction City, and vicinity. The apples raised are choice, and other fruits are of excellent flavor.

The area of agricultural lands under cultivation is small, the principal products being barley, oats, and wheat. Vegetables are raised for consumption in the towns and mining camps.

Nature has been most lavish in her bestowal of natural resources upon this region. A temperate climate; hills stocked with game; streams supplied with trout; mountain sides ribbed with veins of metal-bearing ores; hills, river bars, and benches covered with auriferous gravels; mountain scenery unsurpassed for beauty and grandeur; springs of pure, cold water; streams of heavy grade, with abundance of water for mining, irrigation, domestic, and power purposes; forests of pine and spruce and sugar pine; stock ranges covered with abundant crops of natural grasses; agricultural lands capable, with moderate irrigation, of producing all the varieties of fruit, grass, grain, and berry of temperate climes—such are some of the gifts of nature in this section.

The industry first in importance and opportunity in Trinity County is that of gold mining in its various branches—hydraulic, quartz, and dredge. With all the mines in operation, but a small portion of the auriferous gravel has so far been worked. For the comparatively new industry of dredge mining, because of its large river bars and numerous facilities for obtaining electric power, the county offers splendid opportunities. That the river bars have the necessary values, and that they can be so worked, have been demonstrated.

In quartz mining the county offers equally as good opportunities as in placer mining. Though quartz mining is an industry which was not prosecuted in Trinity until about 1880, since that time it has been constantly followed, with most profitable results, in nearly every section. There are numerous bodies of comparatively low-grade ores which would be opened up and worked if the county had communication by rail with outside points.

Besides gold, copper, iron, platinum, quicksilver, coal, iridium, and asbestos have been found at various places; but with the exception of quicksilver, none of these metals has received much attention. The copper prospects show large deposits of that metal. The finds of platinum have been frequent, and probably would rouse more interest if miners generally knew this metal was as valuable as gold and could be saved by similar methods.

The soil, with moderate irrigation, produces splendid crops of alfalfa and red clover, and fits the county for an industry badly needed—that of the dairy and creamery. With a splendid home market for butter, cheese, ham, bacon, and lard, it is strange that this industry has not been vigorously prosecuted, for certainly there are some splendid opportunities.

Stock-raising has been and always will be a leading business. Fine open ranges and an abundance of water are in every part. Though feeding is sometimes required in the winter, many of the stockmen avoid this by driving their stock to the Sacramento Valley and pasturing there.

Though covered with magnificent forests of pine, spruce, and sugar pine, no use has yet been made of the timber resources beyond the supplying of home demand. In present conditions not much development of the lumber industry can be looked for until the construction of a railroad into the county.

Communication by steam or electric railroad with Humboldt Bay and the Sacramento Valley is the greatest necessity required for the development of Trinity County and its resources.

STATISTICS OF TRINITY COUNTY FOR 1905.

General.

Area	3,000 square miles	Amount expended on roads	\$7,375
Number of farms	160	Amount expended for bridges ..	\$9,500
Number of acres assessed	556,182	Number of miles of public roads ..	250
Value of country real estate	\$1,552,236	Road levy per \$100, 1905	40 cts.
Of improvements thereon	\$225,815	Value of county buildings	\$20,000
Of city and town lots	\$27,161	Irrigating ditches—miles, 200; cost ..	\$20,000
Of improvements thereon	\$84,620	Electric power and light plants ..	7
Of personal property	\$384,639	Electric power lines	30 miles
Total value of all property	\$2,262,880	Number of acres irrigated	8,000

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.		Bearing	Non-Bearing.	Total.
Apple	5,000	3,000	8,000	Quince	50	10	60
Apricot	50	10	60	Almond	20	8	28
Cherry	500	140	640	Chestnut	50	10	60
Fig	15	10	25	Walnut	200	25	225
Lemon	10	5	15	Grapes	20	5	25
Olive	6	2	8	Blackberries ..	30	...	30
Peach	1,500	500	2,000	Currants	5	...	5
Pear	500	200	700	Gooseberries ..	3	...	3
Plum	500	200	700	Raspberries ..	20	...	20
Prune—French ..	1,000	200	1,200	Strawberries ..	20	...	20

Cereal Products and Hay.

Of cereals there are reported 2,000 acres of wheat, 50 acres of barley, 200 acres of oats, and 50 acres of corn.

Of alfalfa hay there are 3,500 acres, the yield from which was 12,000 tons, worth \$120,000; of grain hay there are 10,000 acres, the yield from which was 20,000 tons, worth \$30,000.

Poultry Industry.

There are 500 dozen chickens, worth \$2,500; 10 dozen ducks, worth \$60; 5 dozen geese, worth \$50; and 25 dozen turkeys, worth \$250.

Livestock Industry.

	Number.	Value.		Number.	Value.
Cattle—Beef	1,000	\$4,000	Dairy Cows—Jersey ...	15	\$750
Stock	15,000	150,000	Swine	2,000	10,000
Thoroughbred	10	1,000	Horses—Thoroughbred	2	1,000
Dairy Cows—Graded ..	400	16,000	Common	1,500	45,000
Devon	2	200	Sheep—Common	5,000	15,000
Herefords	2	200	Goats—Common	225	500
Shorthorns	2	200			

Forest Products.

	Amount.	Value.		Amount.	Value.
Area of timber lands			Fuel, wood (cords)	10,000	\$20,000
(acres)	1,000,000	----	Lumber—Cedar (feet) ..	20,000	400
Cedar (acres)	5,000	----	Fir (feet)	250,000	5,000
Fir (acres)	150,000	----	Pickets (pieces)	10,000	100
Oak (acres)	1,000	----	Posts (pieces)	5,000	500
Sugar pine (acres) ...	40,000	----	Shakes (thousand)	40,000	40,000
Yellow pine (acres) ..	50,000	----	Mine timbers (feet)	500,000	10,000
Sawmills (number)	15	----			

There are 15 power plants—10 steam and 5 water.

Exports.

The exports were 1,000 cattle, 3,000 hides, 100 horses, and 300,000 feet of lumber.

TUOLUMNE COUNTY.

Tuolumne County is in Central California, and is known as the Southern Mines. It is 150 miles nearly due east from San Francisco, and varies in width from 8 to 12 miles. The eastern portion extends into the western slope of the Sierra Nevada range. The entire surface is of a rugged character, with many small and fertile valleys and meadows, and sloping hills heavily covered with timber.

The county seat is Sonora, on the line of the railroad, and in about the center of the county.

The Sierra Railway connects at Oakdale with the line of the Southern Pacific, extending thence 53 miles in an easterly direction to Tuolumne, at which point junction is made with the Hetch-Hetchy & Yosemite Valley Railroad, which reaches into the high Sierras, tapping the vast timber belts, and affording transportation for lumber and mining material. The railroad passes directly through all the large towns of the county, and makes stage connections for outlying places.

Tuolumne County has made some wonderful strides during the last few years. While the railroad has worked a hardship to some of our towns, by shutting off staging and teaming, it has been the means of bringing in many people who never would have come if compelled to travel by stage. The population has increased, the assessment roll is larger, mining machinery can be placed at the mine for less cost, and every point can be reached within twelve hours' ride from San Francisco.

The scenery is unsurpassed. The streams afford pleasure to the sportsman equal to any place in the State.

Tuolumne County is noticeable for its many roadways, aggregating something over 400 miles.

During the last six years the mining industry has been steadily on the improve. While mining is the greatest factor, the timber industry is fast coming to the front. The town of Tuolumne was laid out by the West Side Flume and Lumber Company in 1899. Since then it has installed a large sawmill plant. It has also completed a box factory. It has erected a fine hotel, also a large general store with offices overhead, and its lumber yards cover a large area. It has a narrow-gauge railroad which extends into the heavily timbered mountains. Logs are placed on flat cars, and hauled to the sawmill. This town is but a quarter of a mile west of the old town of Carters, and both are surrounded by producing mines.

The annual output of the mines is nearly \$2,000,000. Some of the greatest producing mines in the State are located in Tuolumne County.

The timber belt is great in dimensions, comprising 60 per cent sugar pine, 20 per cent yellow pine, and the balance cedar and fir. Upon some tracts the timber will run 300,000 feet to the acre, many of the trees measuring 33 feet in circumference and 300 feet in height. The Tuolumne grove contains about 1,300 sequoias.

The famous Mother Lode traverses the entire western portion of the county. The foot wall of the Mother Lode is serpentine, with eruptive dikes accompanying, while mineralized slate forms the hanging wall. All east of the Mother Lode is what is known as the East Belt, upon which are situated many fine producing mines, together with prospects held under possessory title. The East Belt has made quite a record, and is the principal mining section of the Southern Mines. The following list shows some of the metals found in Tuolumne County: Gold, silver, copper, arsenic, antimony, galena, zinc, iron, amphibolite, obsidian, asbestos, manganese, corundum, barite, and marble.

The main rivers are the Stanislaus and Tuolumne, tributaries of the San Joaquin. The Tuolumne has its source entirely within the limits of the county, and may be termed the river of a thousand lakelets, although a number of these strictly come under the head of lakes. The main or principal branch of the river flows through the Hetch-Hetchy Valley. This branch, with its many tributaries, commands about three fourths of the watershed of the county. The Stanislaus River, to the north, with one of its branches, forms the boundary line of this county and Calaveras.

The water supply is ample for all requirements, being used for mining and irrigation. It is furnished by a system of dams, reservoirs, and canals.

Four miles east of Sonora is Phoenix Lake, which is the lower distributing point, covering Sonora district and the Mother Lode. At Phoenix Lake is an electric power plant, which supplies power and lights to all the principal mines upon the Mother Lode. The towns of the county are furnished with electric lights from power generated by a plant situate upon the south fork of the Stanislaus River.

In many places the soil is admirably adapted to fruit-growing, and in the foothills some of the finest apples in the State are grown. Semi-tropical fruits of every variety and vines are cultivated, and yield an abundance of highly flavored fruit. The almond and walnut are cultivated, with encouraging results. Lemon and orange trees do well in the southern portion.

Large quantities of grapes are shipped each year, while the second class is made into wine of good quality.

Champagne cider manufactured here has a reputation throughout the United States.

The sunny, sheltered hillsides of Tuolumne County offer inducements for the culture of fruits. With the present system of water ditches, and can easily be irrigated.

Most of the stock-raisers produce sufficient hay for their own use, and considerable is raised upon small farms, also. Little, if any, is shipped out of the county. Stock-raising is controlled mostly by feed—by those who have ranges in the mountains for summer, and pastures in the foothills for winter. In the mountains in certain sections there are meadows upon which grows the finest kind of bunch grass, while upon the hillsides wild oats and timothy afford a splendid feed.

The principal towns are: Sonora (county seat), situate about the center of the county. It has an elevation of about 1,825 feet, and is considered an exceptionally good business town. There is a courthouse, absolutely fireproof, and even age can not impair it. Columbia is 4 miles to the north of Sonora. It is one of California's famous mining

camps of early days. Tuolumne and Carters lie 10 miles east of the county seat, and are situate in the center of the wonderful East Bel mining district, and have an exceptionally bright future, being the terminus of the Sierra Railway, and the junction of the Hetch-Hetchy & Yosemite Valley Railroad; also the headquarters of the West Side Flume and Lumber Company.

STATISTICS OF TUOLUMNE COUNTY FOR 1905.

General.

Area, 9,408 square miles, or 1,518,000 acres	Road levy per \$100, 1905.....	40 cts
Number of farms.....	Value of county buildings.....	\$158,000
Number of acres assessed.....	Irrigating ditches—miles, 203; cost.....	\$1,017,500
Value of country real estate.....	Railroads, Steam—miles, 66.74; assessed value.....	\$342,780
Of improvements thereon.....	Electric power plants, 2; assessed value.....	\$89,840
Of city and town lots.....	Electric power lines—miles, 37; assessed value.....	\$36,000
Of improvements thereon.....	Number of acres irrigated.....	1,030
Of personal property.....		
Total value of all property.....		
Amount expended on roads.....		
Amount expended for bridges.....		
Number of miles of public roads.....		

There are 913,739 acres of this county in a forest reserve.

Cereal Products and Hay.

	Acres.	Tons.	Value.		Acres.	Tons.	Value.
Wheat.....	223	82	\$328	Corn.....	8	4	\$120
Barley.....	31	21½	705	Alfalfa hay.....	391	1,108	16,620
Oats.....	208	105	3,675	Grain hay.....	9,091	12,841	154,092

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.		Bearing.	Non-Bearing.	Total.
Apple.....	14,972	10,087	25,059	Pomegranate.....	16	.....	16
Apricot.....	294	135	429	Nuts—Almond.....	153	46	199
Cherry.....	291	138	429	Chestnut.....	86	27	113
Fig.....	789	34	823	Hickory.....	14	.....	14
Lemon.....	5	.....	5	Pecan.....	2	.....	2
Nectarine.....	14	1	15	Walnut.....	741	507	1,248
Olive.....	39	222	361	Grapes.....	240	.....	240
Orange.....	288	73	361	Wine.....	217	.....	217
Peach.....	7,339	2,108	9,447	Table.....	23	.....	23
Pear.....	4,350	359	4,709	Blackberries.....	15	.....	15
Plum.....	2,456	290	2,746	Currants.....	3	.....	3
Prune—French.....	131	113	244	Gooseberries.....	½	.....	½
Quince.....	266	45	311	Raspberries.....	½	.....	½
Persimmon.....	5	10	15	Strawberries.....	11	.....	11

Fruit, Vegetables, Etc.

Green.	Pounds.	Value.	Green.	Pounds.	Value.
Almonds.....	4,500	\$450	Loganberries.....	2,000	\$200
Apples.....	1,642,500	32,850	Onions.....	76,000	1,520
Apricots.....	16,500	321	Oranges (boxes).....	240	480
Asparagus.....	1,000	70	Pears.....	255,500	2,832
Blackberries.....	40,250	3,020	Peaches.....	415,500	8,310
Beans.....	34,000	680	Peas.....	7,500	300
Beets.....	21,000	420	Plums.....	97,000	1,455
Cabbage.....	76,500	1,530	Potatoes—Irish.....	795,000	15,900
Celery.....	8,000	250	Potatoes—Sweet.....	8,250	250
Chestnuts.....	2,750	220	Prunes—French.....	5,500	165
Corn.....	119,500	1,790	Quinces.....	24,000	480
Currants.....	3,250	325	Raspberries.....	5,000	500
Cherries.....	14,500	1,015	Strawberries.....	24,700	2,470
Figs.....	92,500	2,775	Tomatoes.....	102,000	2,040
Gooseberries.....	1,000	75	Walnuts.....	30,000	2,400
Grapes—Table.....	76,000	1,520	Assorted vegetables.....	300,000	3,000
Wine.....	747,000	5,602	Melons.....	.....	675

Wines, Etc.

	Gallons.	Value.		Gallons.	Value.
Wine—Claret	13,615	\$3,405	Beer (barrels)	623	\$7,700
Port	250	125	Cider	56,600	11,320
Sherry	300	150	Porter	425	5,310
White	1,575	395			

Number of breweries, 4.

Livestock Industry.

	Number.	Value.		Number.	Value.
Cattle—Beef	2,284	\$68,520	Swine	3,290	\$23,030
Stock	14,072	246,260	Horses—Thoroughbred	47	8,225
Thoroughbred	6	1,000	Common	2,877	143,850
Dairy Cows—Graded	990	39,600	Colts	293	5,860
Herefords	4	300	Mules	93	6,975
Holsteins	5	400	Sheep—Common	1,180	4,720
Jersey	15	1,200	Goats—Angora	26	75
Shorthorns	5	450	Common	1,096	2,192
Calves	5,336	42,688	Wool (pounds)	1,120	150

Poultry and Eggs.

	Dozen.	Value.		Dozen.	Value.
Chickens	2,867	\$14,335	Turkeys	242	\$5,810
Ducks	53	371	Eggs	110,910	22,622
Geese	13	235			

Number of poultry farms, 2.

Dairy Industry.

There are 14 dairies, which produce 29,183 pounds of butter, worth \$7,296, and 1,375 gallons of cream, worth \$2,062.

Forest Products.

	Amount.	Value.		Amount.	Value.
Area of timber lands (acres)	275,000	----	Lumber—Fir (feet)	1,005,000	\$10,050
Cedar (acres)	27,500	----	Sugar pine (feet)	17,676,020	309,330
Fir (acres)	41,250	----	Yellow pine (feet)	21,904,250	328,560
Sugar pine (acres)	96,250	----	Posts (pieces)	12,900	905
Yellow pine (acres)	110,000	----	Sash and door factories (number)	1	26,000
Sawmills (number)	7	\$160,000	Shakes (thousand)	1,330	10,640
Charcoal (sacks)	6,800	4,312	Shingles (thousand)	300	225
Fuel, wood (cords)	12,133	60,665	Lagging (pieces)	3,200	1,872
Baths (thousand)	2,700	3,375	Round timber (running feet)	356,100	14,244
Lumber—Cedar (feet)	763,750	7,637			

Honey, Etc.

There are 563 bee hives, worth \$600, with an output of 649 pounds of beeswax, worth 165, and 8,490 pounds of honey, worth \$850.

Manufactories.

	Number.	Number of Employees.	Quantity Produced.	Value of Product.
Cigars	2	6	230,000	\$11,500
Confectionery	2	2	----	2,200
Coundries and iron works	4	15	210 tons	14,700
Brass works	—	—	----	900
Time	1	1	600 bbls.	1,200
Machinery	4	9	----	19,000
Malt	1	—	25 tons	1,250
Sash and door factory	1	110	330,000 ft.	216,000
Hooks	2	40	6,455,000 ft.	116,390
Ce	1	2	200 tons	4,000
Cider, champagne	1	7	3,000 cases	9,000
Cider, new	—	—	200 bbls.	3,600
Cider, cured	—	—	100 bbls.	2,500
Apple champagne	—	—	40 bbls.	1,560

Products Shipped Out of County.

	Amount.		Amount.
Apples.....	300 bbls.	Limestone.....	1,070 tons
Beeswax.....	200 lbs.	Sulphurets.....	11,089 tons
Honey.....	1,000 lbs.	Cider.....	175 bbls.
Cattle—Beef.....	715	Apple vinegar.....	200 bbls.
Hides.....	1,685	Apple champagne.....	800 cases
Wool.....	1,000 lbs.	Lumber.....	14,742,212 feet
Tallow.....	34,750 lbs.	Sugar pine.....	16,873,908 feet
Granite.....	600 tons	Shooks.....	6,455,000 feet
Marble.....	1,440 tons	Doors and windows.....	\$146,000

VENTURA COUNTY.

Ventura is located on the shores of the Pacific Ocean. It has about 208,000 acres of fertile, productive soil. There is one large valley, where all kinds of crops, and nuts, and fruits are raised. Principal among the products is the lima bean, other beans, sugar beet, wheat, barley, oats, hay, corn, walnuts, oranges, lemons, apricots.

The valleys of the county are watered by the Santa Clara and Ventura rivers and their numerous tributaries. The Santa Clara River extends from the northeast to the southwest across the county, and through a fertile and productive valley known as the Santa Clara Valley. The Ventura River extends from north to south through the western portion of the county and empties into the Pacific Ocean just west of the town of Ventura, from which river the town is supplied with water. These streams have an abundance of trout, and are excellent for fishing.

Another important valley is the Ojai, a great amphitheater, whose walls are mountains rising like citadels. This basin has the appearance of a nest, is well timbered, and has a very rich, productive soil.

Other large valleys are the Conejo, admirably adapted to the raising of wheat, oats, barley, and other crops; the Simi, where large wheat fields are seen; also prunes, apricots, and other fruits are successfully grown. In this valley are artesian wells for irrigation. The Las Posas is another valley devoted to the raising of small grains, fruits, and beans. The Sespe, lying along each side of the Santa Clara River, is another ideal spot for the growth of the orange, lemon, apricot, walnut, and other fruits. An abundance of water is secured from the rivers and creeks for irrigation. The San Buenaventura Valley, locally mentioned as the avenue, on account of the beautiful drive, is dotted on each side by pleasant, well-kept homes, where our busy merchant devotes a few hours of the day to growing small orchards, and gardens, and chickens for recreation.

Ventura is one of the best watered counties in Southern California; nearly every farm can be reached at little expense. The soil of the valleys is rich and inexhaustible, varying in depth from 10 to 150 feet, and yielding enormous returns.

The sugar beet is one of the most important industries. At Oxnard there is a large sugar factory. It gives employment to a great many men during the season, covering a period of five to six months each year, besides quite a number the year round. Ventura County is recognized as the ideal locality for sugar-beet cultivation, both for tonnage, yield per acre, and the high percentage of sugar. There is no waste to the sugar beet, as the pulp is saved and fed to stock cattle to fatten them for the market.

Ventura, the county seat, is in the extreme western portion of the Santa Clara Valley, and at the southern extremity of the San Buenaventura Valley. The town is prettily situated on the seashore, between

the mountains on the north and the sea on the south. The town is on the main line of the Southern Pacific, with through trains to the Eastern States, and has regular freight and passenger steamers up and down the coast, making cheap transportation and offering special facilities for manufacturing industries.

Vegetables of every description thrive, and large quantities are shipped to outside markets, principal among these being the Australian crimson rhubarb, Burbank's new production. This crop grows the year round, but brings the best returns during the months of November, December, January, and February.

STATISTICS OF VENTURA COUNTY FOR 1905.

General.

Area, 1852.66 square miles, or 1,185,705 acres	Amount expended for bridges	\$8,016
Number of farms	Number of miles of public roads	485
Number of acres assessed	Road levy per \$100, 1905	40 cts.
Value of country real estate	Value of county buildings	\$112,000
Of improvements thereon	Irrigating ditches—miles, 47; cost	\$105,000
Of city and town lots	Railroads, Steam—miles, 108.32;	
Of improvements thereon	assessed value	\$1,624,800
Of personal property	Electric power plants, 3; assessed	
Total value of all property	value	\$46,250
Amount expended on roads		

Cereal Products and Hay.

	Acres.	Tons.	Value.		Acres.	Tons.	Value.
Wheat	4,184	3,800	\$106,400	Corn	2,297	2,324	\$58,100
Barley	18,713	16,747	301,446	Alfalfa hay	1,042	6,949	58,676
Oats	2,863	2,203	55,075	Grain hay	18,425	27,052	241,557
Rye	224	87	1,740				

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.		Bearing.	Non-Bearing.	Total.
Apple	15,450	1,087	16,537	Prune—French	25,474	515	25,989
Apricot	331,222	31,858	363,080	Quince	149	10	159
Cherry	150	—	150	Nuts—Almond	8,016	3,538	11,554
Fig	587	212	799	Pecan	8	—	8
Lemon	90,373	3,067	93,440	Walnut	72,865	27,331	100,196
Nectarine	46	10	56	Grapes	198	15	213
Olive	39,373	932	40,305	Blackberries	5	—	5
Orange	118,911	9,951	128,862	Currants	1	—	1
Peach	9,549	436	9,985	Strawberries	4	—	4

Fruit, Vegetables, Nuts, Etc.

	Pounds.	Value.		Pounds.	Value.
<i>Green.</i>			<i>Green—Continued.</i>		
Apples	671,600	\$10,074	Potatoes—Sweet	44,200	\$884
Blackberries	12,900	675	Quinces	8,050	161
Beets	296,000,000	740,000	Raspberries (crates)	450	450
Cabbage	26,000	390	Strawberries (crates)	11,260	11,260
Figs	25,000	500	Tomatoes	30,000	300
Grapes	518,000	5,180	Olives	1,440,000	14,400
Grape-fruit (boxes)	300	600	Pumpkins	320,000	480
Lemons (boxes)	177,375	620,712			
Onions	12,000	120	<i>Dried.</i>		
Oranges (boxes)	170,782	341,564	Almonds	67,510	\$8,886
Pears	10,000	200	Apricots	2,221,975	121,658
Peaches	210,000	4,200	Beans	43,747,324	1,312,419
Persimmons	1,000	50	Corn	4,648,000	58,100
Plums	7,940	186	Prunes—French	291,000	4,365
Potatoes—Irish	840,935	8,409	Walnuts	2,828,350	311,120

Poultry and Eggs.

	Dozen.	Value.		Dozen.	Value.
Chickens	4,224	\$16,896	Turkeys	122	\$2,684
Ducks	46	276	Eggs	107,020	18,685
Geese	9	135			

Wine and Brandy.

In the county are 5 wineries and 2 distilleries, with an output of 21,300 gallons of claret wine, worth \$3,195; and 425 gallons of brandy, worth \$680.

Livestock Industry.

	Number.	Value		Number.	Value.
Cattle—Beef	4,381	\$131,430	Horses—Thoroughbred	10	\$18,000
Stock	10,785	215,700	Standard-bred	83	16,600
Thoroughbred	50	4,000	Common	5,276	474,840
Dairy Cows—Graded	1,826	73,040	Colts	971	29,130
Herefords	250	7,500	Mules	864	106,175
Holsteins	250	7,500	Sheep—Common	8,170	15,150
Jersey	328	9,390	Lambs	2,000	3,000
Calves	2,657	26,570	Goats—Common	1,000	2,000
Swine	7,379	36,895	Wool (pounds)	141,358	35,400

Dairy Industry—Fish.

The dairy output is given at 134,421 pounds of butter, worth \$26,884.

The fish industry reports a catch of 75,600 pounds of lobsters, worth \$6,048.

Forest Products.

There is one sawmill in the county, worth \$40,000.

The forest products are 8,500 sacks of charcoal, worth \$2,670, and 9,564 cords of fuel wood, worth \$49,555.

The timber area of the county is 3,000 acres—1,000 of oak and 2,000 of yellow pine.

Miscellaneous Products.

There are 13,171 bee hives; beeswax, 900 pounds, worth \$225; honey, 1,309,600 pounds, worth \$63,523.

Sorghum, 18 acres; output, 54,000 pounds, worth \$216.

Sugar beets, 11,270 acres; output, 148,000 tons, worth \$740,000.

Manufactories.

	Number.	Number of Employés.	Quantity Produced.	Value of Product.
Brick	2	19	800,000	\$6,800
Confectionery	4	8	36,000 lbs.	9,000
Hides	--	--	70,000 lbs.	7,000
Pickled olives	--	--	4,700 gals.	1,980
Olive oil	1	3	3,200 gals.	6,400
Planing-mills	1	3	100,000 ft.	12,000
Sugar—Beet	1	600	22,500 tons	2,225,000

Productions Shipped Out of County.

	Amount.		Amount.
Barley	2,612 tons	Prunes—French	248,700 lbs.
Corn	100 tons	Strawberries	11,000 lbs.
Broom	8,000 lbs.	Walnuts	2,099,925 lbs.
Hay	2,779 tons	Chickens	148 doz.
Wheat	900 tons	Eggs	9,750 doz.
Almonds	60,360 lbs.	Beans	40,346,096 lbs.
Apples	800 boxes	Sugar	22,000 tons.
Apricots	1,652,000 lbs.	Potatoes—Irish	6,050 sacks
Grape-fruit	300 boxes	Potatoes—Sweet	248 sacks
Lemons	162,075 boxes	Butter	1,000 lbs.
Olives	600,400 lbs.	Cattle	2,700
Oranges	167,762 boxes	Hides	5,326
Peaches—Green	325 boxes	Horses	20
Peaches—Dried	42,345 lbs.	Swine	630

YOLO COUNTY.

Yolo County is acknowledged by those at all acquainted with its wonderful fertility to be the gem of the great Sacramento Valley. Approaching it from the north or from the south, one is impressed with the increasing richness of the soil.

About four fifths of its area is level, but the western portion breaks into hills, with cañons and valleys of considerable extent, chief among which is Capay Valley, noted as one of the earliest fruit sections of the State. The hills are nearly all used for grazing, except the numerous homesteads. Along the eastern side of the county, near the Sacramento River, is what is known as the "tule basin," which contains about 40,000 acres. These lands are overflowed during high water, but as the water recedes furnish rich pasture for immense herds of stock. The county has very little waste land.

The two principal streams are Putah Creek and Cache Creek, the former being the boundary line, for a portion of the way, between Solano and Yolo counties. Cache Creek is the outlet of Clear Lake. Its elevation is 1,300 feet above sea-level, and with Cache Creek as its only outlet, it will be seen that nature has furnished a magnificent natural reservoir. It is estimated that 50,000 horsepower could be generated by its waters, and that there would be enough left to irrigate every acre of land on each side of the creek, after it reaches the valley.

During high water Cache Creek has brought down from the hills and mountains immense quantities of the very cream of the soil, and for ages has been depositing this upon the land. The result is that there is a rich sedimentary deposit of from 20 to 30 feet in depth, entirely without hardpan, which is as rich as the valley of the Nile. This is particularly true of a large area around Woodland. It is ideal fruit land. You may find growing on this soil wheat, barley, oats, corn, alfalfa, all the vegetables of a temperate and sub-tropical climate, apples, apricots, nectarines, plums, pears, peaches, prunes, oranges, lemons, limes, figs, pomegranates, grapes (table, wine, and raisin), olives, almonds, walnuts, berries, and melons. Some of these lands are better adapted to particular crops than others, yet there are eighty-acre tracts of this sedimentary soil in the valley on which everything that has been named is now produced. The foothills in the western part, from Winters to Capay, and north, as well as those bordering Capay Valley, are mostly very fertile, and a great many have planted orchards and vineyards, the warm soil and exemption from frost making it a very desirable location.

The products are varied. Until within a few years, the cultivated area was devoted almost entirely to the production of wheat and to stock-raising. Yolo still holds the banner as the largest producer of wheat and barley, according to acreage, but in the meantime she is coming to the front as a fruit-producer.

The grape industry is a very important item. Yolo has the honor of producing the first raisins of commerce in America, and the late R. B. Blowers was the pioneer grower. The Seedless Sultana grape, which is grown here quite extensively, makes a very plump and "meaty" raisin, and for years the Woodland Sultanas have been acknowledged by the trade to be the best in the State. The shipment of table grapes to the New York market is quite an industry.

This county is noted for producing some of the fastest horses in California, and any day, on the streets and roads, can be seen fine specimens of driving horses. Woodland has been a center from which thousands of horses and mules have been shipped during the past few years, and they have gone to all parts of the country, notably to Hawaii, the Philippines, South Africa, and the Southern States.

There are thousands of acres of alfalfa, and the area is rapidly increasing. As each acre will yield from six to eight tons of hay, it can readily be seen how important the dairy interest may become. For stock of any kind there can be no better feed than alfalfa, either green or cured for hay.

The county seat is Woodland. Its streets are wide and clean, and lined with shade trees, while here and there can still be seen some of the majestic old oaks which suggested the name of the city.

Winters is located on Putah Creek, in the southwestern part of the county, and is noted as the earliest fruit section in the State.

Davisville, also located on Putah Creek, is in a very fertile section. There are probably more almonds grown here than in any other district in the State.

Yolo is on Cache Creek. It is also in a very fine fruit section, and boasts of having the largest almond orchard in the world. It has an olive-oil and pickling plant. The olives used for oil are first dried, and then run through a mill, which separates the seed from the pulp, the latter being then pressed to extract the oil. It is claimed that this process gives an oil of superior flavor, and is the only mill in existence which uses this process. The olives, after being dried, can be stored away and will keep in that condition for an indefinite time, thus giving the mill the entire year in which to work up the product.

Esparto is near the mouth of Capay Valley, on Cache Creek. It is surrounded by a fine body of land, largely devoted to fruit, vines, and alfalfa. It is quite a shipping point for wheat and barley.

The Woodland Chamber of Commerce, the Winters Board of Trade, and the Guinda Board of Trade are active public organizations.

STATISTICS OF YOLO COUNTY FOR 1905.

General.

Area, 1,017 square miles, or 650,880 acres	Number of miles of public roads	685
Number of farms..... 1,710	Road levy per \$100, 1905.....	39 cts.
Number of acres assessed..... 596,766	Value of county buildings.....	\$100,300
Value of country real estate..... \$10,369,495	Irrigating ditches—miles, 103; cost.....	\$57,500
Of improvements thereon..... \$1,044,825	Railroads, Steam—miles, 87.8; assessed value.....	\$1,317,000
Of city and town lots..... \$806,885	Electric power lines—miles, 60; assessed value.....	\$47,075
Of improvements thereon..... \$1,354,655	Number of acres irrigated.....	5,600
Of personal property..... \$1,795,500		
Total value of all property..... \$15,371,360		
Amount expended on roads..... \$42,331		
Amount expended for bridges.. \$15,000		

Cereal Products and Hay.

	Acres.	Tons.	Value.		Acres.	Tons.	Value.
Wheat	112,500	-----	-----	Alfalfa hay	13,080	65,400	\$261,600
Barley	136,495	-----	-----	Grain hay	71,000	106,500	426,500
Oats	400	350	\$7,700				

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.		Bearing.	Non-Bearing.	Total.
Apple	2,100	-----	-----	Prune	81,802	-----	-----
Apricot	129,258	-----	-----	Almond	128,052	-----	-----
Cherry	2,670	-----	-----	Walnut	1,000	-----	-----
Fig	5,200	-----	-----	Grapes—			
Lemon	245	-----	-----	Raisin	648,415	20,400	668,815
Nectarine	420	-----	-----	Table	129,685	-----	129,685
Olive	4,300	-----	-----	Wine	559,600	40,000	599,600
Orange	1,820	-----	-----	Blackberries } acres	5	-----	-----
Peach	110,378	-----	-----	Raspberries } acres	8	-----	-----
Pear	37,590	-----	-----	Strawberries } acres	2	-----	-----
Plum	6,090	-----	-----				

Fruit, Vegetables, Nuts, Etc.

<i>Green.</i>	Pounds.	Value.	<i>Green—Continued.</i>	Pounds.	Value.
Apples	360,000	\$3,600	Peaches	9,348,000	\$93,480
Apricots	3,400,000	64,000	Peas	200,000	4,000
Asparagus	250,000	10,000	Potatoes—Irish	20,000,000	120,000
Beans	4,000,000	80,000	Sweet	800,000	8,000
Cabbage	400,000	2,000	Prunes	-----	35,000
Celery	5,000	500	Raspberries	-----	960
Corn	250,000	2,500	Strawberries	-----	240
Cherries	200,000	8,000	Tomatoes	5,000,000	25,000
Grapes—Wine	10,616,000	68,696	Walnuts	20,000	1,000
Raisin	12,800,000	76,800			
Table	2,560,000	15,300	<i>Dried.</i>	Pounds.	Value.
Lemons (boxes)	625	625	Almonds	1,625,000	\$156,500
Nectarines	4,000	500	Figs	320,000	9,000
Onions	6,000,000	42,000	<i>Canned.</i>	Cases.	Value.
Oranges (boxes)	3,640	6,250	Apricots	-----	\$4,400
Pears	3,936,000	110,000	Peaches	-----	10,000

Wine, Brandy, Etc.

The wine output is given at 6,000 gallons, the beer output at 3,000 barrels, and the brandy output at 1,200 gallons.

Livestock Industry.

	Number.	Value.		Number.	Value.
Cattle—Beef	1,240	\$34,880	Colts	800	\$15,000
Stock	9,500	142,500	Sheep—Imported or		
Thoroughbred	120	6,000	fine	1,500	7,500
Dairy Cows—Graded	6,500	195,000	Common	43,000	86,000
Calves	2,560	23,040	Lambs	3,000	3,000
Swine	12,235	36,700	Goats—Common	555	700
Horses—Thoroughbred	37	5,000	Mules	3,500	165,000
Standard-bred	400	18,000	Jacks	30	4,300
Common	4,375	150,000	Wool (pounds)	446,770	50,000

Poultry and Eggs.

	Dozen.	Value.		Dozen.	Value.
Chickens	7,500	\$18,750	Turkeys	300	\$1,250
Ducks	75	190	Eggs	400,000	40,000
Geese	75	190			

Dairy Industry—Fish—Fuel.

In Yolo County are 400 dairies, 2 creameries, and 6 skimming stations, with an output of 1,500,000 pounds of butter, worth \$350,000; and 150,000 pounds of cheese, worth \$15,000. The fish output is 900,000 pounds of salmon, worth \$27,000, and 112,500 pounds of other kinds of fish, worth \$4,500.

The forest products have an output of 30,000 cords of fuel wood, worth \$90,000.

Miscellaneous Products.

There are 1,000 bee hives, valued at \$2,000. The yield of honey is 30,000 pounds, worth \$1,000.

There are 320 acres of hemp, the yield from which is 160,000 pounds, worth \$16,000.

Of hops there are 970 acres, with a yield of 1,010,800 pounds, valued at \$151,620.

The yield of alfalfa seed was 100,000 pounds, valued at \$10,000.

Manufactories.

	Number.	Number of Employés.	Quantity Produced.	Value of Product.
Cigars	1	3	180,000	\$9,000
Confectionery	2	6	45,000 lbs.	8,000
Hides	4,250	---	212,500 lbs.	20,000
Lard	---	---	4,000 lbs.	400
Meat packed	15	---	30,000 tons	1,800
Tallow	300	---	90,000 bbls.	3,600
Olive oil	---	---	1,500 gals.	1,000
Pickled olives	---	---	1,500 gals.	1,000
Planing-mills	2	7	---	---

Productions Shipped Out of County.

	Amount.		Amount.
Barley	17,500 tons	Honey	20,000 lbs.
Corn	100 tons	Hemp	160,000 lbs.
Hay	60,000 tons	Hops	1,010,800 lbs.
Oats	350 tons	Onions—Green	60,000 sacks
Wheat	10,500 tons	Peas	200,000 lbs.
Almonds	1,625,000 lbs.	Potatoes—Irish	150,000 sacks
Apples	4,000 boxes	Potatoes—Sweet	8,000 sacks
Apricots	3,200,000 lbs.	Alfalfa seed	100,000 lbs.
Cherries	200,000 boxes	Tomatoes	5,000,000 lbs.
Figs	320,000 lbs.	Cattle	3,000
Grapes	25,000,000 lbs.	Hides	4,250
Lemons	600 boxes	Horses and Mules	1,500
Nectarines	40,000 lbs.	Sheep	15,000
Oranges	2,500 boxes	Swine	5,000
Peaches	9,348,000 lbs.	Wool	446,770 lbs.
Pears	3,936,000 lbs.	Butter	1,000,000 lbs.
Plums and Prunes	7,492,000 lbs.	Cheese	150,000 lbs.
Raspberries	10,000 lbs.	Beer	1,500 bbls.
Strawberries	4,000 lbs.	Brandy	1,200 gals.
Walnuts	1,000 lbs.	Wine	320,002 gals.
Chickens	2,000 doz.	Wood	400 cords
Turkeys	12,000 lbs.	Salmon	900,000 lbs.
Eggs	350,000 doz.	Other kinds of fish	112,500 lbs.
Asparagus	250,000 lbs.	Cigars	120,000
Beans	4,000,000 lbs.	Olive oil	300 gals.
Cabbage	4,000 sacks	Pickled olives	1,000 gals.
Celery	5,000 lbs.		

YUBA COUNTY.

In Yuba County almost every pursuit known to California can be engaged in, and the cost of lands is extremely low.

The county comprises about 105,000 acres of valley land, 136,000 of foothill, and 199,000 of mountainous. It extends from high in the Sierra Nevada Mountains down to the level valley along the Feather River. It is centrally located in the Sacramento Valley.

In the mountains lumbering, mining, and stock-raising are the leading industries. There are thousands of acres of the best timber land in the State within its confines, and within the past two years a large amount of capital has been invested in sawmills.

Mining is an industry that is receiving more attention now than at any time in the past. Aside from dredge-mining no great amount of capital has been invested, but many small claims are in operation, and hundreds of prospectors are making good money while seeking ledges and gravel deposits. Mines that have not been operated for years are now worked successfully by improved processes. Dredge-mining is the most extensive mode of extracting gold. Monster dredges are engaged in the industry, handling several thousand cubic yards of gravel from the river bed every twenty-four hours.

But Yuba is a great county for agricultural pursuits. Land is cheap, when soil and climatic conditions are considered. This land will produce many varieties of crops. At present it is devoted chiefly to grain and stock-raising—cattle, sheep, swine, etc.—but there are many orchards and vineyards, while some thrifty persons have made a success of poultry-raising, an industry highly profitable when properly handled. Some have sown to alfalfa and clover, and are engaging successfully in dairying, another profitable pursuit.

To enumerate the fruits grown would be simply to give a list of all varieties produced in California. Oranges grow to perfection, but they are not so profitable as deciduous fruits, and are not cultivated so largely. Peaches, pears, apricots, cherries, prunes, figs, walnuts, almonds, and olives are more profitable and are extensively grown. Every doorway has its orange and lemon trees to supply the needs of the owner. The world can produce no finer peaches than come from the orchards of Yuba County. On account of the superior quality of the peaches, large fruit-canning establishments run every summer in Marysville and Yuba City, which towns are separated only by the Feather River.

The grape industry is engaged in on a large scale, and is profitable. The Thompson Seedless and the Flame Tokay are the favorite varieties. Wine grapes are grown in great quantities, and a large part is taken by the Marysville Winery.

During recent years greater attention has been given to gardening, and there are now broad fields of potatoes, tomatoes, beans, and many varieties of berries. Strawberries are profitable and easily grown.

Hops grow profusely along the Bear and Feather rivers, and are an

important industry. Hundreds of people are given employment during the planting, training, and picking seasons.

The rainfall averages from 17 to 20 inches annually, and is abundant, although by irrigation during the summer heavier crops can be produced.

Marysville, the county seat, is the principal town, and is a wholesale center. It has excellent transportation facilities in all directions by rail and stage. It has the best equipped woolen mill on the Coast and it is one of the largest.

The Western Pacific Railroad Company has secured land within the city limits of Marysville for terminal and shop facilities, and a franchise through the city. A survey has been completed for an electric railway to Grass Valley, Nevada City, and Auburn. An electric road is about to be built to connect Oroville, Chico, Colusa, Gridley, Biggs, and a number of smaller towns with Marysville.

There is an abundance of water for power and irrigation. The waters of the Yuba River are supplying power for mills, factories, railways, and lighting, in San Francisco, Sacramento, and all intermediate towns. The great Colgate electric plant is located in the mountains 28 miles east of Marysville, and it sends its energy throughout Northern California, being one of the largest plants in the West.

STATISTICS OF YUBA COUNTY FOR 1905.

General.

Area.....	625 square miles, or 400,000 acres	Number of miles of public roads.....	427
Number of farms	896	Road levy per \$100, 1905.....	40 cts.
Number of acres assessed	380,508	Value of county buildings.....	\$81,000
Value of country real estate	\$2,564,865	Irrigating ditches—miles, 100;	
Of improvements thereon.....	\$433,430	cost.....	\$146,000
Of city and town lots	\$418,380	Railroads, Steam—miles, 44.11;	
Of improvements thereon	\$926,670	assessed value.....	\$508,804
Of personal property	\$1,102,850	Electric power plants, 1; assessed	
Total value of all property.....	\$5,446,195	value	\$163,375
Amount expended on roads	\$14,348.72	Electric power lines—miles, 120½;	
Amount expended for bridges....	9,668	assessed value	\$52,650

Cereal Products and Hay.

	Acres.	Tons.	Value.		Acres.	Tons.	Value.
Wheat.....	29,095	5,710	\$179,865	Alfalfa hay	1,400	3,500	\$28,000
Barley	6,875	1,547	32,641	Grain hay.....	10,150	15,225	91,350
Oats.....	5,445	1,620	38,880				

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.		Bearing.	Non-Bearing.	Total.
Apple	7,400	1,090	8,490	Prune—French	17,900	5,000	22,900
Apricot.....	15,000	4,100	19,100	Other kinds..	3,400	600	4,000
Cherry.....	10,000	3,000	13,000	Almond	5,000	700	5,700
Fig	4,500	2,000	6,500	Walnut	2,100	560	2,660
Lemon.....	3,700	2,100	5,800	Grapes—			
Olive.....	8,000	1,800	9,800	Raisin	165	15	180
Orange.....	33,800	29,600	63,400	Table	70	20	90
Peach.....	64,000	27,000	91,000	Wine	315	80	395
Pear.....	18,000	3,100	21,100				

Wines, Brandies, Etc.

	Gallons.	Value.		Gallons.	Value.
Wine—Angelica.....	10,000	\$3,000	Wine—Sherry	10,000	\$3,000
Muscatel.....	10,000	3,000	Zinfandel.....	50,000	75,000
Port	100,000	28,000	Beer (barrels).....	9,450	61,465
Riesling	15,000	3,000	Brandy	50,000	25,000

Number of wineries, 2; number of distilleries, 1; number of breweries, 1.

Fruit, Vegetables, Nuts, Etc.

<i>Green.</i>	Pounds.	Value.	<i>Green—Continued.</i>	Pounds.	Value.
Apples.....	300,000	\$4,500	Vegetables.....	30,000	\$2,900
Apricots.....	375,000	26,250			
Beans.....	600,000	16,500			
Grapes—Wine.....	2,520,000	17,010	<i>Dried.</i>	Pounds.	Value.
Table.....	2,350,000	29,375	Almonds.....	25,000	-----
Onions.....	120,000	1,800	Peaches.....	66,000	\$4,620
Pears.....	250,000	7,500	Prunes—French.....	900,000	22,500
Peaches.....	520,000	7,800			
Plums.....	30,000	225	<i>Canned.</i>	Tons.	Value.
Tomatoes.....	200,000	1,000	Pears.....	300	\$25,000
Cucumbers.....	500,000	30,000	Peaches.....	1,200	85,000
			Potatoes—Irish.....	40	2,400

Livestock Industry.

	Number.	Value.		Number.	Value.
Cattle—Beef.....	919	\$27,580	Swine.....	2,915	\$5,880
Stock.....	9,387	75,095	Colts.....	500	7,335
Dairy Cows—Graded..	8,757	32,355	Sheep—Common.....	33,467	66,935
Calves.....	500	4,710	Goats—Common.....	1,047	2,095
Horses—Thoroughbred	20	4,000	Mules.....	3,700	18,610
Standard-bred.....	70	8,700	Jacks.....	10	1,515
Common.....	1,600	75,300	Wool (pounds).....	200,800	30,120

Poultry and Dairy Industries.

The poultry industry is given at 2,163 dozen chickens, worth \$8,653; turkeys, 215 dozen, worth \$6,200; eggs, 90,000 dozen, worth \$18,000.

There is 1 creamery, with an output of 350,000 pounds of butter, worth \$80,500.

Forest Products—Hops.

The forests cover 17,369 acres, and are worth \$57,540. There are 2 sawmills, worth \$5,500. The lumber output is 1,840,000 feet, worth \$22,080; and the fuel wood output is 10,000 cords, worth \$30,000.

The area in hops is given at 1,250 acres; output, 2,250,000 pounds, worth \$270,000.

Manufactories.

	Number.	Number of Employes.	Quantity Produced.	Value of Product.
Bookbinderies.....	2	2	54,050	\$5,325
Carriages and wagons.....	1	3	18	2,975
Cigars.....	3	5	158,000	10,120
Confectionery.....	2	5	60,000 lbs.	25,000
Foundries and iron works.....	1	12	-----	18,000
Flouring-mills.....	1	20	-----	-----
Malt.....	1	4	470 tons	15,000
Meat products.....	--	3	75,000 lbs.	7,500
Hides.....	--	--	40,000 lbs.	3,200
Lard.....	--	--	40,000 lbs.	4,000
Meat packed.....	--	--	30,000 tons	1,050
Planing-mills.....	3	17	105,000 feet	42,000
Woolen-mills.....	1	104	351,124 lbs.	200,000

Productions Shipped Out of County.

	Amount.		Amount.
Wheat.....	1,200 tons	Beans.....	400,000 lbs.
Almonds.....	25,200 lbs.	Hops.....	2,250,000 lbs.
Apples.....	60,000 bxs	Onions—Dried.....	60,000 lbs
Apricots—Dried.....	120,000 lbs.	Potatoes—Irish.....	400,000 sac
Grapes.....	200,000 lbs.	Cattle.....	800
Peaches—Green.....	2,000,000 lbs.	Hides.....	50,000 lb.
Peaches—Dried.....	1,200,000 lbs.	Horses and mules.....	2,000
Pears—Green.....	100,000 lbs.	Sheep.....	10,000
Pears—Dried.....	20,000 lbs.	Swine.....	12,000
Plums.....	200,000 lbs.	Wool.....	200,800 lbs.
Prunes—French.....	900,000 lbs.	Butter.....	180,000 lbs.
Raisins.....	800,000 lbs.	Flour.....	40,000 bbls.
Turkeys.....	21,000 lbs.		



SECOND BIENNIAL REPORT

OF THE

COMMISSIONER OF HORTICULTURE

OF THE

STATE OF CALIFORNIA

FOR 1905-1906.

ELLWOOD COOPER, Commissioner.



SACRAMENTO:

W. W. SHANNON, : : : SUPERINTENDENT STATE PRINTING.

1907.

CALIFORNIA STATE COMMISSION OF HORTICULTURE.

ELLWOOD COOPER	Commissioner	Santa Barbara
JOHN ISAAC	Secretary	San Francisco
ED. M. EHRHORN	Deputy	Mountain View
E. K. CARNES	Assistant	Riverside
O. E. BREMNER	Assistant	Santa Rosa
CHAS. T. PAINE	Assistant	Redlands
FREDERICK K. MASKEW	Assistant	Long Beach
GERTRUDE BIRD	Stenographer	Sacramento

OFFICE:

ROOM 41, STATE CAPITOL, SACRAMENTO.

BRANCH OFFICE, ROOM 11, FERRY BUILDING, SAN FRANCISCO.

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OFFICE STATE COMMISSIONER OF HORTICULTURE

STATE CAPITOL,

SACRAMENTO, CAL., January 2, 1907.

*To His Excellency, GEORGE C. PARDEE, Governor, and the Honorable the
Senate and Assembly of California:*

I have the honor to submit herewith the second biennial report of my office, showing the operations of the Commission of Horticulture for the years 1905 and 1906.

Respectfully submitted.

ELLWOOD COOPER,

Commissioner.

Attest:

JOHN ISAAC, Secretary.

REPORT OF THE COMMISSIONER OF HORTICULTURE, FOR 1905.

OFFICE OF THE COMMISSIONER OF HORTICULTURE,
STATE CAPITOL,
SACRAMENTO, CAL., January 30, 1906.

To His Excellency, GEORGE C. PARDEE, Governor.

SIR: In accordance with the provisions of the Act creating the office of State Commissioner of Horticulture, Section 10 of which reads: "It shall be the duty of said State Commissioner to report, in the month of January in each even-numbered year to the Governor, and in each odd-numbered year to the Legislature of this State, such matters as he may deem expedient or may be required either by the Governor or Legislature, and to include a statement of all the persons employed, and of moneys expended under this Act, by itemized statement thereof," I have the honor to submit to you herewith the report of the department under my direction for the calendar year 1905, together with a financial report for the fifty-sixth fiscal year and the first half of the fifty-seventh fiscal year.

HORTICULTURAL QUARANTINE.

Since making my last report, the work of the quarantine department of this office has so largely increased that I have found it necessary to engage additional assistance to carry it on successfully. There has been a very large increase in the tonnage arriving in San Francisco, with a corresponding increase in the importation of trees, plants, fruits, etc., requiring inspection and curative treatment, where curable diseases or pests were discovered. Should the duties of this branch of the office continue to increase in the future as in the past, further assistance may be needed.

All incoming vessels are watched for and boarded, and all classes of vegetable products are carefully inspected before being allowed to land. If such importations are free from insect pests and diseases they are allowed to pass; if found infested with pests already established here, they are submitted to proper treatment for their disinfection; but if affected with any diseases or pests not already in our State, they are

deported or destroyed. By these means we have succeeded in keeping out numerous pests, any of which might have proved a serious menace to the great fruit industry of California.

In connection with the quarantine work of the Commission, I have established stations at San Pedro and San Diego, and appointed deputies to act at each one of these points. Shipments of trees or fruits from foreign ports are sometimes made to each of these ports, and heretofore we have had to rely upon the County Horticultural Commissioners to do the required work. In such cases they were operating without proper authority. By the appointment of Deputy State Horticultural Commissioners, under direct instructions from this office, all necessary authority is vested in them.

PARASITIC WORK.

In connection with our quarantine work in the San Francisco branch, we also conduct an insectary for the propagation of beneficial, predaceous, and parasitic insects. While our accommodations for this work are very limited and altogether unsuitable for the best results, we have, nevertheless, bred and distributed to all parts of the State large numbers of beneficial insects, and have received excellent reports as to their work in checking the spread of injurious species.

The work of exploring foreign countries for beneficial insects, for which purpose an appropriation was made by the last session of the Legislature, has been continued through the year, George Compere having been retained in the work. Efforts were made to secure his services wholly for our own State, but as this was found impracticable on account of his contract with the West Australian Government, an arrangement was made with the latter government similar to that heretofore existing, whereby California and West Australia availed themselves jointly of his labors and pro-rated the expenses. Under this arrangement we have received several shipments of beneficial insects from different parts of the world, which have been cared for and bred in our San Francisco insectary.

INCREASED ACCOMMODATIONS.

The increasing business of our San Francisco branch and the necessity of having more room for our insectary, compelled us to secure larger quarters. We have therefore leased from the Board of State Harbor Commissioners three large rooms in the Ferry Building, which will serve our purpose, temporarily at least. Conditions there, however, are not favorable to the best results in insect propagation, for it is necessary that we have a properly constructed building, affording proper accommodations of light, warmth, and moisture, and situated in a neigh-

borhood where suitable soil can be secured for growing trees and plants for food for the injurious insects which serve as food for the beneficial species.

Next to the quarantine work, by which destructive species are excluded, this one, by which checks upon the injurious species already with us are introduced, propagated, and distributed, is the most important work of this Commission, and it is one that we can not afford to ignore or neglect.

BENEFICIAL INSECTS.

Reports received from all portions of the State, where recently imported parasitic insects have been established, are very encouraging. The successful establishment of a new insect is always a matter of doubt. Differing conditions, variations of seasons, difference of food supply, and many other contingencies enter into their successful establishment, and it is therefore unsafe to predict absolute success until several years have elapsed.

The *Scutellista cyanea*, the internal parasite of the black scale (*Saissetia oleæ*), may be pronounced a success. It has been established a sufficient length of time to become thoroughly established, and has increased enormously, until it is found in ample quantity wherever the black scale is found, and the latter pest is surely and rapidly decreasing before its advance. We may always expect outbreaks of the black scale, for an insect once established can never be exterminated, but at the same time we may regard the black scale as removed from the list of our dangerous insect pests.

Caliephialtes messor, the parasite of the codling-moth, is still in the experimental stage, but gives promise of doing effective work. We have found the insect breeding in the orchards where it was established, so that we have already several generations of California-bred insects of this species, and may safely conclude that it is permanently established; we have also found that it is doing good work. We are still propagating and distributing this parasite, but owing to difficulty in securing codling-moth larvæ in sufficient quantities, we are seriously handicapped in this work. I have been informed that large quantities of these larvæ can be had from New Zealand, and I have written to the Department of Agriculture of that State for a large supply, promising in return to furnish them with the parasite. In the Watsonville district, from whence we had hoped to draw our largest supply of food, the codling-moth was less troublesome than usual, owing to climatic conditions, and we were disappointed in not getting a sufficient supply of food to insure the greatest development and increase in this valuable parasite this year.

As in other years, we have also bred and distributed large numbers

of other parasitic and predaceous insects, among them the *Vedalia cardinalis*, *Novius koebelei*, *Rhizobius ventralis*, etc. We have been propagating these insects steadily for many years to prevent their loss to us, and so that we would have them in readiness for any outbreak of their host pests at any time.

THE MEXICAN ORANGE-WORM.

On invitation of the Mexican Government, an agent of this department was commissioned to investigate the extent and spread of the so-called Morellos orange-maggot in the Republic of Mexico. A thorough study was made of the habits of this pest, its habitat, territorial area, danger to be apprehended from its possible introduction into our State, and other matters connected with it. The result of this investigation has been published in full in a report issued from this office, but I may add that the effect has been to greatly lessen the alarm which our orange-growers were under in regard to this pest, and to encourage the Mexican Government in the taking of effective measures for its control. At the present time our sister republic, stimulated to the work through our efforts, is taking every possible measure to check the pest within her own borders, and to afford us every possible guarantee against its introduction into our State. We are receiving weekly reports from Professor Herrera, who is in charge of the work, showing the number of orchards inspected, the number of oranges condemned and destroyed, the condition of the orchards, etc. All of which gives us as full a guarantee against the introduction of this dangerous pest across our borders as is possible.

CHECKING THE PEAR BLIGHT.

On your Excellency's suggestion, the Department of Agriculture at Washington, D. C., has detailed Prof. M. B. Waite, the leading authority on pear blight, to take up the work of fighting this, the worst of our tree diseases on this Coast. Professor Waite has already made several visits to the afflicted sections, and his first assistant, Professor Scott, is working with us during the winter under his direction. To carry on this great work, the last Legislature made a liberal appropriation, to be used by the Regents of the State University, and that institution has had a large force of men at work in the effort to check this disease. In connection with the Department of Agriculture and the State University, our Commission has been coöperating in this important work, and we have aided in every manner possible in its effective prosecution. I am pleased to report that with the hearty assistance of the various County Horticultural Commissioners, who have lent themselves enthusiastically to the work, the pear blight is becoming well known, and the method of control has been very widely discussed. We may rea-

sonably hope that with the present campaign of education continued for another season, all who are interested in this work will be well informed in relation thereto, and that through the County Horticultural Commissioners we may be able hereafter to keep it under fair control.

PUBLICATIONS.

During the year just passed we have issued a number of publications from this office, among the most important being the following: First Biennial Report of this Commission; Report of the Commissioner appointed to investigate the prevalence of the *Trypeta ludens* in Mexico; A compilation of the horticultural statutes and county ordinances of California; The Russian Thistle, its introduction and spread in California, with laws and measures for its control; Insects and insecticides; Fungi and fungicides; and The pear thrips.

Besides these, we have commenced the issue of a monthly circular, in which is set forth such matter as may be of interest to the County Horticultural Commissioners. We have also published the consular reports as the same have been received from Washington. There is a very great demand for these publications among the horticulturists of the State.

CONSULAR REPORTS.

I am pleased to report some improvement in the consular reports. Sometimes these were held in Washington for several days, and sometimes it was several weeks before they were forwarded, with the result that the information they conveyed was too old to be of service. An agent of this department called upon Mr. Louis G. Reinburg, Acting Chief of the Bureau of Trade Relations, Department of State, in Washington, and found that the delay was due to the reports being held for indexing, and upon representation of the need of these being in the growers' hands at the earliest possible moment, arrangements were made for expedited service. Other improvements might still be made in this service to render it more profitable to our horticulturists.

FRUIT-GROWERS' CONVENTION.

The Thirty-first California Fruit-Growers' Convention was held this last year at Santa Rosa, and I am pleased to report that, so far from these meetings losing their interest, they are increasing each year, and the last was in all respects one of the best ever held. The papers presented on that occasion were eminently practical, the debates intelligent and unmarked by any spirit of acrimony, and there was a feeling of good-fellowship among all present rarely experienced in public assemblies where so many are gathered together.

HORTICULTURAL CONDITIONS.

It gives me great pleasure to report that the past season has been one of the most prosperous in the history of horticulture in this State. It was not, however, without its drawbacks, and the chief of these were the devastation wrought by the pear blight in our Bartlett pear sections, the shortage of the peach crop, and a light prune output. Other varieties yielded fairly well, although the fruit crop was somewhat spotted; but withal, the demand and prices were so unusually good that most growers made a handsome profit on their crops. Table grapes have been an especially profitable fruit. We have received better service from the railroads than usual, and, with the exceptions noted, the season has been very favorable to the fruit-grower.

In conclusion, I wish to state that in all my labors I have received uniformly courteous treatment, and in every case where assistance has been required in the discharge of my duties it has been willingly accorded. This is especially true of the customs service of San Francisco, from the officers of which we have received very valuable assistance in the prosecution of our quarantine work at that port.

I wish, also, to add that I have found the employés of my department uniformly efficient and energetic in their respective branches, and the efficiency of the work of the Commission under my direction is largely due to the willingness and promptness with which each one has performed his part.

In the submission of this brief report, I have the honor to subscribe myself,

Your Excellency's obedient servant,

ELLWOOD COOPER,
State Commissioner of Horticulture.

REPORT OF THE COMMISSIONER OF HORTICULTURE, FOR 1906.

OFFICE OF THE COMMISSIONER OF HORTICULTURE,
STATE CAPITOL,
SACRAMENTO, CAL., January 2, 1907.

To the Honorable Senate and Assembly of the State of California in Legislature assembled.

GENTLEMEN: In accordance with Section 10 of the law creating a State Commission of Horticulture, approved March 25, 1903, which provides that the Horticultural Commissioner shall report to the Governor in each even-numbered year and to the Legislature in each odd-numbered year, I have the honor herewith to submit my second biennial report to your honorable body.

THE MEXICAN ORANGE-MAGGOT.

There has been, in the past, considerable uneasiness on the part of growers of citrus fruits in the State, regarding the Mexican orange-worm (*Trypeta ludens*), which was reported as being a very serious pest in our sister republic, and which, it was feared, might be introduced into the orange orchards of California. To prevent this a quarantine was placed upon the citrus products coming from Mexico, and any such brought into the State were destroyed. As a result of this action, it was feared by the Mexican Government that the Federal Government would take like measures and prohibit the importation of Mexican oranges into the United States. This led to a voluminous correspondence between the Secretary of the Department of Fomento, in Mexico, the Secretary of State at Washington, and the Horticultural Commission of this State, culminating finally in the request of the Mexican Government that an agent be sent from California to investigate the spread of the orange-maggot in Mexico, the districts infested thereby, the amount of damage done, and the probability of its introduction into California, or elsewhere in the United States.

In accordance with this request, and under instructions from Governor Pardee, an agent of this department was dispatched to Mexico with full instructions to carry on investigations along the lines mentioned. To this end, the Mexican Government lent every possible

assistance, and, as a result, we now have full information of the dangers to be apprehended from the introduction of this pest. This has already been published in a bulletin issued by this department, and generally distributed among the fruit-growers of the State.

From the period of the visit of our representative, the Mexican Government has kept its agents at work in the infested sections, gathering all fruit containing worms, which has been destroyed, cleaning out places where the worms could find refuge to go through their transformations, and taking every other possible measure to eradicate the pest. Weekly reports of this work have been forwarded by the Mexican authorities to this office, to indicate the efforts that are being made. As a result of this work, the citrus fruit-growers of California have the fullest assurance of protection from the introduction of this dreaded pest.

INTRODUCTION OF BENEFICIAL INSECTS.

The last Legislature made an appropriation of \$12,000 for the purpose of prosecuting the search for beneficial insects. With this appropriation we have continued to work, keeping our agent, Mr. George Compere, in the field, and very many new and beneficial species have been introduced into our State. We have been very much hampered in this work, however, by the wording of the act, and the construction placed upon it by the Attorney-General, as it states explicitly that the appropriation shall be for the purpose of searching for beneficial insects, although we have required facilities for breeding, propagating, and distributing them after they have been received. Under the ruling of the Attorney-General we have been unable to use any portion of the appropriation for these purposes, and have been obliged to draw upon our general fund to meet the expense thereof, and this has greatly crippled the work in our other departments.

CODLING-MOTH PARASITE.

The parasite (*Caliephialtes messor*) introduced some time since to work upon the codling-moth has received a great deal of attention and has been bred out in large quantities and established in many of the more important apple sections of the State. Reports which have been received from sections where it has been established are to the effect that it is evidently doing good work, and that there has been a material reduction in the quantity of wormy apples during the past season. We have experienced much difficulty in getting sufficient larvæ of the codling-moth upon which to breed these insects, as each female fly lays from one hundred and fifty to two hundred eggs and deposits but one egg in a worm. It is therefore necessary that we should have nearly two hundred worms for each fly. We have found it very difficult to

meet these requirements, and as a result have not been able to distribute the parasite as widely as we otherwise could have done. From our experience with this parasite, however, we believe that, if sufficient worms could be secured, we could readily breed them by millions during the season. Its prolificacy indicates the value of this parasite, as unquestionably in the open it will find its own food supply and multiply in large numbers.

We would call attention to a report on this insect, with colored plate, given elsewhere in this volume.

ASSISTANCE FROM COUNTY HORTICULTURAL COMMISSIONERS.

It is with pleasure that I acknowledge the hearty coöperation of the Horticultural Commissioners of the different counties of the State. The gentlemen comprising these boards have coöperated enthusiastically with this department, and I am under many obligations to them for assistance in our work. Elsewhere are given the reports of many of the county boards, in which allusions to the work of introduced parasites are made.

While treating of the subject of beneficial insects I may safely state that we have now beneficial insects to cope with all the injurious species in the State. It must not be supposed, however, that any injurious insects once introduced will ever be eradicated. All that we can do is to keep them in check to a greater or less extent, and this we are accomplishing by the introduction of beneficial insects. Our worst pests at present are the purple scale and the red scale, for both of which we have parasites now at work, but which are not sufficiently effective to be really valuable. We are, however, introducing others which will unquestionably check the spread of these two pests.

INSECTARY DESTROYED BY EARTHQUAKE.

In the great cataclysm which overtook San Francisco on April 18, 1906, this department did not wholly escape. Our insectary at the time was located in the Ferry Building, at San Francisco, and while this building escaped the fire, it was very badly shaken by the earthquake. The room in which our breeding cases were kept and the beneficial insects were propagated was badly damaged, the walls falling upon the breeding cases and making a general wreck thereof. A great many of our beneficial insects were lost, together with the greater part of our breeding appliances. We gathered what we could from the wreck and removed them to Sacramento, where a temporary insectary has been established. This has been placed in charge of a competent man, and we have now recovered from the loss sustained in San Francisco. During the past summer a great many beneficial insects have

been produced therein and distributed to different portions of the State from which pests have been reported. We have, however, been very greatly inconvenienced in this work by our limited quarters and insufficient accommodations.

QUARANTINE AGAINST INFESTED NURSERY STOCK.

Word was received in this office in the early part of 1906, indicating that the white fly (*Aleyrodes citri*) had become a very serious pest on citrus and other stock in Florida, Mississippi, Louisiana, and other parts of the South. This is one of the most serious pests which the citrus fruit-growers of Florida and Louisiana have to contend against, rendering the production of this fruit unprofitable and almost impossible in locations where the fly has become thoroughly established. This fly does not confine its depredations to citrus fruits alone, but extends to many deciduous varieties, and even to ornamental shrubbery. In order to protect California from the inroads of this pest, a quarantine was established by this department against the states of Florida, Louisiana, and Mississippi, and nursery stocks and plants from these states have been barred from entrance into California.

PROTECTION AGAINST THE GYPSY AND BROWN-TAIL MOTHS.

In view of the spread of the brown-tail moth and the gypsy-moth in Massachusetts and other Eastern states, voluminous correspondence has been carried on between this department and entomologists in those sections, with a view to ascertaining the possible danger of importing these serious pests into California. At the present time the danger to be apprehended from this source is remote, but it is ever present.

I am pleased to note that the authorities of Massachusetts, in conjunction with the Entomological Bureau at Washington, have taken up the policy of fighting both of these pests with their natural enemies. Every known artificial means to destroy them has been resorted to for many years, but in spite of this they have steadily spread and the damage done by them has been enormous. It is to be hoped that the authorities there have now started in the right direction, and that the ravages of these pests may be checked.

California is especially interested in this work, as there is always a possibility, where pests of any kind exist in enormous numbers, of their introduction into our own State, and it is, in the estimation of this department, the better policy to have them controlled, and thereby prevent their entrance into the State, than to have to do the work after they have been admitted. It is for this reason that I am pleased to call your attention to the work now being done against these terrible pests in Massachusetts.

WORK OF THE QUARANTINE DEPARTMENT.

The quarantine department of this Commission has been kept up to its usual high standard during the past year. Every vessel coming into the different ports of California has been thoroughly inspected and all plants, trees, shrubs, cuttings, etc., have been examined before being allowed to pass. If any of these were found infested with insect pests or diseases not prevailing in California they were invariably destroyed, only clean stock being admitted.

It is very difficult to estimate the value of the work so done. While we may form some idea of the damage suffered from an insect pest when once introduced and established, it is impossible to estimate what has been saved by preventing the entry of such pests. At the port of San Francisco there have been stopped hundreds of new destructive insects, any one of which, if once established in our State, might have proved as serious and costly a pest as the cottony-cushion scale in the past, or as the gypsy-moth and the brown-tail moth in Massachusetts at present. The work of this department is steadily increasing, and new demands are continually being made upon those having it in charge.

STATE FAIR EXHIBIT.

In this connection I wish to allude to the very excellent entomological exhibit made by this department at our last State Fair. At the request of Mr. Filcher, Secretary of the State Agricultural Society, an exhibit was prepared by this office and installed in the exposition building at Sacramento. It comprised a large number of different species of insects from all parts of the world, all of which were mounted and displayed in the most attractive form. In addition to this, a number of breeding cases of beneficial insects, illustrating their work, were also shown. The exhibit was visited by several thousand people, and a great deal of interest was manifested. It was pronounced by competent judges to be the most valuable educational feature of the State Fair.

PUBLICATIONS ISSUED.

During the past year a number of very valuable publications have been issued from this department, including a number of monthly bulletins which dealt with horticultural matters of direct interest to the Horticultural Commissioners and fruit-growers of the State.

There has been a very heavy increase in the volume of correspondence during the past year, and knowledge of the work being done by the department is becoming more widely spread over the whole State, and, in fact, over the United States. We are constantly in receipt of specimens of insects, plant diseases, etc., for identification and for remedies. These all receive prompt attention. Correspondence has also been

carried on with the various entomological societies and State institutions, and has reached out to very many foreign nations, all of whom are taking an especial interest in our work.

California is to be congratulated upon the fact that she is the pioneer in the work of fighting insect pests with their natural enemies. For years we have stood alone in this work, but our example is now being followed by very many states and territories and by foreign nations, and this State is looked to as the great exemplar in this work. It is true that the good work done by predaceous and parasitic insects has been known for a great many years, but it remained for California to give a practical turn to the work, and introduce beneficial insects for work upon the destructive species.

FINANCIAL STATEMENTS.

I append hereto the financial report of my office for the fifty-sixth and fifty-seventh fiscal years.

Following is a report of the expenditures of this department for the fifty-sixth fiscal year:

Library, books, papers, and periodicals	\$42 60
Engravings, lithographs, etc., for Biennial Report	574 00
Extra help	208 50
Expenses of agent for nursery inspection	98 70
Express	162 89
Freight and cartage	17 30
Fruit-Growers' Convention	148 60
Furniture	14 35
Fumigation apparatus	55 50
Insect work, supplies, parasitic food, etc.	67 25
Janitors	240 00
Miscellaneous	240 82
Morellos orange-maggot investigation	609 65
Microscopic supplies and chemicals	91 89
Postage	581 13
Reporting vessels	180 00
Salary of inspector at San Francisco	1,475 00
Salary of foreign expert	1,200 00
Salary of stenographer	625 00
Traveling expenses of Commissioner	518 01
Traveling expenses of Deputy Commissioner	145 20
Traveling expenses of Secretary	124 15
Traveling expenses of Inspector	48 45
Telephones and telegrams	193 76
Translations	35 00
West Australian Government	1,640 22
Total	\$9,341 57
Appropriation fifty-sixth fiscal year	\$7,000 00
Balance of appropriation fifty-fifth fiscal year	2,266 77
	<u>\$9,266 77</u>
Stamps sold and money credited to appropriation	74 80
Total amount available during fifty-sixth fiscal year	\$9,341 57
Expenditures fifty-sixth fiscal year	9,341 57

Following is a statement of the expenditures of this department for the fifty-seventh fiscal year:

Library, books, papers, etc.	\$35 75
Express	115 74
Extra help	53 00
Freight and cartage	32 10
Fruit-Growers' Convention	110 70
Furniture	32 45
Janitors	315 00
Insectary	292 97
Insect work, food, supplies, etc.	204 46
Miscellaneous	223 87
Microscopic supplies and chemicals	77 30
Rent of rooms in San Francisco	320 00
Reporting vessels	150 00
Postage	5 00
Salary of Inspector, San Francisco	1,500 00
Salary of Assistant, San Francisco	1,200 00
Salary of stenographer	900 00
Traveling expenses of Commissioner	455 19
Traveling expenses of Deputy Commissioner	145 55
Traveling expenses of Secretary	111 20
Traveling expenses of Inspector	78 90
Traveling expenses of Assistant	35 00
Telephones and telegrams	216 09
Total	<u>\$6,610 27</u>

Following is a report of the expenditures incurred under the appropriation of \$12,000 for the search for beneficial insects for the fifty-seventh fiscal year:

Salary of George Compere for 12 months (July 1, 1905, to June 30, 1906)	\$1,200 00
Expenses of George Compere (July 1, 1905, to January 31, 1906) ...	<u>1,122 07</u>
Total	<u>\$2,322 07</u>

The above is only a partial statement of expense, as the account from the West Australian Government, with whom we share the expense, has not been rendered for 1906.

Respectfully submitted.

ELLWOOD COOPER,
State Horticultural Commissioner.

REPORTS OF DEPUTY COMMISSIONER OF HORTICULTURE.

SAN FRANCISCO, December 30, 1905.

To HON. ELLWOOD COOPER,

State Commissioner of Horticulture.

DEAR SIR: I have the honor to submit to you herewith my report of the work done at the Quarantine Division at San Francisco, covering the period from July 1, 1904, to December 31, 1905.

During this period there have come under our supervision 385 steamers and sailing vessels arriving from foreign countries and our insular possessions, Hawaii and the Philippine Islands, on which were found plants and fruits.

The shipments of plants, fruits, and vegetables on these steamships and sailing vessels, and also by rail overland from the Eastern states and Europe, consisted of the following: Crates and boxes, 48,032; cases of plants by water, 2,100; cases of plants by rail, 113; loose lots of plants by passengers, 757; lots destroyed, 250.

Among the above shipments of trees, fruits, plants, and vegetables from the various countries, as shown by the table below, the lots given were found to be seriously infested with destructive insect pests, and were destroyed.

Country.	Plants.	Fruits.	Country.	Plants	Fruits.
Mexico	10	62	China	24	16
Hawaiian Islands.....	6	19	British Columbia.....		22
also 1 lot of vegetables					
Australia	12	7	Philippine Islands	7	
Central America.....	10	12	Tahiti	35	16

The shipments of this year, when compared with those of 1903-4, show a great increase in all lines coming under our surveillance.

A strict quarantine is maintained on all citrus stock from Florida, against the possible introduction of the dreaded "white fly" (*Aleyrodes citri*). We are in receipt of advices that this pest has spread to adjoining states, and it may become necessary to quarantine against other Southern states as well, in order to protect our citrus industry.

On April 11 there arrived per steamer "Alameda," from Honolulu, a shipment of cucumbers that were found to be infested with maggots of the melon-fly, a very serious pest attacking all kinds of melons, cucumbers, tomatoes, etc. The shipment was promptly destroyed.

REPORT ON WORK IN INSECTARY.

From the various colonies of parasites distributed by this department we have received many very encouraging reports, showing that they have become established. This is especially true of the parasite for the codling-moth, from which we anticipate great results.

There have been received by this department from Mr. George Compere the following shipments of beneficial insects during the time covered by this report:

October 17—A shipment of predaceous Coccinellidæ that prey upon the "red scale" (*Chrysomphalus aurantii*), from Jaffa, Palestine. Identified as *Chilocorus bipustulatus*.

October 25—A shipment of *Caliephialtes messer*, the parasite for the codling-moth, from Spain.

October 25—A shipment of Chalcid flies, parasitic upon *Pieris rapæ* (cabbage-worm). These were reared and liberated near Glendora, Cal.

October 26—A shipment of predaceous Coccinellidæ from south of France and Spain consisting of the following species: *Adalia bipunctata*, *Chilocorus bipustulatus*, *Adalia conglobata*, *Erochomus 4-pustulatus*, *Seymnus* sp., which prey upon red scale, greedy scale, Aphis sp., and others, being general scale-feeders.

November 2—A large shipment of *Caliephialtes messer*, parasite for the codling-moth.

November 15—A lot consisting of four packages of *Caliephialtes messer*, parasite for the codling-moth.

November 23—A lot consisting of five boxes of *Caliephialtes messer*, and additional Coccinellidæ.

December 1—A lot of *Caliephialtes messer* and a smaller Chalcid parasite which works on the pupæ of the codling-moth.

December 28—A lot of 10 boxes of the Ichneumon parasite for the codling-moth and additional Coccinellidæ of the above-named species.

January 10—A lot consisting of fourteen boxes of the codling-moth parasite. This is the largest shipment of parasites ever sent into this State.

April 15—From Bahia, Brazil, a small lot of minute Coccinellidæ which feed upon red spider. Unfortunately these insects did not survive the long voyage, and arrived dead.

September 28—From Hongkong, China, two small orange trees infested with purple scale, showing signs of internal parasites. These have been placed in breeding cases and every effort is being made to rear the parasites.

September 29—From German New Guinea, the following: A shipment of predaceous Coccinellidæ (*Cryptolæmus subviolaceus*), which prey upon the mealy-bug (*Pseudococcus* sp.); also, another species of *Vedalia*, which preys upon *Icerya aegyptica*, a near relative of our cottony-cushion scale; also, pupæ of *Thalpochares* sp., a moth which preys on *Eulecanium nigrum*.

October 28—From China, five cases and two packages of orange, shaddock, sago palms, and other plants infested with red and purple scales, and containing the eggs of the internal parasites for the two scales above mentioned.

Reports from the various sections into which parasites have been sent show that they have been doing excellent work, and the increased demand for colonies is ample proof that the growers approve of our system of fighting insect pests with their natural enemies.

INSECT PESTS AND DISEASES.

The record of our observations and of the various reports received during 1905 of injurious insects and plant diseases are as follows:

Plant Lice.—Owing to the cool moist season, aphids have been rather plentiful; especially is this true of the apple-aphis (*A. mali*), the prune-

aphis (*A. prunifoliae*) on young trees, the melon-aphis (*A. cucumeris*), and the hop-aphis (*Phorodon humuli*).

Cutworms.—Reports from various sections of the State, asking advice in regard to damage done by cutworms, were very numerous, and announce the fact that this pest was again plentiful. As stated last year, the sudden destruction of weeds, their natural food, always forces a severe attack on young trees and vines while this pest is in the larval stage.

Grasshoppers.—This pest was again reported from various sections, and for a time caused considerable alarm in the vicinity of orchards and vineyards. Good work was done by the use of poison baits before the winged form appeared.

Codling-Moth (*Carpocapsa pomonella*).—Reports from nearly all the apple and pear sections indicate a material decrease of this pest, probably due to climatic conditions; and from our own observations this is greatly verified. I might state that it has been a hard task to procure worms for the breeding of the imported parasites (*Caliephialtes messer*). Wherever this parasite has been liberated, satisfactory reports have been received and our own observations have shown that the parasite has become established; in fact, in several instances the third and fourth generations have been found. Owing to the abnormal season of 1905 and the scarcity of worms it has proved an unfavorable season for the rapid increase of the parasite.

Peach-Moth (*Anarsia lineatella*).—According to reports this pest has been more plentiful. Our observations of the worms in the fruit in the market and in that from Honolulu which has been rejected verify these reports.

Vine Flea-Beetle (*Adoxus vitis*).—In July complaints of a severe attack on vines by this pest reached this office. Although this insect can do considerable damage in favorable seasons, such as 1905 was, complaints of its occurrence in this State are not very numerous. In Europe this beetle is a very serious pest.

Other Flea-Beetles (*Haltica bimarginata* and *H. torquata*).—Serious damage to beans, potatoes, and other vegetables was reported—too late to get much benefit from insecticides, which was very unfortunate, as much good can be accomplished when the pest first makes its appearance.

Fuller's Rose-Beetle (*Aramigus fulleri*).—The damage done by this beetle every year amounts to a great deal more than reports generally indicate, and strangest of all, the insect, not being able to fly, seems to spread quite rapidly. This insect is also very destructive in the larva form, as it attacks the roots of various plants.

Thrips (*Euthrips pyri*).—This insect has caused considerable correspondence, on account of the very serious damage done to fruit

blossoms. It has been reported from several counties, but the most damage is recorded from Santa Clara County.

Scale Insects (Coccidæ).—Generally speaking, there is a great reduction in scale insects throughout the State, partly due to a vigorous campaign with sprays and fumigation outfits, and partly to the efficient work of parasites.

Black Scale (Saissetia oleæ).—This scale at the season's opening looked threatening and discouraging. Its parasite, *Scutellista cyanea*, owing to the prolonged cold spring weather, was not much in evidence, but as soon as warmer weather prevailed the *Scutellista* appeared by millions, and in sections where it was not abundant they were at once reinforced with strong colonies from this office.

Brown Apricot Scale (Eulecanium armeniæ).—This species was not as abundant as last year, although in some of the upper counties quite a demand was made for its parasite, *Comys fusca*.

Red Scale (Chrysomphalus aurantii).—This species has been vigorously fought during the past year by fumigation and spraying, and as far as recorded has not increased to any great extent.

Purple Scale (Lepidosaphes beekii).—This species has been on the increase in San Diego and Orange counties during the past two years, owing to the unsettled condition of the County Horticultural Boards, but I am pleased to report that during the latter part of 1905 the County Boards have been reorganized and a vigorous campaign has been inaugurated against this serious pest and good work in eradication is being done by fumigation.

Soft Tulip Scale (Eulecanium tulipiferæ).—During the year several cherry branches infested with this scale were brought to this office. Not having any record of its presence in California, the orchard was at once visited to ascertain conditions. From the quantity found and the general spread—finding it not only on the cherry, but also on peach, apricot, and prune—this insect must have been in the locality for several years. The scale is a great pest in the Eastern states on linden trees and other ornamental shrubbery.

Cottony-Cushion Scale (Icerya purchasi).—This scale has been so completely held in subjection by the *Vedalia cardinalis* that it has been very difficult to secure enough material to keep our breeding cages supplied with the necessary food for the propagation of this valuable ladybird.

Yellow Scale (Chrysomphalus aurantii citrinus).—Numerous applications for parasites on this scale have been sent into this office from the northern section of the State. On examination of specimens submitted to us, evidence of the parasite was found, and we believe that climatic conditions, which have proved unfavorable for the parasite, are probably responsible for the slight increase of the scale.

Mites.—The yellow mite (*Bryobia* sp.) was very abundant again in the interior valleys. The extreme summer heat seems to be favorable for an enormous increase of this pest, which attacks almost all growth. Much damage is done to peanuts, beans, and all orchard trees, as well as the willow and sycamore. The almond mite (*Bryobia pratensis*) was abundant in the upper valleys. The pear-leaf blister mite (*Phytoptus pyri*) was so abundant in some sections as to cause inquiry about its being pear blight. The grape-leaf mite (*Eriophyes vitis*) was reported during the season from several of the grape sections as causing considerable damage by producing an erineum on the under surface of the leaves, causing large swellings on the upper surface. A similar trouble was also reported on walnut, which is caused by another species, probably *Eriophyes tristriatus*. By the application of dry sulphur these two species have been readily destroyed.

Red Spiders (*Tetranychus mytilaspidis*, *T. sexmaculatus*, and *Tenuipalpus californicus*):—These species, affecting the citrus trees principally, have not been as numerous in 1905 as they were in previous years. Owing to the fact that distillate sprays have been extensively used, no doubt accounts for the marked decrease of these species.

Fungi.—Owing to favorable climatic conditions (a warm moist spring), the more common fungi, such as shot-hole fungus, peach curl, pear scab, peach and apple mildew, onion blight, potato blight, and scab, were very abundant and occasioned much inquiry and correspondence. In the Sacramento and San Joaquin valleys the peach was attacked by a species of fungus (*Coryneum beyerinkii*) and much damage was done. The apricot crop in other sections was badly damaged by shot-hole fungus, and the market was full of very inferior fruit.

Respectfully submitted.

EDW. M. EHRHORN,
Deputy Commissioner of Horticulture.

SAN FRANCISCO, November 1, 1906.

TO HON. ELLWOOD COOPER,
State Commissioner of Horticulture.

DEAR SIR: I have the honor to submit to you herewith my annual report as Deputy State Commissioner of Horticulture, embracing the important duties of the Horticultural Quarantine Division.

During the period from January 1, 1906, to November 1, 1906, there arrived at the port of San Francisco 217 passenger steamers and a few sailing vessels from foreign countries, and which required our attention, as most of them carried passengers and were liable to carry fruits and plants. Of all vessels inspected, we found that about 18 per cent arrived without fruit or plants, being mostly slow freighters which carry a few passengers, but owing to slow travel seldom carry perishable goods; 47 per cent of these vessels contained fruit and plants, which

were fumigated and passed; and 35 per cent contained fruits and plants, some of which were destroyed and some refused landing.

The following shipments under date will be of more than ordinary interest and merely represent some of the many instances in the quarantine work:

January 9th, on the steamer "Newport," in the passengers' baggage, we found three lots of oranges, three lots of sweet limes, and a few pome-oes which came from Mexican ports. As these were liable to contain the Morellos orange-maggot (*Trypeta ludens*), they were destroyed.

January 14th, on board the transport "Sherman," we found three flowering cherry trees infested with *Eriococcus azalea* and seven camellias badly infested with *Pseudaonidia duplex*. Both being dangerous pests, the plants were destroyed.

January 15th, the steamer "Sierra" brought by freight from Honolulu, thirteen cases of tomatoes infested with the larvæ of the melon-fly (*Dacus cucurbitæ*). The whole shipment was destroyed and notice given the shipper not to send any more tomatoes to California. In one tomato we found seventy-nine maggots. This is the most destructive pest on cucurbits in the tropics and would play havoc with many of our vegetables, if it ever got a foothold in our State.

January 26th, on the steamer "Mongolia," a passenger brought two flowering cherry trees and a dwarf maple infested with *Aulacaspis pentagona*, the East India peach scale; another passenger brought two palms infested with an *Aleyrodes* species. All these plants were promptly destroyed. *Aulacaspis pentagona* has proved to be the most destructive scale insect of the peach in other countries, and the importance of a strict quarantine against it is quite necessary.

March 1st, on board the steamer "Curacao," from Mexico, we found one box of oranges and sweet limes which were badly infested with *Chrysomphalus aurantii*; in fact, some of the fruit was completely covered with the scale. Among the oranges we found a few containing the larvæ of a fruit-fly, and destroyed the whole shipment.

March 10th, on the German steamer "Sesostris," from Central American ports, we found five cocoanut palms badly infested with *Pseudococcus nipæ*, one of the most serious mealy-bugs known.

March 19th, on the steamer "Coptic," from the Orient, we found in possession of the crew two Biotas badly infested with an aphis, which were so numerous as to cover the trunk of the plant completely. This is apparently a very prolific species. We promptly destroyed the plants.

April 6th, the steamer "America Maru" brought two cases of plants by freight, which were fumigated and overhauled. One third of the plants were destroyed, on account of being infested with the following scale insects: *Ceroplastes* sp., *Antonina crawii*, *Leucaspis japonica*, and *Aulacaspis pentagona*.

April 13th, on the steamer "Mongolia," from the Orient, passengers had in their possession five lots of oranges infested with *Parlatoria*

ziziphus, four flowering cherry trees and two other plants infested with *Aulacaspis pentagona*, which were destroyed.

May 14th, on the steamer "Mariposa," from Tahiti, we found in possession of one of the crew two cocoanut palms infested with several species of scale insects.

May 15th, in the United States postoffice, we inspected two packages of plants from Japan, out of which eight plants were destroyed, on account of being infested with scale insects. The postoffice authorities always notify us of the arrival of plants by mail.

June 7th, on the steamer "Coptic," from the Orient, we found six flowering cherry trees infested with *Aulacaspis pentagona*, also a lot of oranges badly infested with *Parlatoria ziziphus*.

June 10th, a passenger on the steamer "Queen," from British Columbia, had among his clothing a lot of oranges from the Fiji Islands, badly infested with *Parlatoria* sp., *Aspidiotus* sp., and *Chionaspis* sp.

July 18th, on the steamer "Alameda," three cases of mangoes infested with *Phenacaspis eugenix*. Judging from the appearance of this lot of fruit this insect would prove a serious pest if allowed to land in this State.

July 24th, on the steamer "Doric," from the Orient, we found five lots of mangoes and a bunch of mango cuttings infested with *Phenacaspis eugenix*, and some Leit-Chees infested with a *Eulecanium* sp. and an *Odonaspis* sp.

July 30th, on the steamer "Sonoma," a passenger had some oranges and apples from Sydney, and owing to the danger of fruit-flies these were destroyed. We also found some fruit packed in grass which was infested with *Odonaspis ruthæ*, a destructive grass pest. On the same steamer six boxes of alligator pears had to be overhauled, as we found leaves and twigs packed in with the fruit, and these were infested with *Pseudococcus nipæ*. The steamer also brought 900 boxes of lemons from New Zealand, which were badly infested with a fungous growth and scale insects. These were not allowed to land in the State.

August 14th, on the steamer "Ventura," a lady had a box of plants from Honolulu, which she received from the Commission of Agriculture and Forestry. Among the lot were seven plants badly infested with *Pseudococcus nipæ*, which were destroyed.

September 3d, on the steamer "Sierra," from Honolulu, we found twelve wreaths in the passengers' baggage. As these were all made of Melei leaves, which are infested with *Ceroplastes rusci* and an *Aleyrodes* sp., we destroyed them.

September 4th, on the steamer "America Maru" we found four dwarf maple trees which were badly infested with *Parlatoria pergandii*.

September 29th, on the transport "Sherman" we found a pine tree containing the pupæ of a large sawfly (*Monoctenus* sp.) and two *Solanum* plants infested with a fungus and a *Eulecanium* sp.

October 11th, on the steamer "Doric" a passenger had a pomelo infested with no less than five different scale insects, which she was bringing as a curio to some interior town, and no doubt when the fruit

would show decay the owner would have thrown it into some yard, possibly among growing plants. It was destroyed.

To give a clearer idea of the various shipments which arrived during the several months, the following table has been arranged.

All shipments of fruits and trees which arrived by rail from foreign countries and other states are also included:

Month—1906.	Number of Vessels.	Cases of Fruit.	Cases of Plants by Steamer.	Cases of Plants by Rail.	Loose Lots Passengers' Baggage.	Fruit or Plants Destroyed or Refused Entry.
January	22	4,494	77	16	155	45
February	18	4,472	73	23	60	34
March	26	15,687	16	12	150	26
April	22	11,446	4	28	109	17
May	20	6,623	21	3	78	19
June	20	2,483	31	-----	109	11
July	20	3,004	-----	-----	98	928
August	23	4,249	6	-----	182	75
September	22	2,591	92	-----	154	25
October	24	2,362	705	2	113	23
Totals	217	57,411	1,025	84	1,208	1,203

As in the past, all trees, plants, and fruit infested with injurious insects or diseases new to the State have been destroyed. Occasionally we find a few oranges in the possession of passengers from Mexican ports, which, as noted above, are always destroyed. Despite the fact that the Morellos orange-worm (*Trypeta ludens*) does not exist in all parts of Mexico, we deem it wise and by far a safer plan to confiscate and destroy all this fruit. The maggot being in the fruit, it is difficult to detect it; and to make an examination, the fruit has to be cut open, which destroys it. As this pest does exist along the Mexican coast, we have reasonable cause to presume that the fruit might be infested. All employés on vessels from Mexican ports have been instructed not to bring oranges and sweet limes.

A great amount of time and labor is taken up in the fumigation of pineapples from Hawaii, which have found a good market in California, Oregon, and Washington, and very large shipments arrive during the season. Through the agencies of Wells, Fargo & Co., Morton Special Delivery, and others, a great amount of this fruit is shipped to individuals all over the State. As this fruit is always more or less infested with *Pseudococcus citri* and *Diaspis bromeliæ*, it is very important to guard against the spread of these pests. We have made special arrangements whereby this office is furnished with chemicals, labor, and other expenses required in the fumigation of the fruit.

We are greatly indebted to the U. S. Customs Bureau for the hearty coöperation and the very evident interest which they accord us in the furtherance of our duties, as without this material aid we would be greatly handicapped.

Respectfully submitted.

EDW. M. EHRHORN,
Deputy Commissioner of Horticulture.

REVIEW OF THE FRUIT SEASON.

SEASON OF 1905.

Cherries.—The season of 1905 opened very promisingly for the cherry crop. The trees were heavily loaded with fruit buds and blossomed profusely early in the season. Excessively heavy rains, however, fell at the time the trees were in bloom, washing out the pollen and preventing the setting of the fruit. As a result, instead of the heavy crop that was expected, the cherry yield was one of the lightest known in our State for many years. There were but 79 carloads of cherries shipped to the Eastern market and the supply at the canneries fell so short that the lightest pack of cherries that has been put up for years was the result. In a few orchards, especially favored by location, fair crops were gathered, and the fruit from these brought almost fabulous prices. Shipments for 1904, which were also considered light, ran up to 209 cars, so that it will be understood from the comparison that the cherry crop of 1905 was a failure.

Apricots.—The apricot crop for the year 1905 was an unusually heavy one. It is a peculiarity of this fruit that we rarely have two good seasons together, and the crop of 1905 seemed in some way to make amends for the shortage of the cherry crop. It was, taken altogether, one of the best that has ever been gathered in the State, being above normal in quantity and yet average in quality. There were shipped of this fruit, in its fresh condition, 279 cars, the largest quantity ever reported from the State in any one season. Shipments were very active, good prices were obtained, and the cannery demand was heavy. In the section around Lodi, the crop ripened very early—from a week to ten days earlier than usual. In their anxiety to take advantage of the early market, some shippers packed and forwarded immature fruit, upon which losses were sustained, but, on the whole, good prices were realized.

Peaches.—In some of the peach sections of the State the peach blight made very serious inroads on the peach orchards and affected the total output very materially. Yet, on the whole, it may be said that the peach season of 1905 was an extraordinarily good one. The crop in most sections was heavy and brought generally good prices. Shipments were very largely in excess of those of any previous season, running

up to 1,946 carloads, a number not equaled in any season since that of 1899. The greater part of this fruit was composed of the late varieties, the earlier kinds not turning out well, and it was feared early in the season that the crop would be light. The earlier shipments of peaches brought good prices in the Eastern market, but the later consignments came into contact with the Eastern fruit, and prices fell. There was a very active demand for peaches for canning purposes, and altogether the peach season may be summed up in the statement that the crop was good, the demand heavy, and prices all that could reasonably be expected.

Plums.—The plum crop on the whole was good, being somewhat in excess of former years. The shipments of this fruit were the largest ever known, with perhaps one exception, in the history of this fruit in the State. During the season there were 1,391 carloads of fresh fruit shipped to the Eastern markets. As a rule, the shipments brought very good prices. The cannery demand was equally good, and plum men enjoyed a prosperous season.

Pears.—Pear blight cut very largely into this fruit during the season of 1905, and added to this were the excessively heavy rains which fell during the blooming period, and as a result the pear crop, like the cherry crop, may be said to have been a failure, the total output being less than that of any year since 1895 and less than one half the crop of the preceding year. There were but 1,003 carloads of pears shipped out of the State during the year. Prices were phenomenally high, but even at the prices offered, the fruit could not be obtained. In view of the prices obtained for the fruit, it is probable that, despite the short crop, more money was received for pears during the season of 1905 than in any previous year. Quotations were made early in the season at \$35 per ton and rapidly climbed up until reports were made of \$60 to \$65 being offered, with no fruit to supply the demand.

Apples.—The apple crop was a large one, one of the largest, in fact, that has been produced in the State. Owing to the care bestowed upon the orchards in the principal apple sections, the percentage of wormy fruit was greatly reduced, and the quality of the fruit as a whole very greatly improved. There were 1,208 carloads of apples shipped out of the State for 1905, as compared with 43 for 1904. This was the heaviest total shipment of apples ever made in one season from California. Prices during the greater part of the season ruled high, and on the whole were very satisfactory to the growers.

Prunes.—Early in the season the outlook for the prune crop was a very good one, and estimates rendered were generally to the effect that the output would be large. As the season advanced, however, con-

ditions changed, and the reports indicated a continual shrinkage in the estimate, and by the time the crop was harvested it developed that the output was very far below normal. This was especially true in the Santa Clara Valley, the principal prune section of the State. In other parts the crop was better, but not sufficiently good to bring it up to normal. One of the great causes of the shortage was the presence in enormous numbers of a minute insect pest, the pear thrips (*Euthrips pyri*), which attacked the essential organs of the blossoms and prevented the pollenization of the fruit. A great deal of the fruit that remained was also attacked by this pest, being inferior in size and deformed in shape. Altogether, the prune season was a very unsatisfactory one, with prices equally unsatisfactory to the grower, owing to the poor quality of the fruit. The great shortage of prunes, however, had one beneficial result, as the market was cleared of hold-over stock and an open field left for the following crop at better prices.

Grapes.—The grape crop fell somewhat below normal in quantity, but still was a very fair one, the quality of the fruit compensating for the small shortage in the crop. There was a very hot spell during the early part of July of 1905, which very seriously cut into the crop, especially in the early districts, and reduced the total output, particularly in table grapes. Notwithstanding this fact, the shipments of table grapes were exceedingly heavy, running up to 1,602 carloads and overtopping the exports of 1904 by 150 carloads. The market was unusually active, the demand good and prices unusually high, and growers and shippers of table grapes netted very large returns on their crops.

Walnuts.—The walnut blight was very serious throughout the walnut orchards of Los Angeles and Orange counties, and did a great deal of damage during the season, cutting largely into the crop. It also extended its operations into new sections and appeared in Ventura and to some extent in Santa Barbara counties for the first time. Indications in the early part of the season were very promising for a good crop, but owing largely to the effects of the blight and unfavorable climatic conditions the crop fell very much short of early expectations. Shipments were very much lighter than usual, and the crop was not over sixty per cent of what was expected. A very large portion of the crop was also of poor quality, owing to the blight; but the poor nuts were carefully sorted out and only the best shipped to the Eastern market. Prices were good, but owing to the shortness of the yield the season can not be considered a favorable one for the walnut-growers.

Almonds.—Almonds gave better returns to the growers than did walnuts. The yield of orchards in San Joaquin and Alameda counties

ranged from very fair to good. In the almond orchards of Yolo and Solano counties the red spider appeared in large numbers during July and August and somewhat reduced the crop and lowered the quality of the nuts. With all this, taking the State at large, the almond crop of 1905 may be considered as a good one. The growers received very fair prices for their fruit, and have generally done well with their crops.

SEASON OF 1906.

Cherries.—The early cherry season opened with great promise for the growers, and there was every prospect that the crop would be an exceedingly heavy one. Trees blossomed freely and the young fruit set heavily. Late rains and high winds in many of the cherry sections, however, did great damage to the crop and there was a very heavy falling off of the early varieties. In consequence, the shipments of early cherries were light, but the later varieties brought the crop up to above normal. The latter yielded very heavily, and late in the season the Eastern shipments were very large. As a rule, the shipments commanded good money, and cherry-growers had a good season. The shipments for the season totaled $149\frac{1}{2}$ carloads, against $79\frac{1}{2}$ for the previous year. There was a very heavy demand for cherries, too, on the part of the canneries, and an unusually large pack of this fruit was put up.

Apricots.—This was a decidedly off season for apricots, and the yield of this fruit was so light that it may be said to have been a total failure, the entire output of the State not reaching over fifteen per cent of the normal. There were altogether $16\frac{1}{4}$ carloads shipped to the Eastern markets, against $278\frac{1}{2}$ for the previous year. The canneries had contracts for a large portion of the crop and the greater part of it went to these institutions. Very high prices prevailed and dried apricots reached 15 cents, the highest price for many years past.

Peaches.—Owing to the heavy rains and moist weather of the late winter and early spring months, the peach blight got a strong foothold in the principal peach sections of the State and very much damage was done thereby. This disease affected the bearing wood of the trees and very largely curtailed the crop. In addition, there were severe winds and heavy rains during the blooming period, the blossoms were not pollinated and the set was very light. As a result, the peach crop of the State this year fell very much below normal, as indicated in the total shipment of $583\frac{1}{4}$ cars against $1,945\frac{3}{4}$ for 1905.

As indicating the destructive work of the peach blight where it obtained a foothold, it may be noted that in sections where the blight had not made its appearance the yield was normal. The late fruit

was less seriously affected than the early varieties, and the shipments consisted almost entirely of late peaches.

The earlier shipments to the Eastern markets brought very good returns, but later in the season our fruit came into conflict with the Georgia, Michigan, and other Eastern-grown fruits, and the market price dropped materially. The home demand was very active, and canneries offered from \$50 to \$60 per ton for clings. Altogether the season of 1906 may be designated as an unfortunate one for the growers.

Plums.—This crop was very nearly normal and the yield generally good. The shipments fell below those of the preceding year, being $1,220\frac{1}{2}$ cars against $1,391\frac{1}{2}$ for 1905. The slight reduction in amount, however, was more than compensated for by the increase in price, and the greater part of this fruit reached the Eastern market in excellent condition, bringing the shippers good returns.

Prunes.—Some little complaint has been made of the shortage in some sections of the Santa Clara Valley, but generally the prune crop turned out well there, also in all other prune sections of the State, and will be at least normal. The work of gathering is now finished, drying and processing are being completed, and reports from all sections are to the effect that there is a full average crop, ranging probably to 180,000,000 pounds.

The crop of 1905 was very seriously damaged by an attack of the pear thrips, but these did not show up in such numbers in the spring of 1906, and very little damage is reported from their attacks this season. Prices have very materially advanced, and as the foreign prune crop is very light, and the demand for this fruit is increasing, there is every prospect that the growers will get good figures for their stock. They are now holding at a $3\frac{1}{2}$ -cents base.

Pears.—In spite of the ravages of the pear blight, which has been reported from several new sections, and which has done a great deal of damage wherever it has obtained a foothold, there has been a very large increase in the pear crop of 1906 over that of 1905, shipments being $1,511\frac{1}{2}$ cars against $1,011\frac{1}{2}$, leaving a balance to the credit of 1906 of 500 cars over 1905. Besides this there was a very much heavier pack of pears at the canneries and unusually good prices were paid to the growers. There has been a very determined fight in the pear districts against the inroads of the pear blight. In the sections where it has not appeared, every effort has been made to prevent its entrance, and so far with very good promise of success. Where the blight had not appeared this year, the crop was a very heavy one.

Apples.—Reports from the apple sections indicate that the crop of this fruit has been normal this year and the quality of the fruit exceptionally good. There has been a very marked decrease in wormy fruit, and this condition is reported from nearly all parts of the State. This is probably due to a number of causes: an unfavorable season for the codling-moth, unusual efforts on the part of the growers in watching for and fighting the pest, the introduction and work of the parasite, and various other causes. It is matter for congratulation on the part of all our apple-growers that this most serious of pests appears to be decreasing, and it is to be hoped that by the combined efforts of all the causes, we may yet succeed in keeping it in check to a great extent.

At the present writing the apple-shipping season is on, and this fruit is going forward steadily in carload lots. There have been shipped the present season up to date $511\frac{3}{4}$ carloads, against 1,208 carloads for last season. No comparison can be made between the two seasons, however, as active shipments will continue for some time yet, and the exports will probably equal if not exceed those of last year.

Grapes.—The grape crop was somewhat lighter than that of 1905, but prices, which were excellent for that year, were twenty-five per cent higher for the present season, and the quality was very much better than that of 1905. The shipments also have been heavier, there being 1,984 carloads shipped during the present season as against $1,556\frac{1}{4}$ during the last. The demand for table grapes in the East is a steadily growing one, and prices are increasing with each year. In this State very large new areas are being planted constantly to table grapes, and there is little question but that this will become one of the most important and profitable in the list of our horticultural industries.

The principal cause of the slight shortage in the grape crop was due to the very hot spell during the early part of July, which burned a great many grapes on the vines where they were exposed to the direct rays of the sun. While the crop was somewhat light, there was sufficient new acreage coming into bearing to compensate for the shortage, as is indicated by the increased shipments.

Walnuts.—The walnut crop, which fell somewhat below normal in 1905, increased to very nearly the normal output in 1906, being about twenty per cent heavier than that of last year. The larger part of the crop has already been shipped, 850 carloads having been sent out of the State. Prices have been very fair, ranging up to $12\frac{1}{2}$ cents, and the demand has been good. Grave fears had been expressed in regard to the spread of the walnut blight, but this disease seems to have been checked during the past season, and while it existed in destructive force in some orchards, yet it did not spread to any extent and was not nearly so serious even in those sections where it had become firmly fixed.

Almonds.—The almond crop of 1906 has been fair to good, very many of the orchardists reporting heavy crops. In some instances the yield was light, but, taking it altogether, the crop has been normal. The red spider was reported in some of the orchards, but was not so serious a pest as it was the preceding year. The nuts, as a rule, have been well filled out, and have commanded good prices for the grower.

FRUIT SHIPMENTS—1905 AND 1906.

Following is a comparative statement of the shipments of fruit out of the State during the past two years:

	1905—Cars.	1906—Cars.
Cherries.....	79 $\frac{1}{2}$	149 $\frac{1}{2}$
Apricots.....	278 $\frac{1}{2}$	16 $\frac{1}{2}$
Peaches.....	1,945 $\frac{3}{4}$	583 $\frac{1}{2}$
Plums.....	1,391 $\frac{1}{2}$	1,220 $\frac{1}{2}$
Pears.....	1,011 $\frac{1}{2}$	1,511 $\frac{1}{2}$
Grapes.....	1,556 $\frac{1}{2}$	1,984
Apples.....	1,208	511 $\frac{3}{4}$
Tomatoes.....	$\frac{1}{2}$	3
Figs.....	---	1 $\frac{1}{2}$
Quinces.....	13 $\frac{1}{2}$	14 $\frac{3}{4}$
Cantaloupes.....	---	$\frac{3}{4}$
Persimmons.....	1 $\frac{3}{4}$	1
Totals.....	7,486	5,998

ENTOMOLOGICAL.

Entomology in Outline.

The Coccidae of California.

Insects of the Year.

Parasite of the Codling-Moth.

Gypsy and Brown-tail Moths.

Peach Blight.

ACKNOWLEDGMENT.

To P. Blakiston's Sons & Co., Philadelphia, we are indebted for the use of the cuts numbered below, which appeared in the excellent work by Professor J. W. Folsom, entitled "Entomology, with Special Reference to its Biological and Economic Aspects": Cuts numbered Fig. 1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 38, 41, 56, 57, 59, 60, 68, 80, 84, 87, 110.

ENTOMOLOGY IN OUTLINE.

Arranged for Horticultural Commissioners, Fruit-Growers, and Farmers.

By JOHN ISAAC.

Some simple work, which shall present, in plain, every-day language, information about the insect world, has long been desired by our County Horticultural Commissioners and fruit-growers. As a rule, these men are not scientific entomologists, nor do they need be, but, at the same time, it is necessary that they should know something of insects and their modes of living, and be able to distinguish between insect friends and enemies, in order that they may protect the one and destroy the other.

It is much to be able to tell to what order an insect belongs, more to know to what family in that order it belongs, and this is as far as the average commissioner or orchardist can hope to go; to go farther and trace it to genera and species is the work of the trained entomologist, and is a life work alone for any man.

It is the desire of the writer to place such knowledge before his readers, in the simplest manner, divested as far as possible of all scientific and technical terms. Those who desire more can acquire it from the scientific text-books. We do not offer this as a scientific dissertation on entomology, nor as giving, by any means, all that is known of that science, but simply as an introduction to every-day men of the more general facts which they should know in the pursuit of their calling for the benefit of their constituents.

SYSTEM IN NATURE.

Success in any pursuit depends upon system, and this is essentially true of the study of any branch of natural history. As we gaze around us upon the material world, we behold a conglomerate mass of life that may astonish, or even oppress, us with its multitudinous forms, but until we can take each individual object and trace it down to its proper place in the order of nature, it has no meaning for us. To accomplish this, the natural sciences,—geology, botany, biology,—have been established, and these again have been subdivided, until every object can be assigned to its proper place and its life and peculiarities known and described. There is no field in which subdivision has been called out

so fully as in the natural sciences; as a result, we have a perfect system of classification, which enables us to recognize and study with the greatest ease any natural object which comes under our observation.

The earth naturally is divided into three great kingdoms—the mineral, the vegetable, and the animal. The mineral is the first and the oldest. Without it, neither of the others could exist. In fact, the vegetable and animal kingdoms may be considered as subordinate to the mineral and springing from it, for the material part of all vegetable and animal is mineral, and so soon as the vital element has departed, they restore to the mineral what they have borrowed from it. The vegetable kingdom comes next in order, for there could be no animal life until there was abundant vegetable life to support it.

Our business now is only with the animal kingdom, and with only one branch, though a very important branch, of that. This kingdom has been divided into two subkingdoms, known as the Vertebrata and the Invertebrata. The Vertebrata include all animals having a

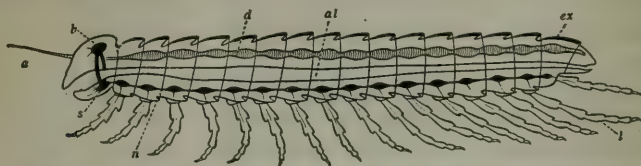


FIG. 1. Diagram to express the fundamental structure of an Arthropod. *a*, antenna; *al*, alimentary canal; *b*, brain; *d*, dorsal vessel; *ex*, exoskeleton; *l*, limb; *n*, nerve chain; *s*, subesophageal ganglion. (After Schmeil.)

backbone, as mammals, birds, fishes, and reptiles. The Invertebrata cover all that class of animals which have no backbone, or vertebra, and this is by far the larger and more important branch of the animal kingdom, as it includes a vastly greater number of forms and is more numerous in its individuals than is the other.

The Invertebrata have been divided into eight branches, as follows:

Protozoa, which includes the lowest forms of animal life. These are single-celled animals, many or most of them exceedingly minute, or even microscopic in size, and without definite shape. In most cases reproduction is effected by subdivision.

Poriferata, which are animals a stage higher in their development, and including sponges and kindred forms.

Cœlenterata, in which we find the jelly-fishes and corals.

Echinodermata, which includes the sea-eggs or sea-urchins and the star-fishes.

Vermes, which covers the various forms of worms, leeches, and their kindred.

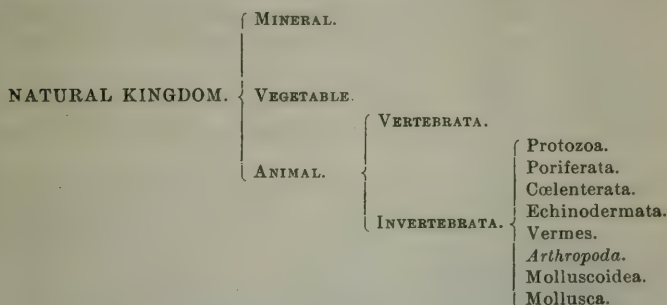
Molluscoidea. This is confined to two groups of aquatic animals, the Brachipoda and Polyzoa. The first of these was formerly placed in the

Mollusca, and the latter in the Zoöphytes, but they were found to be more nearly related to each other than to the branches in which they had been included and the Molluscoidea was erected for them.

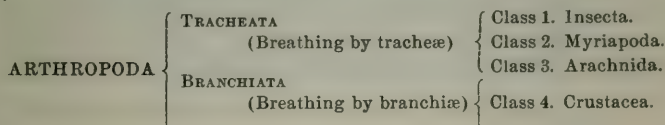
Mollusca embraces what is commonly known as shell-fish, while the land forms are represented by snails and slugs.

Arthropoda. This is the branch in which we are especially interested. It is separated into two divisions: the Tracheata and Branchiata. The Tracheata are aerial animals, which derive their oxygen from the air by tracheæ or tubes. This division includes insects, myriapods, centipedes, thousand-legged worms, etc., and the Arachnida (spiders, scorpions, etc.). The Branchiata are aquatic animals, which breathe through branchiæ, or gills, or sometimes through the whole surface of the body. There is but one class under this division, the Crustacea, including crabs, lobsters, shrimps, etc. The common sow-bug is a land form of this branch.

Having now reached our subject, and traced the insect group down to its proper place, we will proceed to deal with this class by itself. The following diagram will present to the reader the position of the class *Insecta* in its relation with creation:



The branch Arthropoda may be presented in tabular form, as follows:



Conspicuous examples of the Crustacea are lobsters, crawfish, crabs, shrimps, etc., while the terrestrial forms are represented by the sow-bugs, which are so common in damp locations, and which are frequently mistaken by young entomologists for members of the Myriapoda.

Class 1, *Insecta*, is the only one with which we have any immediate concern, although it is necessary to understand something of the other air-breathing classes, which are so nearly related to the insects, and

among which we find forms beneficial or injurious to our fields and orchards.

The *Crustacea* are of little interest to us, except as members of the Arthropoda. The members of this class are chiefly aquatic, and are grouped with the insects because the general structure is the same.



FIG. 2. A diplopod (*Spiroboleus marginatus*).
Natural size.

The distinguishing feature of the Arthropoda is that the bodies are segmented; that is, they are composed of a series of rings fitted into each other or articulated. In some classifications this class is designated as the Articulata, and is made to include the Vermes, or worms, which are also segmented. The latter, however, properly belong in a class by themselves, and the Arthropoda may be stated to include all segmented or ringed animals with legs.

It is by far the most important of all the subkingdoms, and includes a larger number of species than all the others combined. The Crustacea fit the description above and are naturally included in the same subkingdom with the insects.

The *Myriapoda* come more directly under our view. They are land animals and, in some cases, are very injurious to crops. The centi-

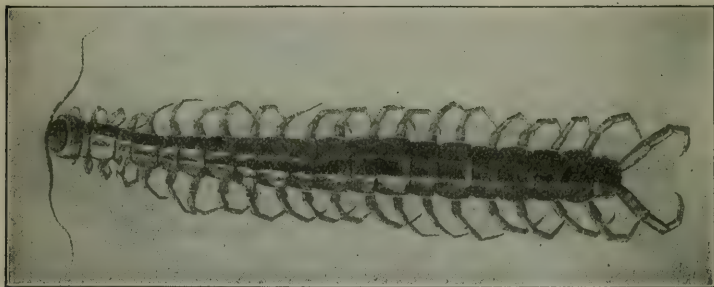


FIG. 3. A centipede (*Scolopendra heros*). About two thirds the maximum length.

pedes and millipedes are included in this class. Some of these are very minute and others attain great size. One of the smaller of the centipedes sometimes appears in vast numbers in damp locations and does great damage to young plants.

The *Arachnida* include the whole of the spider family. They are distinguished from insects by the fact that their members generally have eight legs, while insects have but six. They pass through no

metamorphosis, the young resembling the matured members in everything except size, and they have no antennæ. Some of our greatest orchard pests are found in this group, among them being the red spider



FIG. 4. A scorpion (*Buthus*). Natural size.

and various mites; the ticks, which so trouble our poultry and live stock, also belong to this class, as do the phytpti, which infest our pear trees and grapevines. The disease known as the "itch" among men is also caused by a member of this family, called the itch mite. Some of the mites, during the larval or undeveloped stage, have six legs, acquiring their entire complement of eight only when fully developed, and the phytpti have but four legs at any period of their existence. These, however, are exceptions to the rule—that members of this class have eight legs. It will be observed from the above that some of our most troublesome pests are found in this class, but there are also some that are beneficial. In fact, very many of the spiders, which are generally predaceous, perform a beneficial work in keeping down injurious species.

CLASSIFICATION.

In order to place properly an insect or other natural object, a system of classification is necessary. As stated before, we have three great kingdoms. All objects have distinguishing characteristics which place them naturally in one or the other of these, and we know at a glance to which

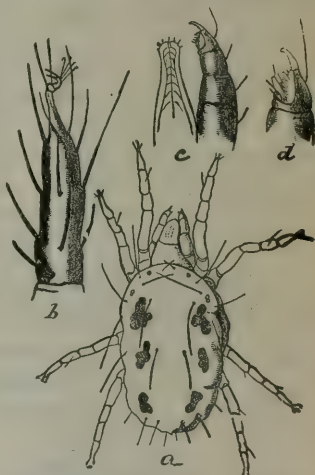


FIG. 5. Six-spotted mite (*Tetranychus maculata*). *a*, insect, much enlarged; *b*, tarsus; *c*, rostrum and palpus, still more enlarged; *d*, tip of palpus, still more enlarged.

they belong. Everything that lives, breathes, walks, flies, or swims, everything with fur, feathers, or scales, we know belongs to the animal kingdom. But among animals there are great dissimilarities. As stated, one great portion has an articulated backbone or vertebra, and another, and more important class, has none; so our great animal kingdom branches off into two forks, and these are known as subkingdoms. It is still easy to tell to which of these an animal belongs, for every child can tell at a glance whether it has a backbone or not. So far our task is easy, but there are great points of difference, even among backbone and non-backbone animals. The snake, the bird, and the horse all have backbones and, therefore, all belong to the subkingdom Vertebrata, but they have little else in common, so the Vertebrata are again divided into four classes—mammalia, birds, reptiles, and fishes. Each of these again is divided and subdivided according to well-marked peculiarities common to the whole group, until we get down to the species and the individual. This has been explained in the preceding pages, where we have followed the insect down to its place in the animal kingdom, through the Invertebrata, Arthropoda, and Tracheata. So by means of the following stages we can trace an insect down to its natural place:

Kingdom,
Subkingdom,
Branch,
Class,
Order,
Family,
Genus,
Species,
Individual.

To illustrate, we will take our common swallow-tailed butterfly, and work it down to its final place:

Kingdom	= Animal.
Subkingdom	= Invertebrata.
Branch	= Arthropoda.
Class	= Hexapoda.
Order	= Lepidoptera.
Genus	= Papilio.
Species	= Rutulus.

All of the species *Rutulus* are alike. Where there are slight variations, these are not fixed, but found only in the individuals. With different members of the genus *Papilio*, however, there are very distinct differences, yet all have a general similarity, enough to group them in one genus, so all the members of the genus *Papilio* have characters in

common with all other butterflies and are grouped with them in the order Lepidoptera.

Really, the first four of these stages concern us but little. We all know to what kingdom an animal belongs, equally to what subkingdom. Neither the branch nor the class will bother us much, although the knowledge of very many people stops at this and they confound many of the other members of the Arthropoda with the class Hexapoda, and regard spiders, centipedes, scorpions, and, in fact, all things that creep or crawl, and are not beasts, birds, reptiles, or fishes, with insects. It is after we have decided that the object of our interest is an insect that the trouble begins. It is sometimes very difficult to decide to what order it belongs. It is much to know this, and much more to know the family. Beyond this point it is unnecessary for the average entomologist to go. In the case of our more common insects, however, it is well to be able to recognize them by their generic and specific names, and with an acquaintance with the family to which they belong, they can readily be traced to their species.

It is sometimes necessary to enter into closer subdivisions, and, to this end, a higher and a lower section is provided, designated by the prefix *super* or *sub*, as *super-family* and *sub-family*, classing them above or below the regular family as their characteristics seem to indicate.

Dismissing the greater and more general divisions, we now come to the orders, and here we are met with confusion. It would seem as though science, or at least scientists, instead of making matters clear, as they should, take a delight in confusing. A student no sooner gets the system of nomenclature of a science firmly fixed in his memory, or the classification properly versed in his mind, than some new authority steps forward, and, in order to keep up with the times, the student has to unlearn all and learn over again.

There are several groups or orders of insects, ranging from seven to thirty-four, according to the authority. The commonly accepted number of orders has been seven. Westwood gives us thirteen, Comstock makes it nineteen, and Kellogg, the latest authority, gives us nineteen, but makes changes in Comstock's names and arrangement. The differences are in the minor groups or species.

There are six well-defined orders: Orthoptera, Hemiptera, Coleoptera, Diptera, Hymenoptera, and Lepidoptera. Then there is the seventh, the Neuroptera. Now it is an easy matter to assign an insect to any one of the six when it belongs there, but there are numbers of insects which do not clearly belong to any one of these, and the order Neuroptera has furnished a dumping-ground for most of them. When the entomologist found an insect which he could not clearly locate, he called it a Neuropteron, and let it go at that. This will answer as well,

for the purpose of our readers, probably, as any, as the more minute divisions, while undoubtedly correct, are more confusing and less suitable for the non-professional. So we will take the seven orders, as follows:

Orthoptera: The straight-winged; as grasshoppers, crickets, cockroaches, etc.

Hemiptera: The half-winged; as plant bugs, aphids, scale bugs, etc.

Coleoptera: The sheath-winged; as beetles of all kinds.

Diptera: The two-winged; as two-winged flies of all kinds.

Hymenoptera: The membrane-winged; as bees, wasps, ants, etc.

Lepidoptera: The scale-winged; as butterflies and moths.

Neuroptera: The nerve-winged. This order includes all the rest; as dragon-flies, lace-winged flies, etc.

The more minute division, according to Comstock, includes the following, which have principally been removed from the last-named order and erected into separate orders:

Thysanura: The bristle-tails, spring-tails, fish-moths, etc.

Ephemera: Mayflies.

Odonata: Dragon-flies.

Plecoptera: Stone-flies.

Isopoda: Termites or white ants.

Corrodentia: Book lice.

Malophaga: Bird lice.

Dermaptera: Earwigs.

Physopoda: Thrips.

Mecaptera: Scorpion-flies.

Trichoptera: Caddice-flies.

Syphonaptera: Fleas.

These minor orders are not of much interest to the average man, so it will not be out of place to consider them in their connection with the other orders which contain the great bulk of insects important to us, from either their beneficial or their destructive standpoint.

We have now some idea of the manner in which insects are divided into various classes, and it is necessary that we should learn the distinguishing features of them, in order that we may know to which of the various orders and families they belong. This we shall endeavor to make plain; but first it is necessary to know what an insect is, and something of the peculiarities which separate it from the other branches of the animal world. After considering this, we shall take up the principal orders and point out wherein they differ one from the other.

THE STRUCTURE OF INSECTS.

The external structure of insects is termed the exo-skeleton. In the Vertebrata, the bony framework of the body is internal and supports the muscular and nervous systems, which are attached to the outside of the osseous or bony system. With the insects, the reverse is the case. Here the skeleton is a hard, horny crust, composed largely of a substance called *chitine*, and it is situated on the outer surface, all the muscles and other organs of the body being attached to the inside, instead of the outside, of the skeleton. It is really a many-jointed tube, varying in size in different species, and composed of thirteen rings, most of them so articulated as to be movable at the will of the insect. Of these, the first composes the head, and is the most distinct. Three are fused together in the thorax, and, in most species, appear as one, there being no well-defined mark between the segments, which are immovably joined to each other. In the last section of the body the rings are loosely articulated and freely movable, being joined together with a yielding membrane, allowing the insect the widest freedom of movement. It must not be supposed, however, that these rings, or segments, are composed of one solid, unyielding piece, and that their only motion is at the joints. Each ring is composed of many plates, more or less movable, to accommodate the needs of the insect and to allow the movement of its various organs of locomotion, flight, etc. This outer integument, or case, varies very greatly in density in different insects; in some it is very thin, and easily crushed, while in others it is excessively hard. In some of the beetles, for instance, the wing covers are so hard that it is difficult to force a pin through them.

An insect is divided into three sections: the head, the thorax, and the abdomen. The upper portion, or back, is known as the dorsal surface, or dorsum; the under side is the ventral surface, or venter; while the sides are designated as the lateral surface, or pleurites. The upper and under surfaces of the thorax are sometimes designated respectively as the notum and sternum.

There are very many minor subdivisions into which the different sections of the body are separated, but it is not necessary in this treatise to name or enumerate them, nor for the young entomologist to learn them. If our readers desire to go deeper into the subject, the scientific text-books will give them an account of the more minute subdivisions and their various uses. It is enough for us to get a general idea of our subject, and we shall therefore have to proceed at once to investigate the three principal divisions, their attachments and various organs.

THE HEAD.

In insects, as in the higher animals, the head includes most of the sensory organs—the eyes, the antennæ, and the mouth parts, containing the organs of taste, and, in some species at least, the organs of smell also. The different portions of the head are: The epicranium, which is

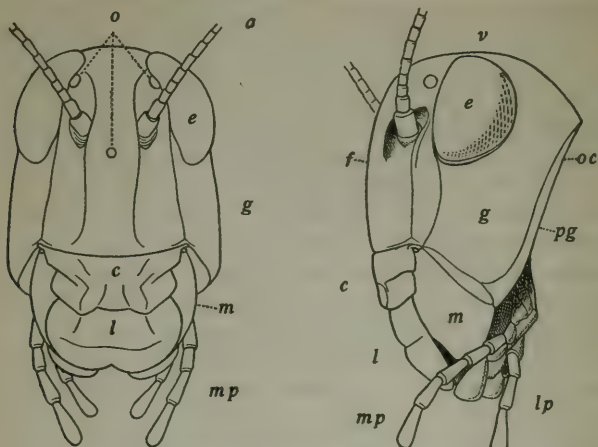


FIG. 6. Skull of a grasshopper (*Melanoplus differentialis*). a, antenna; c, clypeus; e, compound eye; f, front; g, gena; l, labrum; lp, labial palpus; mp, maxillary palpus; o, ocelli; oc, occiput; pg, post-gena; v, vertex.

the upper or dorsal portion of the skull; the face, or front or frons, above which is the vertex or forehead. The clypeus is in the lower portion of the face, and is the part to which the upper lip or labrum is attached. The cheeks are known as genæ, and in some species these

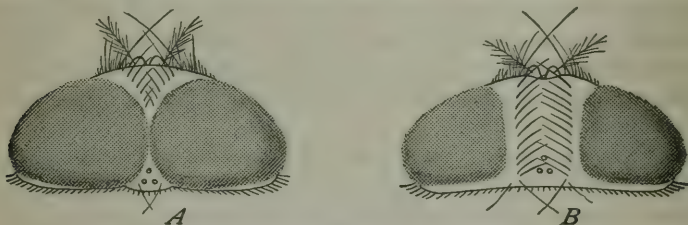


FIG. 7. Ocelli and compound eyes of a fly (*Phormia regina*). A, male; B, female.

are double, and we have post-genæ. On the under side of the head is the gula, to which the lower lip or labium is attached. The external top of the head, in contact with the prothorax, is the occiput. The principal organs of the head are the eyes, the mouth, and the antennæ.

Eyes—In the perfect insect there is a pair of compound eyes. These are usually very prominent and highly faceted. In some insects,

as the dragon-fly, the house-fly, and others, they form the greater part of the head. The eye of an insect is immovable, fast in its socket. It is hemispherical or curvilinear in form, and covered with facets or flat surfaces. They are called compound eyes, and are of many colors—blue, black, emerald green, or deep golden, as in the lace-winged fly. Really,

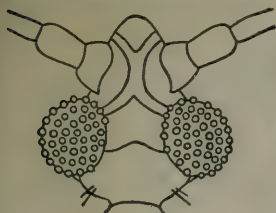


FIG. 8. Agglomerate eyes of a male coccid, *Leachia fuscipennis* (After Signoret.)

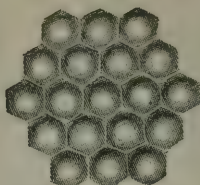


FIG. 9. Facets of a compound eye of *Melanoplus*. Highly magnified.

each facet is a separate eye, hexagonal in shape, with a cornea, lens, pigment-coating, and nervous filament. The facets face in every direction and enable the insect to see on all sides with greater ease than if they were single lensed and movable. In some cases these facets are very numerous, the eye of a small beetle, the *Mordella*, having over 25,000, the common swallow-tailed butterfly, the *Papilio*, having 17,000, the dragon-fly 12,000, the house-fly 4,000, while the eyes of some ants are limited to 50. Besides these compound eyes, most insects have two

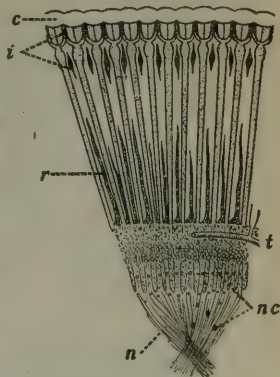


FIG. 10. Portion of compound eye of fly (*Calliphora vomitoria*), radial section. c, cornea; i, iris pigment; n, nerve fibers; nc, nerve cells; r, retinal pigment; t, trachea. (After Hickson.)

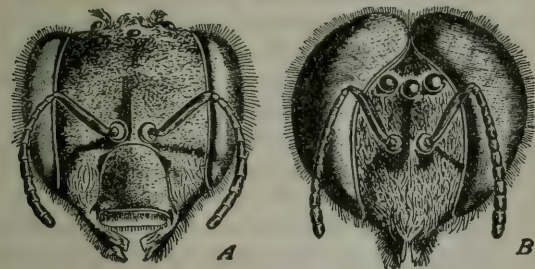


FIG. 11. Ocelli and compound eyes of the honey-bee (*Apis mellifera*). A, queen; B, drone. (After Cheshire.)

or three simple eyes, known as ocelli or stemmata. These are usually arranged in triangular form (thus \therefore), and are round and convex in shape. These extra eyes are not present in all insects, nor are their exact functions known.

They are possessed of great refractive power and are supposed to be of use in the examination of near-by objects.

Mouth.—The mouth is a very complicated piece of mechanism, and is furnished with various organs, enabling the insect to take its nourishment as its habits require. There are two general classes of

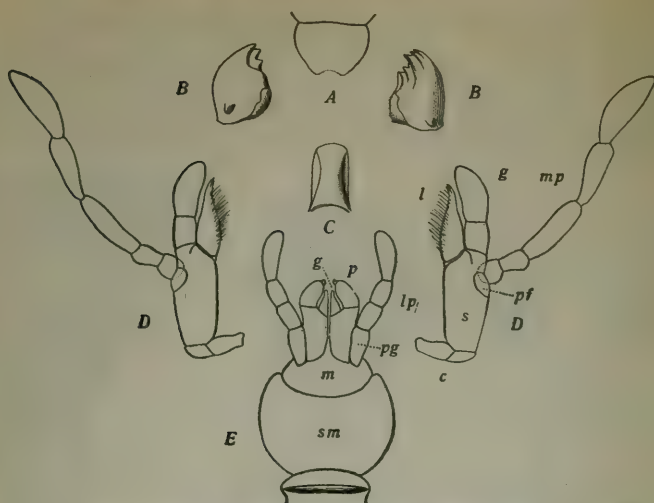


FIG. 12. Mouth parts of a cockroach (*Ischnoptera pennsylvanica*). A, labrum; B, mandible; C, hypopharynx; D, maxilla; E, labium; c, cardo; g (of maxilla), galea; g (of labium), glossa; l, lacinia; lp, labial palpus; m, mentum; mp, maxillary palpus; p, paraglossa; pf, palpifer; pg, palpiger; s, stipes; sm, submentum. B, D, and E are in ventral aspect.

insects, distinguished from each other by their mouth parts, the one having biting or gnawing organs, and known as mandibulate insects.

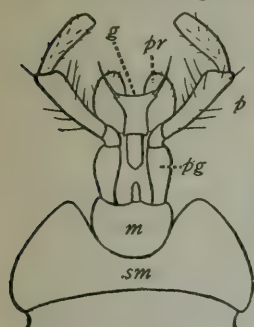


FIG. 13. Labium of *Harpalus caliginosus*, ventral aspect. g, united glossæ, termed the glossa; m, mentum; p, palpus; pg, palpiger; pr, paraglossa; sm, submentum. The median portion of the labium beyond the mentum is termed the ligula.

Beetles, grasshoppers, locusts, etc., belong to this class. In the other, the mouth parts are fitted for sucking only, and the insects acquire their nourishment by inserting their beaks into plants or animals and absorbing the juices by suction. These are known as haustellate insects, and in this class we find many of the greatest pests of the farmer and fruit-grower, among them the plant lice, or aphids, scale bugs, etc. In their perfect state, moths and butterflies derive their nourishment by suction, sipping the nectar from flowers with the long, thread-like tube which forms the mouth. Really, the haustellate mouth is a form of the mandibulate, modified to suit the habits of its possessor.

In the biting insects (Mandibulates) the mouth is composed of six different parts. First, the mandibles, a pair of horny curved jaws, often serrated, or supplied with sharp, saw-like teeth. Secondly, a second pair of jaws located beneath the mandibles, and generally of four parts and arranged

for masticating the food torn off by the mandibles. These organs are known as the maxillæ. To these are usually attached one or two pairs of jointed organs, called palpi, or feelers. One pair of these is attached to the lower jaw or maxilla, and are termed the maxillary palpi, and the others are attached to the lower lip, and are designated the labial palpi. Their office seems to be somewhat like that of the tongue in

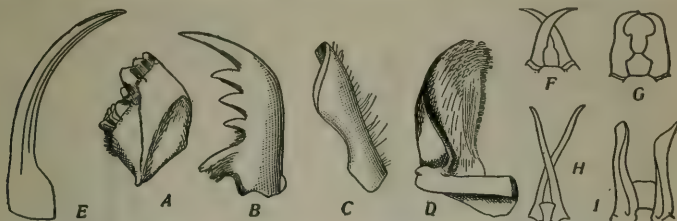


FIG. 14. Various forms of mandibles. A, *Melanoplus*; B, *Cicindela*; C, *Apis*; D, *Onthophagus*; E, *Chrysopa*; F-I, soldier termites. (After Hagen.)

the higher animals. Third, an upper lip, or labrum, attached to the lower portion of the head; and, fourth, the lower lip, or labium, with its attached palpi. The labium is usually composed of two or more parts, the mentum or chin, which is a broad, horny plate, varying in size in different species, and the ligula, or tongue, which lies on its inner surface. This is usually a membranous or fleshy organ, sometimes supported by a horny plate when it projects beyond the mentum.

Antennæ.—The antennæ are organs found in all insects, and are situated near the compound eyes and usually between them. These organs vary greatly in different insects and frequently even in the two sexes of one species. In some cases they are mere knobs, as in the ladybirds; in others they are much longer than the entire insect. They are sometimes feathered; sometimes branched, knobbed, or composed of a series of spherical joints joined together like a string of beads. In some cases they connect by a number of plates, and, throughout the whole class, they vary in structure almost as much as the species themselves differ one from the other. What the object of these organs is, has not been definitely determined. They are commonly called feelers, and certainly appear to possess a tactile sense. They may, in some cases, be organs of hearing, and sometimes seem to have auditory qualities. Experiments



FIG. 15. Head of butterfly (*Vanessa*): p, labial palpus; a, antennæ; l, proboscis.

have shown that in some cases they are organs of smell. In fact, they may be any or all of these, or, as has been suggested, they may be the organs of a sense in insects of which we have no knowledge. Practically, there is but one sense, that of feeling. What we know as sight, hearing, taste, and smell are but different forms of feeling, and are caused by vibrations which convey to our special organs certain

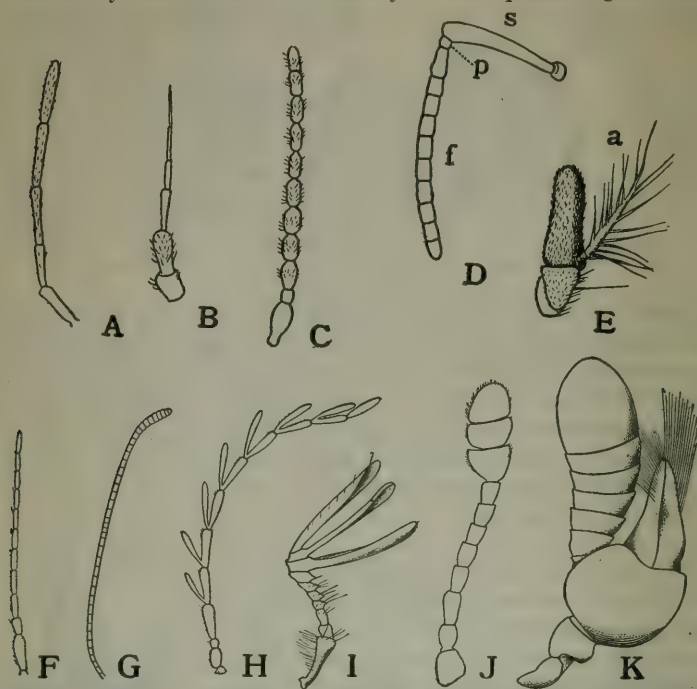


FIG. 16. Various forms of antennæ. A, filiform, *Euschistus*; B, setaceous, *Platemis*; C, moniliform, *Catogenus*; D, geniculate, *Bombus*; f, flagellum; p, pedicel; s, scape; E, irregular, *Phormia*; a, arista; F, setaceous, *Galerita*; G, clavate, *Anosia*; H, pectinate, male, *Ptilodactyla*; I, lamellate, *Lachnosterna*; J, capitate, *Megalodacne*; K, irregular, *Dineutus*.

sensations, which we designate by different names, but which depend for their reception upon the sensory nerves, and we therefore feel sound, color, flavor, and odors. The antennæ of insects are especially adapted to receive and convey the various forms of vibration, and it is not improbable that they may serve the purposes for which several organs are required in the higher forms of life. Let this be as it may, it is certain that the antennæ of insects are among the most important of their organs. They may be used also for the conveyance of information, as we know that ants and other insects on meeting will communicate to each other by means of their antennæ, and we know also that many insects, especially social insects, have the means of conveying information to each other.

It is necessary that some knowledge should be had of the different forms of antennæ, as these are all classified, and are sometimes used in the description of families. In the beetles, for instance, we have the Clavicornia, club horns; Serricornia, saw horns; Lamellicornia, thin plate horns, etc. So in order to describe the different forms of antennæ, they have been classified as follows (see Fig. 16):

Setaceous: Bristle-like.

Filiform: Thread-like.

Moniliform: Necklace-like.

Serrate: Saw-like.

Pectinate: Comb-like.

Clavate: Club-shaped.

Capitate: Ending in a head or knob.

Lamellate: Plates.

Geniculate: Jointed or kneed.

Besides these general terms others are used in describing the antennæ; as, plumose, or feathered; and "irregular," which includes many forms not included in the above list.

THE THORAX AND ITS APPENDAGES.

The foregoing will give the student a general idea of the head and its various organs, the eyes, the mouth, and the antennæ, and we will now proceed to consider the next im-

portant division of the body, the thorax. This is composed of three segments immediately back of the head. These segments are named pro-, meso- and metathorax. The first, or the one connecting with the head, being the prothorax, the middle section the mesothorax, and the last, the one connecting with the abdomen, being the metathorax. These segments appear to be solid rings, but really they are composed

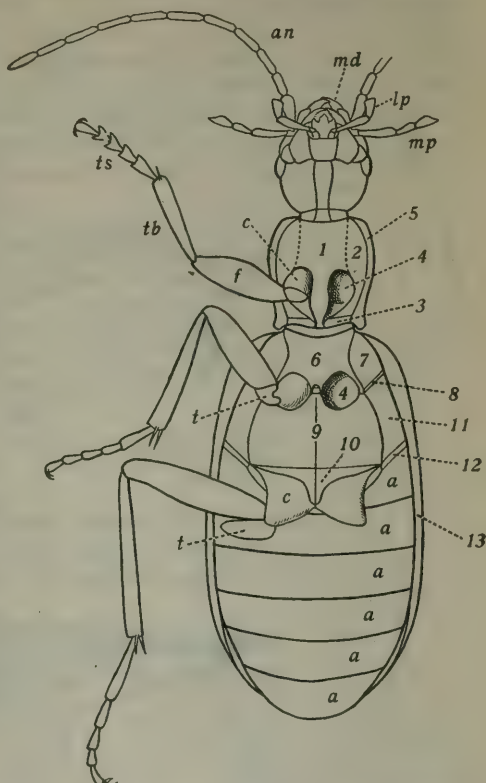


FIG. 17. Ventral aspect of a carabid beetle (*Galerita janus*). 1, prosternum; 2, proepisternum; 3, proepimeron; 4, coxal cavity; 5, inflexed side of pronotum; 6, mesosternum; 7, mesoepisternum; 8, mesoepimeron; 9, mesasternum; 10, antecoxal piece; 11, metaepisternum; 12, metaepimeron; 13, inflexed side of elytron; a, sternum of an abdominal segment; an, antenna; c, coxa; f, femur; lp, labial palpus; md, mandible; mp, maxillary palpus; t, trochanter; tb, tibia; ts, tarsus.

of several hexagonal plates, capable of motion and to which the various appendages are articulated. Each of these segments bears one pair of legs, but only the meso- and metathorax bear wings, and either or both pairs of wings may be wanting; as in the flies there is but one pair, and in many insects none.

Legs.—In most adult insects and many larvæ, each of the three thoracic segments bears one pair of legs, composed of several parts.

That joint immediately attached to the body is known as the coxa, the next as the trochanter, femur, tibia, and tarsus, the latter corresponding to the foot in the higher

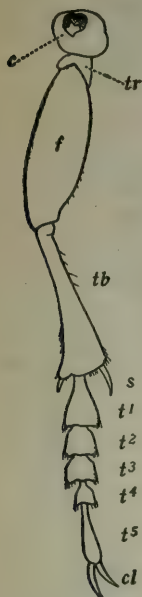


FIG. 18. Leg of a beetle (*Calosoma calidum*). c, coxa; cl, claws; f, femur; s, spur; t¹-t⁵, tarsal segments; tb, tibia; tr, trochanter.

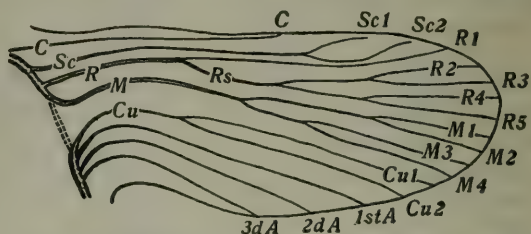


FIG. 19. Hypothetical type of venation. A, anal vein; C, costa; Cu, cubitus; M, media; R, radius; Sc, subcosta. (After Comstock and Needham.)

animals. The legs are modified in many ways to meet the requirements of the insect, and are adapted to running, leaping, swimming, burrowing, or grasping their

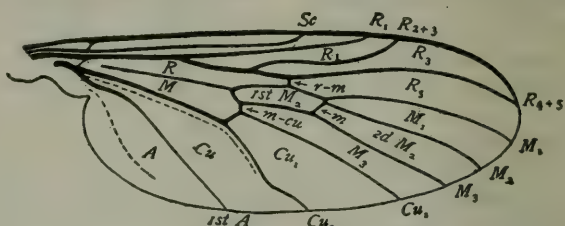


FIG. 20. Wing of a fly (*Rhyphus*). A, anal vein; C, costa; Cu, cubitus; M, media; R, radius; Sc, subcosta. (After Comstock and Needham.)

prey, according to the habits of the species. The tarsus is composed of several parts or segments, usually five, the last one generally being provided with one or two claws.

Wings.—There are usually two pairs of wings, and these are borne on the last two segments of the thorax—the mesothorax and the metathorax. As above stated, either one or both pairs may be absent, but when so they are usually represented by rudimentary pads or other organs. In the order Diptera, or two-winged flies, a pair of small hooked or knobbed organs, known as halteres, or poisers, represent

them. In earwigs and beetles the first pair of wings are represented by a hard, horny wing covering, known as the elytra. The upper wings are designated as superiors, anteriors or primaries, and the hinder wings as posteriors or secondaries. Commonly they are known as fore and hind wings, which is good enough for practical use.

The wings of an insect may be compared to a boy's kite, in which a light membrane is tightly stretched over a tough framework. In the insect we find a strong framework of horny tubes, termed veins or nerves, with a tough,

membranous film on either side. The arrangement of these veins is called the venation or neurulation, and is exceedingly variable, so much so that expert entomologists can tell to what order or family, and often to what species, an insect belongs by the arrangement of its

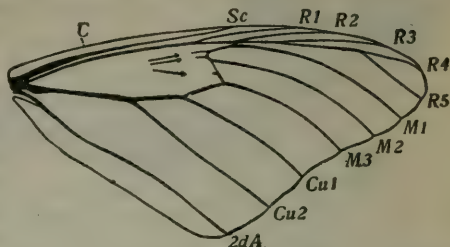


FIG. 21. Wings of a butterfly (*Anosia*). A, anal vein; C, costa; Cu, cubitus; M, media; R, radius. Sc, subcosta. (After Comstock and Needham.)

wing veins. The spaces between the veins are termed cells. With all this variation, however, in all wings there are certain well-marked veins, common to all, and these have all been named and numbered. The principal veins are known as the costa, subcosta, radius, cubitus, media, and anal. These are found in some form in all wings.

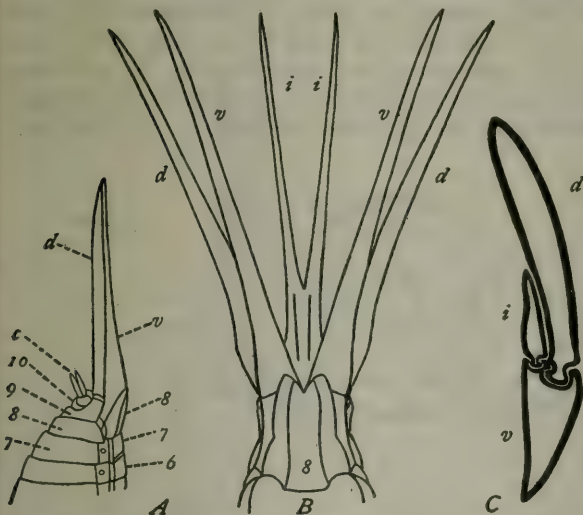


FIG. 22. Ovipositor of *Locusta*. A, lateral aspect; B, ventral aspect; C, transverse section; c, cerci; d, dorsal valve; i, inner valve; v, ventral valve. The numbers refer to abdominal segments. (After Kolbe and Dewitz.)

Insect wings vary not only in form, but also greatly in color and texture, and among them, especially in the butterflies, moths, and beetles, we find the most exquisite expression of color, form, and arrangement in nature.

THE ABDOMEN.

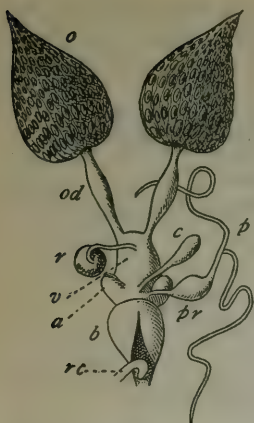


FIG. 23. Reproductive system of queen honey-bee. *a*, accessory sac of vagina; *b*, bulb of stinging apparatus; *c*, colleterial, or cement, gland; *o*, ovary; *od*, oviduct; *p*, poison glands; *pr*, poison reservoir; *r*, receptaculum seminis; *rc*, rectum; *v*, vagina. (After Leuckart.)

This is the third and last portion of the body, and is generally composed of nine segments. The number, however, varies greatly, and in the cuckoo-flies there are but three or four to be seen. The principal organs of the abdomen are those of respiration, digestion, and reproduction. The latter varies greatly in different species, especially in the female, in some cases being elongated into a long tube, the ovipositor; in some being supplemented with a sting; in others being supplied with sawing or piercing organs; all of which serve for the proper deposition of the egg in its future food supply, which instinct forces the mother insect to select.

As stated above, the abdomen is composed of nine segments, but these are not always distinct. It is usually considered as composed of two parts, the abdomen and post-abdomen, the latter being composed of the three terminal segments. In the abdomen proper, we never find articulated appendages, with perhaps the single exception of a small beetle, the *Spiractha eurymedusa*. On the post-

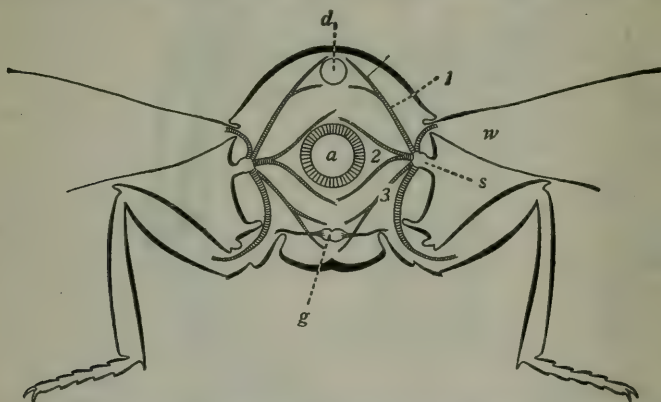


FIG. 24. Diagrammatic cross-section of the thorax of an insect. *a*, alimentary canal; *d*, dorsal vessel; *g*, ganglion; *s*, spiracle; *w*, wing; 1, dorsal tracheal branch; 2, visceral branch; 3, ventral branch.

abdominal segments, such appendages are frequently found; as the honey tubes of the aphids, the forceps of the earwigs, and the thick bristles of the cockroaches.

THE INTERNAL ORGANS.

Having now given a short account of the external organs of insects, we will glance at their internal organs, which comprise a digestive, circulatory, respiratory, and nervous system.

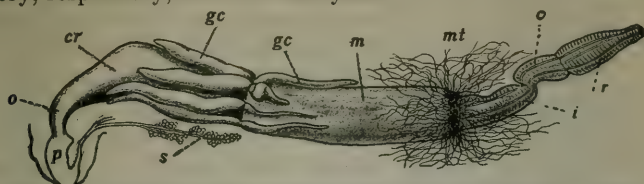


FIG. 25. Alimentary tract of a grasshopper (*Melanoplus differentialis*). *c*, colon; *cr*, crop; *gc, gc*, gastric caeca; *i*, ileum; *m*, mid intestine, or stomach; *mt*, Malpighian, or kidney, tubes; *o*, esophagus; *p*, pharynx; *r*, rectum; *s*, salivary gland of left side.

The digestive organs consist, as in the higher animals, of a continuous tube, somewhat longer than the body, varying in form with different insects, from a simple tube in the Thysanura, to a complicated system in the higher orders. It is usually supplied with a crop, gizzard, stomach, and necessary assimilative organs. The digestive tube is divided into three parts: the large intestine, the small intestine, and the rectum.

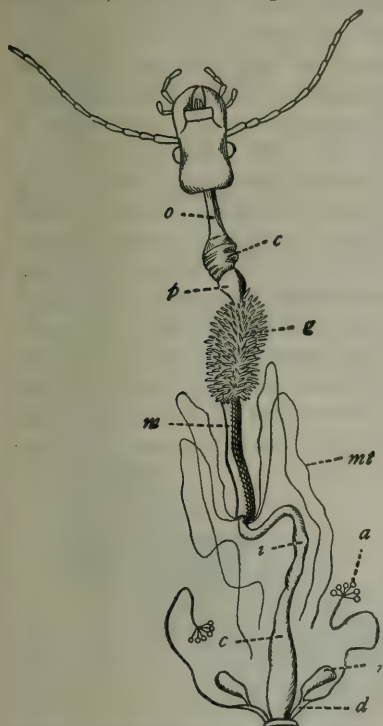


FIG. 26. Digestive system of a beetle (*Carabus*). *a*, anal gland; *c* (of fore gut), crop; *c* (of hind gut), colon, merging into rectum; *d*, evacuating duct of anal gland; *g*, gastric caeca; *i*, ileum; *m*, mid intestine; *mt*, Malpighian tubes; *o*, esophagus; *p*, proventriculus; *r*, reservoir. (After Kolbe.)

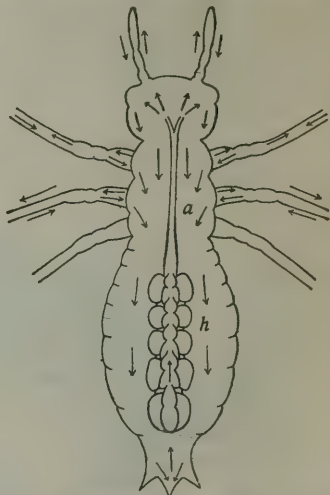


FIG. 27. Diagram to indicate the course of blood in the nymph of a dragon-fly (*Epiletheca*). *a*, aorta; *h*, heart; the arrows show direction taken by currents of blood. (After Kolbe.)

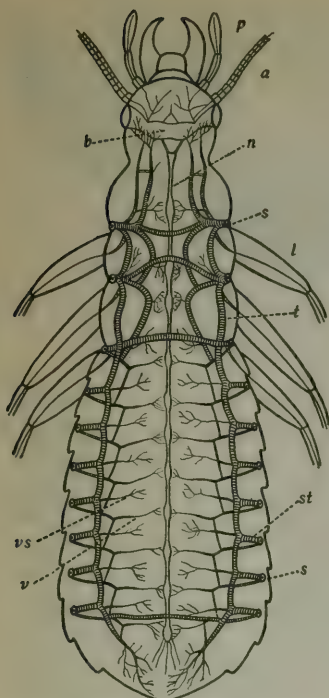


FIG. 28. Tracheal system of an insect. *a*, antenna; *b*, brain; *l*, leg; *n*, nerve cord; *p*, palpus; *s*, spiracle; *st*, spiracular, or stigmal, branch; *t*, main tracheal trunk; *v*, ventral branch; *vs*, visceral branch. (After Kolbe.)

The circulation of insects is as yet imperfectly understood. The blood is cold, and, except for a slight yellowish tint, is colorless. There is no system of closed blood vessels, as in the higher animals, but the blood is forced through the body cavities by an organ which represents the heart. This organ is a delicate tube, located in the upper surface of the body, and is usually called the dorsal vessel. This represents the heart, and ordinarily consists of eight sections, or sacs, which open into each other and which, by contracting, drive the blood forward to the region of the head, where it escapes into the body cavity. No system of arteries or veins has been traced. In its course through the body, the blood becomes oxygenated by contact with the respiratory organs, which penetrate into all parts of the body. (See Fig. 27.)

The respiratory system consists of a vast number of tubes or tracheæ, which have their openings to the outer air along the sides of the insect. These air tubes are known as spiracles or stigmata. They are usually placed on each side of every segment, excepting the head, and communicate with a main tracheal

trunk which extends along the sides of the body. One of these trunks is situated on each side and from these the tracheæ branch off in all

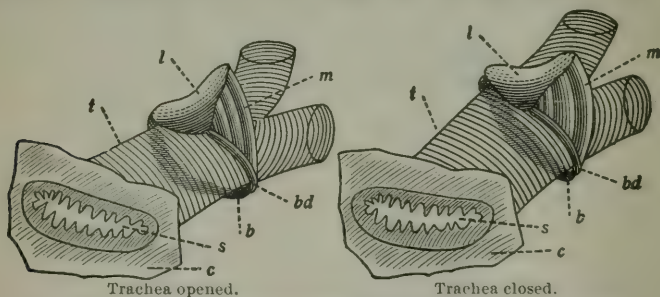


FIG. 29. Apparatus for closing the spiracular trachea in a beetle (*Lucanus*). *b*, bow; *bd*, band; *c*, external cuticle; *l*, lever; *m*, muscle; *s*, spiracle; *t*, trachea. (After Judeich and Nitsche.)

directions until the whole body is permeated with these delicate air tubes and thoroughly aerated.

The nervous system of insects consists of two thread-like cords running the length of the body, connecting which are nerve centers, or ganglia. From these centers, or ganglia, nerve threads branch and reach all parts of the body, governing the sense and motion of the insect. In the lower forms of life the brain is a mere nerve thread running through the body. As we advance from the lower to the higher, we discover small swellings or lumps along this thread. These are the ganglia, and each one forms a separate little brain, all connected with the main thread. Still further, we find, branching off from these ganglia, other threads, and we have a nervous system. In the higher animals, the bulb in the head is much the larger and dominates all the rest, and we know it as the brain, and the rest as the nervous system. In the higher animals there are two sets of nerves, one known as the

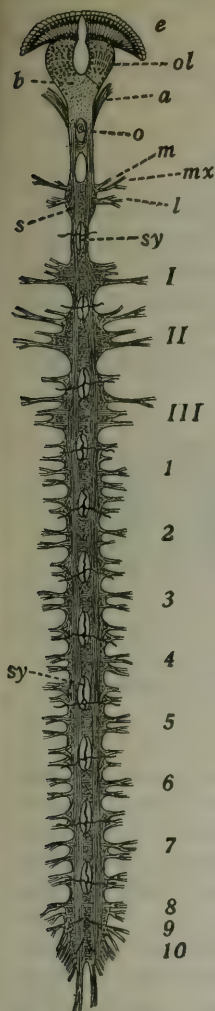


FIG. 30. Central nervous system of a thysanuran (*Machilis*). The thoracic and abdominal ganglia are numbered in succession. *a*, antennal nerve; *b*, brain; *e*, compound eye; *l*, labial nerve; *m*, mandibular nerve; *mx*, maxillary nerve; *o*, esophagus; *ol*, optic lobe; *s*, subesophageal ganglion; *sy*, sympathetic nerve. (After Oudemans.)

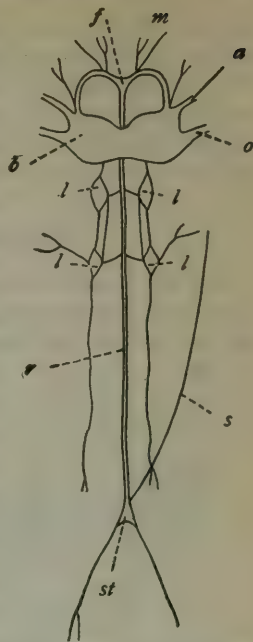


FIG. 31. Sympathetic nervous system of an insect, diagrammatically represented. *a*, antennal nerve; *b*, brain; *f*, frontal ganglion; *l*, *l*, paired lateral ganglia; *m*, nerves to upper mouth parts; *o*, optic nerve; *r*, recurrent nerve; *s*, nerve to salivary glands; *st*, stomachic ganglion. (After Kolbe.)

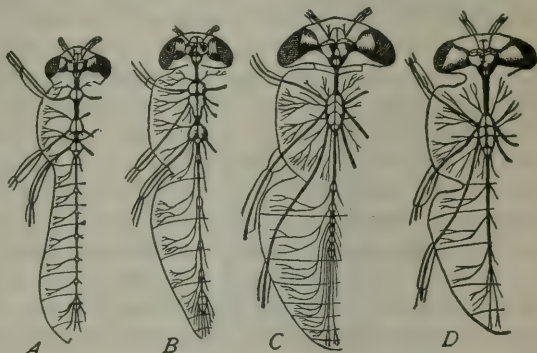


FIG. 32. Successive stages in the concentration of the central nervous system of Diptera. A, *Chironomus*; B, *Empis*; C, *Tabanus*; D, *Sarcophaga*. (After Brandt.)

sensory nerves, or those with which we feel and which convey impressions to the brain, and the motor nerves, or those which receive impressions from the brain. The one set enables us to feel, the other to act. With the lower insects the brain and nervous system are very simple, but in the higher orders it becomes more complicated, and is evidence of the possession of much intelligent force.

THE TRANSFORMATION OF INSECTS.

One of the most peculiar and wonderful of natural phenomena is the transformation or metamorphosis of insects—a process which, were it not so common and going on under our observation every day, would be unbelievable. If we did not know of it, and some traveler should tell us that in a distant country he had seen animals that in one stage of their existence were repulsive worms, and then became mummified,

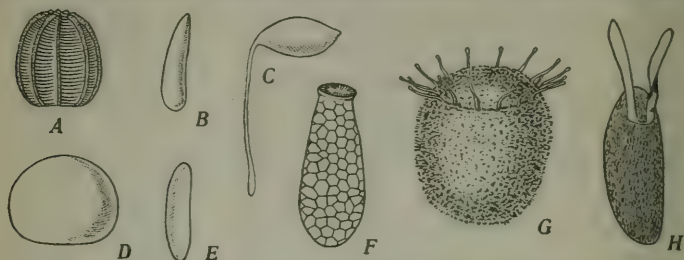


FIG. 33. Eggs of various insects. A, butterfly, *Polygonia interrogationis*; B, house-fly, *Musca domestica*; C, chalcid, *Bruchophagus funebris*; D, butterfly, *Papilio troilus*; E, midge, *Cecidomyia trifolii*; F, hemipteron, *Triphleps insidiosus*; G, hemipteron, *Podisus spinosus*; H, fly, *Drosophila ampelophila*. Greatly magnified.

losing all semblance to themselves, being practically dead for some time, and then broke forth from their mummy cases into the most beautiful and brilliant creatures imaginable, far exceeding any other animal in their beauty, we should regard him as drawing upon a very vivid imagination and relating things that were utterly impossible. Yet it is all true, and it is so common that it all passes under our eyes without a thought on our part of the wonder of it.

The insect passes through four stages: the egg, the larva, the pupa, and the imago. The egg is the germ, the beginning, the contained potentiality, which, under proper conditions, brings forth the new being. The second stage, the larva, is the growing period. In this the insect eats, increases in size, sheds its skin, or molts, several times, until it has stored up sufficient tissue for the final stage. But there is an intermediate stage, one of remarkable change, in which the insect ceases to be a mere eating, growing thing, and is transformed into its perfect shape. This is the pupal form. At last the final change takes place, and we have the new being in all its perfection.

It may be set down as an axiom that all the beauties of the animal and vegetable kingdoms are for the purpose of sexual attraction, the whole object of them being the continuation of the species. Plants are plain and uninteresting until they attain their growth and put forth their blossoms, and these blossoms, with their gorgeous hues and beautiful forms, are for the sole purpose of attracting the insects, the little go-betweens in the love-making of the plants, which carry the fructifying pollen from one to the other and make possible a future crop of plants, flowers, and seeds, and so it goes on forever.

It is so in the metamorphoses of insects. At the last it has ceased to be a gourmand. In many cases, its voracious appetite ceased with its larval life and it lives by sipping the nectar of the plants. It has now acquired its full sexual strength, its full sexual beauty, and its



FIG. 34. Caterpillar of *Phlegthontius sexta*. Natural size.

great object in life now is to be attractive to the other sex. For this purpose the bright colors are developed in some, peculiar markings in others—strange shapes, rapid flight, strength, or other characteristics, having for their one object the continuance of the species. This accomplished, their life cycle has closed and they pass, like the rest of us, from this stage forever.

Metamorphoses are not similar in all the orders. In some of the orders we have what is known as “direct,” or incomplete, metamorphosis; in this case there is no passive stage, and in many cases the change from the larval to the perfect form is hardly noticeable. In others, the larvæ, or nymphs, as they are called, molt several times, and, at the last, where they are winged at all, the wings develop and the insect becomes perfect, or enters upon the imago stage. Among insects of this class we have the bugs, or Hemiptera, the grasshoppers, crickets, cockroaches, and other members of the order Orthoptera. These insects passing through the direct metamorphosis are classed together under the name of Holometabola.

The other group, which have an "indirect" or complete metamorphosis, are grouped together as Heterametabola. In these, the insects pass through the regular stages: the egg, the growing larva, the pupa, and the perfect insect or imago.

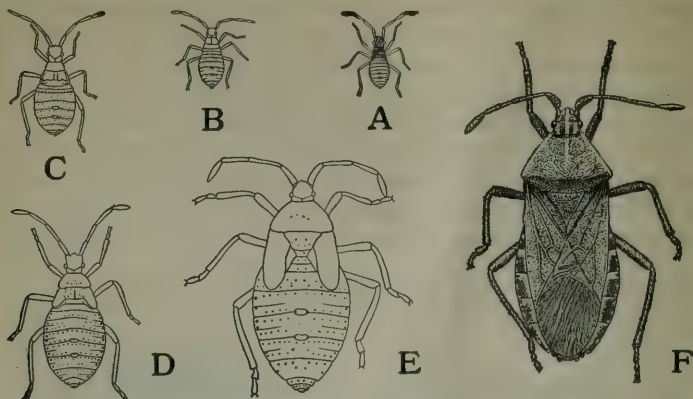


FIG. 35. Six successive instars of the squash-bug (*Anasa tristis*).

In the pupal stage of most insects having an indirect or complete metamorphosis, there is a strong approach to suspended animation, for while the pupa will sometimes squirm, when touched, it usually remains in perfect rest until the great change has been accomplished.

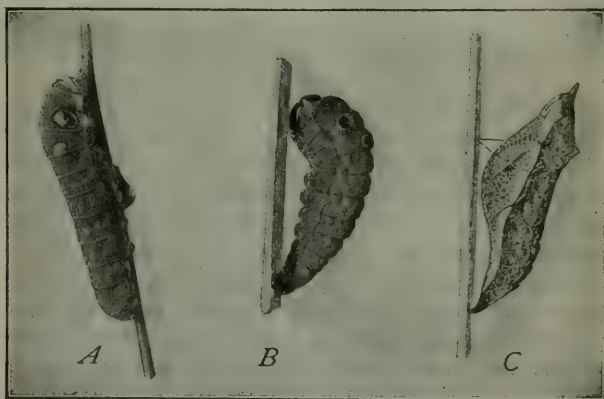


FIG. 36. *Papilio troilus*. A, larva; B, larva suspended for pupation; C, chrysalis. Natural size.

In those insects which have a direct metamorphosis, the insect in its transition stage is spoken of as a nymph.

The changing insect in other cases is known as a pupa, although in the case of butterflies it is often referred to as a chrysalis.

The change is one of the most wonderful operations in nature. It is as if the original larva had been entirely destroyed and an animal of an entirely new species had appeared. With its pupa integument, it has lost all the organs characteristic of the larval stage, and an entire new set have been provided. It now possesses six true legs, wings suited for rapid flight, compound eyes, antennæ, a more perfect nervous system, while, in the case of many insects, the sharp, gnawing jaws of the larva, which were adapted to cutting leaves or boring into wood, have been replaced with long, delicate tubes suited to absorbing the nectar of flowers. The very instincts of the insect are changed, and the life habits of the larva and the imago are as different as their outward appearance.

THE ORDERS OF INSECTS.

We have now given an outline of the structure and peculiarities of insects as a whole, and have reached a point where we can segregate them into groups or orders, which is necessary for closer study. As stated before, there are seven principal orders of insects—Orthoptera, Hemiptera, Neuroptera, Coleoptera, Diptera, Hymenoptera, and Lepidoptera. There are, as we said, several minor orders, but the above classification will answer our purpose and we will consider them in the order named.

Order **ORTHOPTERA.**

Orthoptera means straight-winged, and alludes to the fact that the hinder wings, when folded, lie perfectly straight down the back of the insect without any folds. The anterior wings are of little, if any, service in flight, serving principally as a covering for the large posterior wings, which, when spread, are semicircular in shape, and open and close like a fan. They are of large size, and the principal veins radiate, like the sticks of a fan, from the center. Not all members of this order are winged, however, many of them being apterous, or wingless.

The head is usually large and very prominent, and the antennæ either short, stout, and few-pointed, as in the locust, or very long and slender, as in the katydid. The head bears one pair of large compound eyes and usually two or three ocelli or simple eyes, and the mouth parts are suited for gnawing or biting.

The Orthoptera have a direct or incomplete metamorphosis. The young, when hatched, very much resemble the mature insect, and in the first or larval stage are wingless. They pass through several molts

when the wingpads appear, and they are now known as nymphs. At the last molt the wings are fully developed, and the insect is perfect.

They are voracious in all their stages, and while we find a beneficial member of the order in the mantis, we also find in it many of our most destructive insects, the grasshoppers, locusts, crickets, cockroaches, etc. Our readers are fully alive to the devastation wrought by one of the families of this order—the locusts—as California, and the whole Pacific Coast, frequently suffer severely from their depredations. With, perhaps, the exception of the *Cicada*, or seventeen-year locust, which, by the way, is not a locust, but a “bug,” as explained elsewhere, we find in this order the only “singing” insects, and the song of the cricket on the hearth and the katydid in the trees has given most people a kindly feeling for these destructive insects, not felt toward others.

The Orthoptera are classed in six families, which Comstock describes as follows:

The Running Orthoptera.—The body is oval when seen from above and is very flat; the three pairs of legs are similar in form; the insects run rapidly. . . . *Blattidæ*

The Grasping Orthoptera.—The prothorax is very long and slender; the first pair of legs are very different from the others, and are fitted for grasping. . . . *Mantidæ*

The Walking Orthoptera.—The body is very long and slender; the three pairs of legs are similar in form, and are also very long and slender; the insects walk slowly. . . . *Phasmidæ*

The Jumping Orthoptera.—The hind legs are very much stouter or very much longer, or both stouter and longer, than the middle pair, being fitted for jumping. This group includes three families:

The Short-Horned Grasshoppers, or Locusts.—The antennæ are shorter than the body. The ovipositor of the female is short and composed of four separate plates. The tarsi are three-jointed. . . . *Acrididæ*

The Long-Horned Grasshoppers.—The antennæ are very slender and longer than the body. (This is also true of the crickets.) The ovipositor is sword-shaped. The tarsi are three-jointed. . . . *Locustidæ*

The Crickets.—The antennæ, like those of the long-horned grasshoppers, are very slender and longer than the body, except in the mole-crickets. The ovipositor is spear-shaped when exerted. The tarsi are three-jointed. . . . *Gryllidæ*

These families are sometimes grouped in two large sections: the Saltatoria, or the leapers, in which the hind legs are much lengthened and formed for jumping, as the crickets, grasshoppers, and locusts, and the Cursoria, in which the legs are formed for running, as the cockroaches, etc. The latter group includes the first mentioned three families, and the first group the others.

Section CURSORIA.

Family *Blattidæ*. At the head of the section Cursoria is placed the *Blattidæ*, or roaches. While few of them are known to California, there are a thousand or more species in the world. Many of these live in the fields and find shelter under sticks and stones. Some are wingless, and all are nocturnal and very fond of heat and moisture. It is on

this account that they swarm in kitchens, around sinks, in pantries, the holds of ships and steamers, and similar locations.

The female lays her eggs in a purse-like pouch, in a double row, which she carries with her for some time before she deposits it. This mass resembles a small, brown bean in shape. In some cases it is asserted that the female remains with and cares for her young. They breed in enormous quantities, and once introduced into a house will soon overrun it, but on account of their nocturnal habits and timorous disposition, they may be present in quantities, yet remain unsuspected. Going suddenly into the kitchen with a light will sometimes show them by hundreds scampering off in all directions for a place of retreat.

Like most of our pests, the worst of the cockroaches is an introduced species. They are omnivorous in diet and do much damage to books and clothing, besides overrunning and devouring food in the pantry and cupboards.

Insect powder freely dusted over books and similar articles will drive them away, while powdered borax mixed with sugar, of which they are very fond, will kill them in large numbers.

Family Mantidæ (The Mantis). This family includes about twenty species in our country, and is the one beneficial family of the order. From its peculiar habit of holding its head erect, its fore legs raised, and remaining motionless in this position for some time, the most conspicuous member of the family has been named "The Praying Mantis." If a pun were permissible, it might be called "The Preying Mantis," for its patience, devout attitude, and generally saintly appearance are designed to throw other insects off their guard, which, when they come within reach of the waiting, watchful mantis, are quickly grasped between the fore legs, their juices sucked from their bodies, which are then thrown aside, while the mantis again assumes its devotional attitude and awaits a fresh victim.

All the species of Mantidæ are carnivorous, but in securing their prey they depend altogether upon their resemblance to twigs, leaves, etc., and wait for their victims to come within their reach, when they are quickly seized and devoured. The eggs are laid in masses, inclosed in a soft silk-like substance, through which the young gnaw their way as soon as hatched. These insects are cannibals, for if there is no other food within easy reach the young will devour each other.

Family Phasmidæ (Walking-sticks). This is a peculiar family, and comprises within it some of the largest and most monstrous appearing creatures of the insect world. They are strangely formed and depend for their protection and their food upon their mimicry. Some of them strongly resemble green twigs, others dry twigs, some the leaves of trees, and so strong is the likeness that it is almost impossible to detect them

upon the tree where they are at rest. These insects are most numerous in the tropics, where they sometimes attain a length of eight or ten inches. All are vegetable feeders, and would become injurious were they introduced and acclimated, but, being tropical, there is little danger from this source.

Some members of the family are found in the Eastern states, through the Mississippi Valley and in the South, but none have ever been reported from California.

Section **SALTATORIA.**

Family **Acerididæ** (The Locusts). This is a family in which we are especially interested, as it includes the most destructive foes of the farmers of the West. The members of this family are distinguished from others of the order in having the antennæ—composed of from six to twenty-four joints—shorter than the body. It is from this fact that they are sometimes called the short-horned grasshoppers.

The females lay their eggs, usually underground, but sometimes in other locations, in an oval, bean-like mass. The number of eggs in each mass varies from twenty or thirty to double that number. The holes for the reception of the eggs are made by means of two pairs of horny valves at the tip of the abdomen of the female. These open and shut rapidly and are well adapted to execute this function. The female, by pressing the tip of her abdomen forcibly against the soil, rapidly opens and shuts these hard-pointed valves and soon pushes them into the ground, thus drilling a hole. In a short time the entire and greatly extended abdomen is inserted in the little curved and more or less oblique cavity. The legs are hoisted above the back during the operation of drilling the hole, which requires more or less time, depending entirely upon the character of the soil. As soon as the hole is finished, it is filled with frothy and mucous material.

Professor Riley describes the method of egg-laying as follows: "By repeatedly extracting and studying specimens in every stage of oviposition, we have been able to ascertain the exact method by which the egg mass is formed. If we could manage to watch a female from the time the bottom of her hole is moistened by the sebific fluid, we should see the valves all brought together, when an egg would pass down the oviduct along the ventral side, and, guided by a little finger-like style, pass in between the horny valves, and issue at their tips amid the mucous fluid already spoken of. Then follows a period of convulsions, during which more mucous material is elaborated, until the whole end of the body is bathed in it, when another egg passes down and is placed in position. These alternate processes continue until the full complement of eggs are in place, the number ranging from twenty to thirty-five, but averaging about twenty-eight. The mucous matter

binds all the eggs in a mass, and when the last is laid, the mother devotes some time to filling up the somewhat narrower neck of the burrow with a compact and cellular mass of the same material, which, although light and easily penetrated, is more or less impervious to water, and forms a very excellent protection. When fresh, the mass is soft and moist, but it soon acquires a firm consistency."

The Rocky Mountain locust (*Melanoplus spretus*) is the most dreaded of any of our American species. This species finds an ideal breeding place in the high plateaus of the Rocky Mountains, where tens of thousands of square miles have been untouched by the plow for all the ages. Here they breed undisturbed, and by countless millions, and those who have never seen a flight of these insects can form no idea of their numbers—or

perhaps, of their quantity, for numbers is an inadequate term. In their flight, they will sometimes swoop down upon a fertile section and in a short time devastate hundreds of square miles. Kansas has suffered severely from their depredations, until Kansas and locusts have become connected in the mind. Yet these insects are not indigenous to

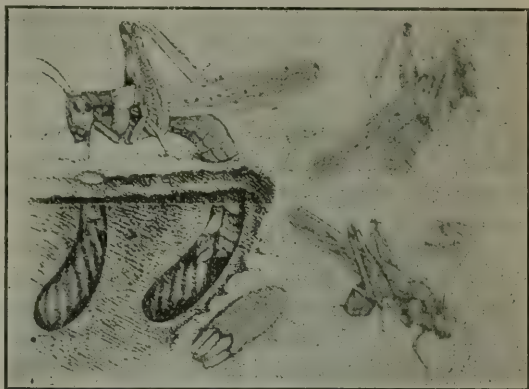


FIG. 37. Rocky Mountain locust (*Melanoplus spretus*) ovipositing. Females with abdomen inserted in the soil; egg-pod broken open and lying on the surface; a few scattered eggs; section of soil removed to show eggs being put in place, and egg-pod sealed over.

Kansas, nor can they thrive there. Their natural habitat is the high plateaus of the Rocky Mountains at an elevation of from 2,000 to 10,000 feet. Here, when their food supply becomes short, a swarm will sometimes rise in the air, and on their expanded wings may be carried hundreds of miles on an air current until they alight in a place far distant from their breeding grounds. Thus they reached Kansas and did damage for several years. Each year their numbers became fewer until they disappeared, Kansas and its climate not being suited to them.

Swarms of Rocky Mountain locusts reach Utah, Idaho, Nevada, and frequently eastern California; occasional small swarms pass over the Sierra Nevada range, but on this side of the range they have never been very numerous or in sufficient quantities to be serious.

There is, however, a close relation to this pest—*Melanoplus devastator*—with which California is too well acquainted. This is the locust which appears in swarms each season in some parts of the State, the foothill regions of the Sacramento and the San Joaquin valleys being especially afflicted with their visitations. Fortunately their breeding grounds are not so extensive, their swarms much smaller, and their destructive powers vastly less than *M. spretus*. But they are bad enough. From historic records, it is evident that this pest was much worse in California in early days than at the present time, swarms of them having been recorded even near San Francisco. This is natural, as the insects breed in the wild, uncultivated land, and, as the country becomes more densely settled and more intensely cultivated, their breeding area is more and more circumscribed, their swarms reduced, and their destructive area lessened. Their favorite breeding grounds are now found on the warm slopes of the foothills, those having a southwestern exposure being preferred. Here, where the soil is too thin for agricultural purposes, and is left undisturbed, large swarms of *M. devastator* breed and do great damage on the cultivated lands in the vicinity. Fortunately, there are efficient parasites for these pests, and they do not often appear in destructive numbers for two years in succession in the same place.

Grasshoppers in such localities usually make their appearance during the latter part of May, and in the following months of June and July cause their greatest destruction. After that, effects of disease, attacks of natural enemies, and their extension over a wider area so reduce their numbers in a given locality that their depredations are comparatively so small as to pass unnoticed.

Grasshoppers generally first appear in greatest numbers along the edges of the foothills, which are their breeding ground, in isolated swarms, often many miles apart. When first hatched, their powers of destruction are not great; but with each molt their voraciousness increases, and unless steps are promptly taken to combat them, or unless attacked by their natural enemies in numbers, cultivated crops in their path may be seriously injured or destroyed by them.

The grasshopper has many enemies. A tachina fly, about the size of the common house-fly, and which it much resembles, is one of the most abundant and most destructive to the hoppers. Birds also aid greatly in their destruction. The common meadowlark is among the most active destroyers of this insect. When grasshoppers are plentiful the meadowlark does not eat the entire insect, but only the abdomen or a portion of one, and this habit enables it to destroy a great number every day. Blackbirds of all varieties are also great aids in destroying them, but, unfortunately, the birds are breeding and taking care of their young when the grasshoppers first appear, and as their nesting-

places are close to water in the tules and the breeding grounds of the grasshoppers are near the foothills, perhaps miles away, their services are not so valuable in proportion to their numbers as those of the meadowlark, whose home may be in the midst of the young grasshoppers or adjacent thereto. Later in the season, the blackbirds become fearfully destructive of grasshoppers. Woodpeckers also for a time cease their arboreal habits to prey upon the grasshoppers on the ground. While the sparrowhawks, owls, sparrows, groundlarks, and, in fact, all kinds of land birds, except the dove, give their welcome aid in destroying the pests. It is said that skunks and gophers eat them, as do also toads, frogs, and snakes.

Grasshoppers, like all insects that gather in large swarms, are subject to contagious diseases, which spread rapidly and carry them off in large numbers, often almost exterminating them. A fungous disease is one of the most fatal to grasshoppers in some countries.

But when grasshoppers become numerous and destructive, it is not wise for farmers or horticulturists to await the action of natural causes, for proximity to cultivated areas does not give the necessary time for their action before great damage has been done. The farmer must, therefore, be prepared to defend his crop. The best method to combat the pest is to plow the land known to contain eggs, before the grasshoppers are hatched. When the young hoppers have appeared, they may be plowed under and destroyed. Plowing should commence at the outer boundary of the grasshopper section, and a number of plows should be used at the same time, the plows following each other as closely as possible. The grasshoppers are in this manner forced to the center, where a black mass of struggling insects are crowded together. But few of them will escape, for as one plow makes a furrow, which is rapidly filled with grasshoppers, the following plow covers them under and they are buried alive, few of them escaping.

The genus *Melanoplus*, to which both of the above described locusts belong, is a very extensive one, including one hundred and twenty species in the United States, and is the largest of all the Acridid genera.

The next most destructive member of the subfamily Acridinæ is the *Edaleonotus enigma*, which species is sometimes very numerous and destructive.

Family Locustidæ. Dismissing the family Acrididæ, which includes the numerous and destructive locust genera, we come to the next family, the Locustidæ, to which, by the way, the locusts do not belong. This includes the katydids, meadow grasshoppers, wingless crickets, etc. Their common and peculiar characteristics are their very long antennæ, which, in many species, greatly exceed the length of the body, and the prominent wings in many of those which have these

organs. In those species which have well-developed wings, the males are provided with an elaborate musical apparatus, the use of which is to call the females. The chirping made by these insects is familiar to most people, to all who have spent a summer in the country, and the short rasping sound made by one species (*Cyrtoptyllus concavus*) has given it the popular name of katydid, which its song is supposed to resemble. In the different species, each has its own distinct note, and entomologists who have made a special study of them can distinguish each by its peculiar sound.

Comstock arranges the Locustidæ in four general groups for facility in studying, to which he gives the everyday names of:

1. The Meadow Grasshoppers, including the smaller and common members of the family, which abound in meadows and moist places.

2. The Katydid, or tree crickets, generally bright green in color, strongly resembling the foliage among which they live, and which render night musical with their songs. One of the most common of these in California is the angular-winged katydid (*Microcentrum retinervis*). The eggs of the insect are laid in a double row along the edge of a leaf, a twig, or other object, overlapping each other like a row of shingles, and are often mistaken for scale insects.

3. The Cricket-like Grasshoppers, which are found under stones and rubbish, especially in woods, and which are wingless.

4. The Shield-back Grasshopper, also wingless, dull colored, and resembling crickets. This group is represented in California by the *Stenopelmatus irregularis*, a large, clumsy creature, with a big head and long antennæ, which lives under stones and strongly resembles the mole or Indian cricket.

Family **Gryllidæ** (The Crickets). The members of this family of jumping Orthoptera resemble the Locustidæ, in that they have long, slender, tapering antennæ, but differ from them in having the wings laid flat on the back, the forewings bent down on the sides. The ovipositor in the female is long and pointed, while in the Locustidæ it is flat and sword-like. The males of this family are the greatest of all insect musicians, and the sharp chirp, chirp, chirp of the cricket is well known. The commonest and best known of these insects is the field cricket, which appears in such quantities in our country towns on warm summer nights, where they are attracted to the electric light and perish by millions without apparently diminishing the next season's supply. Every warm night in every summer brings them out in countless swarms. It is this insect that we generally understand as being meant when the cricket is alluded to, yet it is but one of a very numerous family, comprising eight subfamilies, each containing several genera and species. These, however, are classed into three distinct groups, a

classification ample for any but the most minute, scientific study. These groups are:

1. Mole Crickets, heavy bodied, large-sized burrowing insects, frequently brought to the surface in digging or plowing. This is among the most peculiar of these insects. It is well named the "mole cricket," as in its general form and habits it resembles that animal. The front legs are short, very stout, and furnished with strong tibiae, well suited for digging and much like the fore paws of the mole. These insects live wholly underground, and feed upon the tender roots of plants, becoming a very serious nuisance where they are numerous.

2. True Crickets, which include the common house and field crickets, which visit us in such hordes in the summer nights. The eggs of these insects are generally laid in the fall, in light, sandy soil, and remain until

spring, when they hatch and the young begin to eat, grow, and molt, until they attain their growth and their wings later in the summer, when they become very much in evidence. They are serious pests, being omnivorous feeders, and will devour anything in their way. If they secure entrance to the house, which they often do, cotton and woolen fabrics alike will be damaged by them. They are in no way choise in the matter of diet and do not turn away from their own kind, but will devour each other with avidity and a keen relish.

3. Tree Crickets, which are found on trees and shrubs, as a rule, although they are sometimes found on grass and herbs. They are delicate and rather small insects, as compared with other members of the family. In laying her eggs the female cuts a groove in the tender canes of raspberry and blackberry vines, or of fruit trees, and in these

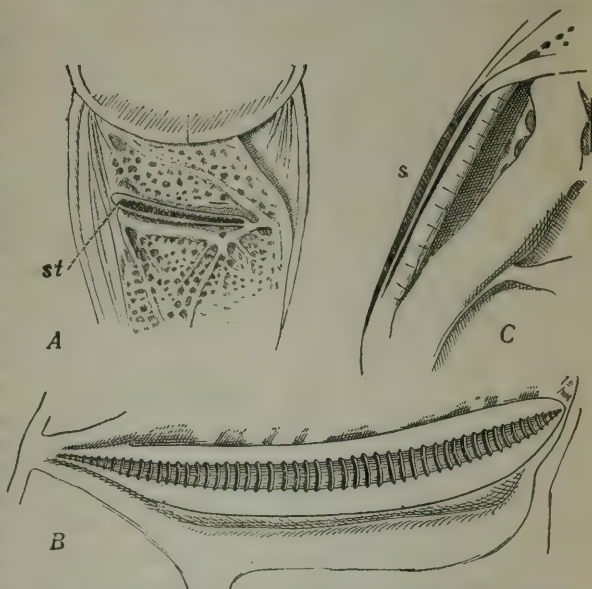


FIG. 38. Stridulating organs of *Microcentrum laurifolium*. A, dorsal aspect of file (st) when the tegmina are closed; B, ventral aspect of left tegmen to show file; C, dorsal aspect of right tegmen to show scraper (s).

her eggs are deposited in a long row. Much damage is often done from this cause, when the insect is numerous, as the twigs are likely to die above the point of damage.

The Earwigs.—Until recently the earwigs were classed with the Orthoptera, but a new order, *Euplexoptera*, has been erected for them.



FIG. 39. Full-grown larva of earwig (*Forficula auricularia*). Enlarged.

These insects are readily recognized by the forceps-like appendages at the end of the body. These organs are used in folding the wings of the insect, which are snugly tucked away under the wing covers when at rest. They are vegetable-feeders, and where numerous do much damage. They are nocturnal in their habits and are not frequently met with in the daytime.

In California the order is represented by *Amsolabis*, a black, wingless species, about three fourths of an inch long, with short, heavy forceps.



FIG. 40. Adult earwig (*Forficula auricularia*). Enlarged.

Order **HEMIPTERA.**

We now come to the order of most importance to the fruit-grower and the farmer, for in this we find the greater number of enemies of plant life; in fact, while there are some beneficial species in it, we may say that it is the pest order of the insect world. In this we find the entire group of scale bugs, the aphids or plant-lice, the phylloxera of the grape, and woolly-aphis of the apple; it gives us those most detested of all insects, bedbugs and lice. It is a bad order, but as there is no such thing as unmixed evil or absolute good, so even this order, composed as it is wholly of suckers, supplies us with some members that work for our good. There are those which prey upon their kind; the assassin-bugs as they are called, from the fact that they are predaceous upon other insects and live by sucking the blood of their fellows.

The name *Hemiptera* means half-winged, and these insects are so named from the fact that most of the members of this order have wing covers that are partly thick and leathery, and partly thin and membranous. While this name was given to the order at an early date, and was tolerably applicable to it, still there were found to be a great many insects which properly belonged here to which it was not applicable, as their wings were not half-and-half, so the order has been divided into two suborders, called *Heteroptera*, having diverse wings, and *Homoptera*, having similar wings, so an insect in this order is either *Hemiptera homoptera*, or *Hemiptera heteroptera*. There is still another group belonging to this order, the members of which are wingless, which prey

upon other animals, and protect themselves by hiding on the body of their host, or crawling away in cracks and crevices, to issue in the night when all is still and suck the blood of their victims. This group is known as *Parasita*, and will need little further allusion, as it only indirectly affects the orchardist and farmer.

The Hemiptera is one of the most numerous of all the orders. It includes over five thousand known species in North America, and to it belongs the one suborder which the entomologist recognizes as "bugs." To the lay mind all insects are bugs, but to the scientific mind the term brings up a member of the order *Hemiptera heteroptera*; these are the true bugs.

Like the preceding order, the metamorphosis is direct or incomplete. The young insect, as soon as hatched, strongly resembles the adult in shape, and, in many cases, in coloring. It is wingless in its earlier stages, and in some species always so, and passes through several molts in attaining its adult form. The winged species acquire their perfect wings after the last molt.

The members of this order are very diverse in form, size, and markings, and there is no order in which there is such disparity in the appearance of the different families. We have within it the *Cicada* and the mealy-bug, the giant water-bug, which is attracted to the electric light in such great numbers as to have acquired the name of "electric-light bug," and the common scale-bug. In it we find giants of the insect world, and species so minute as to require a strong glass to make them visible. But all through, there is one characteristic which is possessed in common by all, big and little alike—they are all suckers, and live by imbibing the juices or blood of plants and animals. They form the greater part of the Haustellates, or sucking insects, the other half of the insect world being known as the Mandibulates, or biters—a very respectable group compared with the one we are now treating on. The mouth parts are formed for piercing and sucking, and vary in length in different species. The sucking beak can readily be seen by examining the insect, where it will be detected on the under side, folded close to the body. In many species there is a groove into which the beak fits snugly when not in use, and in these it is sometimes difficult to detect it. This beak is really a compound instrument, and is composed of four bristles inclosed in a jointed sheath. Two of these bristles are supposed to represent the mandibles and two the maxillæ of the mandibulate insects, while the sheath takes the place of the labium.

As stated, this order is divided into three suborders: 1. *Parasita*; 2. *Homoptera*; 3. *Heteroptera*.

Of the first of these, little more need be said. Nearly every animal and most birds have a particular species of lice which prey upon them, and people engaged in breeding animals and fowls are sometimes confronted with a serious problem in getting rid of them. This is said to

be a degraded family, since they have through their degraded habits lost their wings, and to a great extent powers of locomotion, being wholly dependent upon the bodies of their hosts, to which they are attached all their lives. They have, however, become highly specialized for this style of life, and are well adapted for it.

While on this subject we may state that the bird-lice are not true lice, nor do they belong to the order now under consideration. - With the true lice, the mouth parts are made for suction—haustellate—and they properly belong to the Hemiptera, the bird-lice and the book-lice have biting mouth parts, and for these separate orders have been erected, the biting bird-lice being classified as *Mallophaga*, and the book lice as *Corrodentia*.

Suborder **HETEROPTERA.** (The True Bugs.)

The word Heteroptera means having diverse or different wings, and included in this suborder are the true bugs of the entomologist, for while, as before stated, to the average person all insects are bugs, to the entomologist the term means only members of this suborder.

The common squash-bug may be taken as the type of this group. When winged, their wings differ from the suborder Homoptera in the composition and position of the wing covers and in the direction of the head. The insects in this suborder have the head horizontal, on a plane with the body, the beak arising from the front. The wing covers lie flat on the back, and are composed of three separate pieces: corium, clavus, and membrane. These parts are modified in different species in a great variety of ways.

The young of this suborder are known as nymphæ, and after the third molt show the rudiments of wings. The nymphæ are sometimes quite different in coloring to the mature insect. Some difficulty has been experienced in arranging a perfect synopsis of this suborder, which has been arranged in twenty-six families. They have been divided into two groups, the long-horned bugs and the short-horned bugs. About one third of them live in the water, a large section near the water, and the rest on land. They may therefore be classed as Aquatic, Amphibious, and Terrestrial bugs. The following synopsis of families is arranged by Comstock:

THE SHORT-HORNED BUGS. Bugs with short antennæ, which are nearly or quite concealed beneath the head.

BUGS THAT LIVE WITHIN WATER.

- The Water-boatmen. Family Corisidæ.
- The Back-swimmers. Family Notonectidæ.
- The Water-Scorpions. Family Nepidæ.
- The Giant Water-bugs. Family Belostomidæ.
- The Creeping Water-bugs. Family Naucoridæ.

BUGS THAT LIVE NEAR WATER.

- The Toad-shaped Bugs. Family Galgulidæ.

THE LONG-HORNED BUGS. Bugs with antennæ at least as long as the head, and prominent except in the Phymatidæ, where they are concealed under the sides of the prothorax.

THE SEMI-AQUATIC BUGS.

- The Shore-bugs. Family Salididæ.
- The Broad-shouldered Water-striders. Family Veliidæ.
- The Water-striders. Family Hydrobatidæ.
- The Marsh-treaders. Family Limnobatidæ.

THE LAND-BUGS.

The Land-bugs with four-jointed antennæ.

- The Thread-legged Bugs. Family Emesidæ.
- The Assassin-bugs. Family Reduviidæ.
- The Damsel-bugs. Family Nabidæ.
- The Ambush-bugs. Family Phymatidæ.
- The Flat-bugs. Family Aradidæ.
- The Lace-bugs. Family Tingitidæ.
- The Bedbug and the Flower-bugs. Family Acanthiidæ.
- The Leaf-bugs. Family Capsidæ.
- The Red-bug Family. Family Pyrrhocoridæ.
- The Chinch-bug Family. Family Lygæidæ.
- The Stilt-bugs. Family Berytidæ.
- The Squash-bug Family. Family Coreidæ.

The Land-bugs with five-jointed antennæ.

- The Stink-bug Family. Family Pentatomidæ.
- The Burrower-bugs. Family Cydnidæ.
- The Negro-bugs. Family Corimelænidæ.
- The Shield-backed bugs. Family Scutelleridæ.

Many of these are of little interest to us and can be dismissed with a mere allusion.

Family Corisidæ (Water-boatmen). These are smallish insects, less than half an inch in length, and frequent pools, streams, and ponds. They are surrounded by a film of air and look like a bubble in the water, as they are seen usually on the bottoms. They are generally distributed over the United States, and are predaceous on other water insects. They have no economic importance with us, but in some parts of Mexico they are so numerous in the ponds that aquatic plants upon which they have deposited their eggs are gathered, dried, and beaten in order that the eggs may be secured for food.

Family Notonectidæ (Back-swimmers). These are aquatic bugs, their backs shaped like the bottom of a boat. They always swim on their backs, hence the common name. Their hind legs are oar-shaped, and they pass through the water with their aid with great rapidity. They prey upon young fish, and probably are destructive in this respect.

Family Nepidæ (Water-Scorpions). This is another of the aquatic bugs, and derives its common name from the possession of a long respiratory tube, at the end of the abdomen, which gives it a strong resemblance to the land-scorpion. There are two distinct types of these insects, one having an oval, flat, thin body, the other a linear and

cylindrical body. The latter strongly resembles a stick in the water, where it is usually found in the dirt of the bottom. The family is predaceous, and probably their peculiar form enables them to capture their prey.

Family *Belostomidæ* (Electric-light Bugs). In the hot summer nights, a very large insect will be seen flying around the electric lights in cities near watercourses or lakes. Many of these fall to the ground, where they are crushed under the heel of the pedestrian. These have become so noticeable since the introduction of electric lights that many people believe that they have been produced by the electricity, and their common name of "electric-light bugs" has been given them in recent years. These belong to the family *Belostomidæ*, which family

includes the giants of the bug order. The common electric-light bug in our California towns will reach a length of two inches and is the *Belostoma americanum*, while in the tropics and in Mexico, specimens are common three to four inches in length. In their larval form they are wholly aquatic. Their eggs are attached to the stems of water plants or other convenient objects, and, as soon



FIG. 41. Electric-light bug (*Belostoma americanum*).
Natural size.

as hatched, they commence their predatory career. They are exceedingly destructive to young fish, the young of frogs and toads, and other small game within their reach, which they capture by means of their strong fore feet and leisurely suck the blood. This insect is very numerous in Sacramento and in the valley where the great water areas furnish it ideal breeding grounds, and on summer nights they may be seen by thousands under the electric lights.

A peculiar member of this family is the genus *Zaitha*, in which the female lays her eggs on the back of the male, and he is compelled to carry them about and care for them until he is relieved of the load by their hatching. The male resents this indignity, but the female compels him to submit, and sometimes this is accomplished only after a struggle of several hours. In spite of protests and struggles, however, his better half always gets the best of the argument and he has to take care of the babies. It was at one time thought that the female laid the eggs

on her own back, but this belief was corrected by Miss Slater, who made a study of this insect. In speaking of it, this lady says: "That the male chafes under the burden is unmistakable; in fact, my suspicions as to the sex of the egg-carrier were first aroused by watching one in an aquarium which was trying to free itself from its load of eggs, an exhibition of a lack of maternal interest not to be expected in a female carrying her own eggs. Generally the *Zaithas* are very active, darting about with great rapidity; but an egg-bearer remains quietly clinging to a leaf with the end of the abdomen just out of the water. If attacked, he meekly receives the blows, seemingly preferring death, which, in several cases, was the result, to the indignity of carrying and caring for the eggs."

Family Naucoridæ (Creeping Water-bugs). These are rather small, flat-bodied, oval insects, predaceous in their habits, but not common on this coast, and of no economic importance.

Family Galgolidæ (Toad-shaped Bugs). These include a family of predaceous bugs only found near the margins of streams, and which are of no importance economically.

Family Salididæ (Shore-bugs). These are small, soft, dark-colored insects, with white or yellowish markings. Some are shiny black, but none of any importance to us.

Family Veliidæ (Broad-shouldered Water-striders). This is a small family of peculiarly shaped insects. Their legs are formed for running over the surface of water, but they can also travel on land with considerable speed.

Family Hydrobatidæ (Water-striders). The members of this family are well known to all who have ever observed insects skimming along over the surface of the water. Often they gather in large numbers, and, when disturbed, dart, with lightning-like rapidity, in all directions. They have no economic value, being neither good nor harmful.

Family Limnobatidæ (Marsh-treaders). There is but a single species of this family in the United States, and this is of no economic value.

Family Emesidæ (Thread-legged Bugs). This is a small family of very peculiar bugs. The body is long and slender and the middle and hind legs very long and thread-like. The fore legs are constructed for grasping, and resemble those of the praying mantis. It frequents trees, and is predaceous in its habits.

Family Reduviidæ (Assassin-bugs). We now come to a family of more interest to us, as in this are many of the most beneficial of the

bug family. The members of this family are all predaceous and voracious. They usually attack other insects and suck their juices, but the higher animals are not free from their attacks, and the kissing-bug belongs here. They have a very powerful beak, and can inflict a painful wound, if not carefully handled. One of the members of this family has a local reputation, and in the mountains it is known as the lumber-

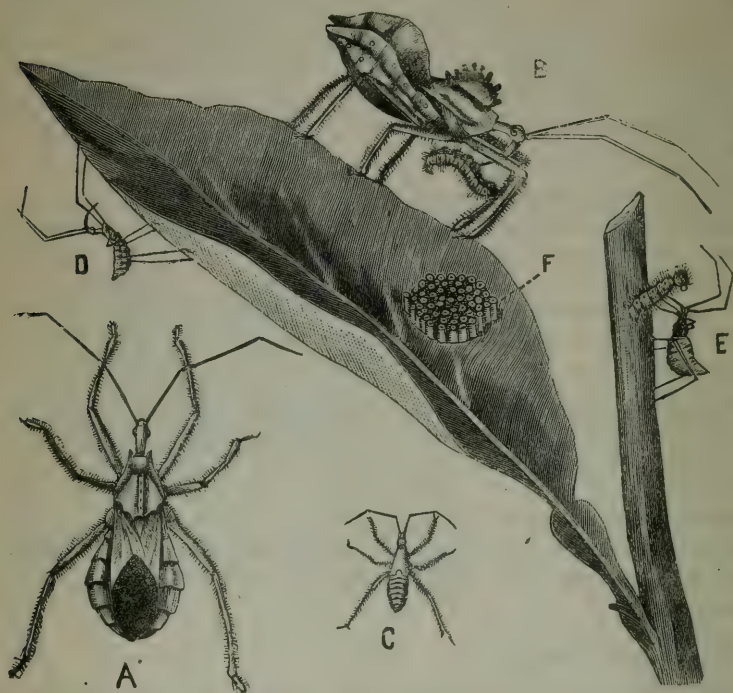


FIG. 42. Wheel-bug (*Prionidus cristatus*). A, adult insect; B, adult insect devouring a caterpillar; C, larva; D, larva; E, larva devouring a caterpillar; F, egg cluster. All enlarged.

man's bedbug. It is sometimes known as the Big Bedbug, and is the *Conorhinus sanguisugus*.

A peculiar member of this family is *Opsicætus personatus*, which, in its younger form, covers itself with particles of dust, and is coated even to the tips of its feet and antennæ. It enters houses and is an inveterate enemy of the bedbug, which it captures and sucks the blood from. From this habit it is known as the "Masked bedbug hunter." This mask is worn only during its immature stage; when fully developed it is about half an inch in length, and is one of about fifty members of this family known as kissing-bugs. It preys also upon flies and other insects. It has a very sharp beak, which it uses in its defense.

Another of the kissing-bugs, which appeared in large numbers in

California some years ago, is *Melanolestes picipes*. This insect is black, and is commonly found hiding beneath stones and boards. It can inflict a very painful wound.

The wheel-bug (*Prionidus cristatus*) is one of the most beneficial of the bug class, as it preys upon leaf-eating caterpillars, and does not hesitate to attack hairy worms, as the tussock-moths, fall web-worm, etc.

This is a large family, representing nine subfamilies and at least fifty genera. They are usually long, rakish-looking insects, with prominent, bulging eyes. The body color is generally dark-brown or black, although some of the members are lighter colored and in some cases beautifully marked. They have a three-jointed beak and are quick in their motions. Altogether the members of this family Reduviidæ or assassin-bugs may be regarded as friends of the fruit-grower, florist, and farmer, and should be protected, even at the expense of an occasional puncture from their beak.

Family **Nabidæ** (Damsel-bugs). This is a small family of predaceous insects. They generally hide among the blossoms and foliage of plants, where they prey upon small insects.

Family **Phymatidæ** (Ambush-bugs). These insects are called ambush bugs from their habit of concealing themselves and seizing their prey unawares. The most striking feature of this insect is in the peculiar form of the front legs, which are especially adapted for seizing and holding their prey. While a small insect, it will seize and hold an insect very much larger than itself, and will catch cabbage-worms, bees, and even wasps, and devour them.

Family **Aradidæ** (Flat-bugs). This family comprises the flattest of all the bugs. Its members live under the bark of decaying trees and in cracks where their flat bodies make it possible for them to creep.

Family **Tingitidæ** (Lace-bugs). This is a family of very small but very beautiful insects. Their common name is given on account of the beautiful lace-like markings of the wing covers, which are reticulated in a manner strongly resembling fine lace work. This insect is very common in California, where it attacks many plants and sometimes becomes so numerous as to seriously interfere with the health of the plant attacked.

Family **Acanthiidæ** (Bedbugs and Flower-bugs). The bedbug needs no description here. It is too well known, and no insect is more thoroughly detested. But there is a very close relation to this pest, which have wing covers fully developed and which are found on flowers and in other locations. They are predaceous, and are known as the flower-bugs.

Family **Capsidæ** (Leaf-bugs). This is the largest of any of the families of true bugs, including more than two hundred species in the United States alone. Most of the members live upon leaves of plants, but some of them are predaceous and prey upon other insects. In this family we find the tarnished plant-bug, the four-lined leaf-bug, and many other of our injurious species.

Family **Pyrrhocoridæ** (Red-bugs). Insects belonging to this family are usually large in size, stoutly built and marked with strongly contrasting colors, in which red and black are conspicuous. The cotton-stainer is a member of this family, and has earned an unenviable notoriety from its habit of puncturing and discoloring the opening bolls of the cotton plant. This bug is a serious pest in Florida, where it pierces the rind of oranges, causing decay to set in.

Family **Iygæidæ** (Chinch-bugs). This is another large family, comprising nine subfamilies and a hundred and fifty species in the United States. The chinch-bug is the representative of the family, and probably the most destructive member of it. This is a rather small bug, but its destruction in the United States each year will run into many millions of dollars. It has two broods a year, and appears in enormous numbers, attacking the stems of grain and grass. While we have this insect in California, it has never been so destructive as in the Mississippi Valley, due probably to the custom which prevails here of burning over the stubble in the grain fields after harvest, by which means these insects are destroyed by millions and their increase prevented. In this family, too, we find the false chinch-bug, a very common insect here, and which somewhat resembles the true chinch-bug, but is never so numerous or destructive.



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FIG. 43. Chinch-bug (*Blissus leucopterus*). Enlarged.

Family **Berytidæ** (Stilt-bugs). This is a small family of land bugs, in which the legs, body, and antennæ are all very slender. They resemble the crane-fly in general build, and are found in the undergrowth of woods and pastures.

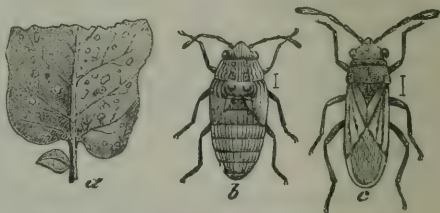


FIG. 44. False chinch-bug (*Nysius angustatus*). Enlarged.

Family **Coreidæ** (Squash-bugs). This is another large family, and is divided into many subfamilies and species. The family comprises both carnivorous and vegetable-feeding forms, and in some cases

the same species will attack both animals and plants. A common species in our State is *Leptocoris trivittatus*, the box-elder bug.

Family Pentatomidæ (Stink-bugs). Every one who has lived in the country, and especially all our fruit-growers, is well acquainted with the stink-bugs, whose popular name is perhaps more descriptive than elegant. They are broad, flat bugs, generally rather large, and mostly dull colored. Most of them are vegetable feeders, although the family contains some predaceous species. One of the worst species of this family with us is the Harlequin cabbage-bug, which sometimes appears in great numbers, and does much damage to growing plants.

Family Cydnidæ (Burrowing-bugs). These bugs have a roundish, elliptical body, usually black, or very dark in color, and are found burrowing in sandy places, under sticks, stones, or near the roots or plants.

Family Corimelænidæ (Negro-bugs). These are small, black insects, and are sometimes found in quantity on blackberries, raspberries, and

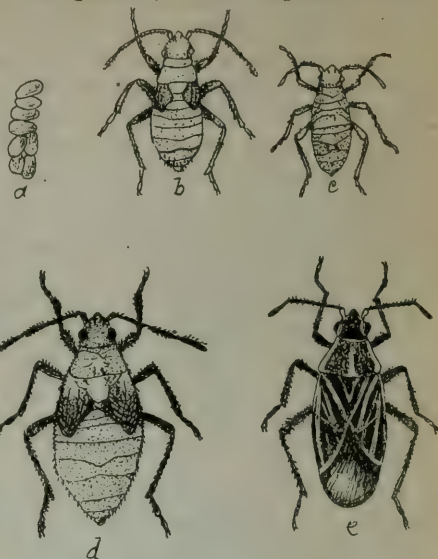


FIG. 45. Box-elder plant bug (*Leptocoris trivittatus*). a, eggs, enlarged; b, c, d, different stages of immature bugs, all enlarged. (After Howard.)



FIG. 46. Harlequin cabbage-bug (*Murgantia histrionica*). a, larva; b, pupa; c, eggs, natural size; d, eggs, enlarged; e, eggs, seen from above, enlarged; f, adult insect; g, adult insect, wings expanded.

strawberries. They do not confine themselves to these fruits, however, as they sometimes attack potato vines and do much damage.

Family Scutelleridæ (Shield-back bugs). This is not a numerous family. They are plant-eating insects, and somewhat resemble the negro-bugs in general appearance.

Suborder **HOMOPTERA**.

The name of this suborder is derived from two Greek words, *homos*, the same, and *pteron*, a wing. Its members differ from those of the other suborder in that the wings are of the same texture throughout, there being no difference in the two pairs of wings. The wings when at rest are usually sloping, like the roof of a house. They have no neck, the head being closely attached to the thorax, and this connection is so close that in many species the beak seems to exude from the thorax itself and to arise from between the fore legs. This suborder is divided into nine families, which are given by Comstock, as follows:

The Cicadas. Family Cicadidæ.

The Lantern-fly family. Family Fulgoridæ.

The Spittle Insects. Family Cercopidæ.

The Leaf-hoppers. Family Jassidæ.

The Tree-hoppers. Family Membracidæ.

The Jumping Plant-lice. Family Psyllidæ.

The Plant-lice. Family Aphididæ.

The Aleyrodes. Family Aleyrodidæ.

The Scale-bugs. Family Coccidæ.

In looking over this list, it will be noticed that here we have a great part of the more injurious pests of the farmer and fruit-grower. In fact, in the whole of this suborder there are not any that are not pests, and many of them the worst of the insect enemies with which we have to contend.

Professor Uhler, our authority in this order of insects, writes that "this grand division of the order contains the greatest number of large species, and the widest range of diversity in the forms of all stages. Comparatively few are destitute of wings, except in one sex of the lowest group; but some have these organs short and unfinished, and it is but very rarely that we meet with one of this kind fully winged. This division is also remarkable for the blunt face and backward pressed elements of the head and breast, thus carrying the rostrum far underneath. Both kinds of eyes are generally present; the compound ones being generally large and prominent, while the single ones, ocelli, are like little convex gems, placed between the larger eyes on the vertex or front, but occasionally, as in Fulgoridæ, on the sides of the cheeks, between the latter and the antennæ. There are usually two ocelli, although in Cicadidæ and most Psyllidæ they are three in number and are placed in front, forming a triangle. The antennæ are usually situated in the hollow between the eyes, and are composed of a few expanded joints at the base, with a tapering, slender, bristle-shaped termination. Exceptions occur in Psyllidæ, Aphididæ, and Coccidæ,

where these organs are commonly filiform and somewhat thickened at the tip.' There are two principal types of legs in this division, although these are variously modified for particular modes of life, the one being adapted for crawling, the other for leaping. The former have short legs, generally stout; the latter have the hind legs long, often curved and set with rows of stiff spines."

Family Cicadidæ. This includes the harvest-flies, seventeen-year locusts, etc. These insects are of large size, and are generally well known. This family has a peculiarity found in no other member of the Hemiptera: the possession of a musical apparatus. The song of the cicada is well known, and is produced by special organs consisting of two large parchment sacs. The surfaces are ribbed and, when in action, the air is forced against these ribbed surfaces, producing sound vibrations and forming the song. It is probable that this "song" is used for the purpose of attracting



FIG. 47. Periodical cicada (*C. septendecim*). a, pupa, ready to change; b, pupa skin from which the adult (c) has emerged; e, eggs taken from the egg-punctures (d).

the female, as these organs are found in the male only. This fact was known to the ancients and an old Greek, Xenarchos, says:

"Happy the cicadas' lives,
For they all have voiceless wives."

The females deposit their eggs in slits which they make in the twigs of trees; these eggs hatch in about six weeks and the young drop to the ground and bury themselves in the earth, where they are supposed to attach themselves to the roots of trees and shrubs, and where they remain until they reach their mature stage, when they force their way from the earth and attach themselves to any convenient object. Here the back of the pupa skin splits and the mature insect, fully winged, creeps forth. It requires some little time for its wings to fully develop, when the newly hatched cicada takes flight to start a new cycle.

The most remarkable thing connected with this family is the length of the larval stage of the two members, known as "Seventeen-year" and "Thirteen-year" locusts. These broods have been watched and recorded by entomologists, and, in one case, they are known to appear in seventeen and in the other in thirteen years. It is, therefore, supposed that their larval, or growing, stage requires seventeen and thirteen years respectively. This is a most remarkable thing in the insect world, as most of these animals have lives of short duration, rarely covering a longer period than a year or two, though this is exceeded in a few instances. But a seventeen-year-old insect is a phenomenon that might be doubted, were it not that the records have been accurately kept and prove it.

Family Fulgoridæ (Lantern-flies). In the tropics of South America, members of this family attain great size and are phosphorescent, from which fact we have their common name. The family is represented with us by some small and insignificant species.

Family Cercopidæ (Spittle-bugs, Frog-hoppers, etc.). Often during the summer months one will notice masses of froth on shrubbery; upon removing this, a small, soft-bodied insect will be discovered beneath it. Sometimes there will be two or more of these insects under



FIG. 48. Frog-hopper or spittle insect (*Aphrophora* sp.). Slightly enlarged.

one mass of froth. These are the spittle-bugs, and the froth, which is composed of the sap of the bush upon which they are lodged and which is pumped out by them, is their means of protection. Clear this away a few times and keep the insect clear of it, and it will dry up and die. At its last

molt, a clear space under the froth is formed, and the mature insect, no longer needing the moisture for its safety, emerges a perfect frog-hopper, and wanders about the plant.

This is quite a large family, and includes a number of species. All are injurious, where they appear in numbers, as they exist by sucking the juices of the plants upon which they lodge.

Family Jassidæ (Leaf-hoppers). This is a family of insects, generally small in size, but very destructive. In this family is *Erythoneura vitis*, the grapevine leaf-hopper, which has a most unfavorable reputation in the raisin vineyards of this State, where it is commonly known as "thrips," although it is not at all related to that insect. During the summer season, they sometimes appear in the vineyards by millions, and by sucking the juices of the vines through the leaves do immense damage. These insects hibernate in the vineyards or vicinity, and

under leaves or rubbish, and the best preventive method to be applied against them is to thoroughly clean the vineyard and its neighborhood of all loose rubbish and burn it. By this means the next season's crop of the pest can be greatly reduced.

They are very destructive in meadows, and it is stated that these insects destroy from one fourth to one half of the grass that springs up annually. They are more numerous than any other insect, except, perhaps, the aphids.

Family Membracidæ (Tree-hoppers). In this family we find some of the most grotesque forms in the animal kingdom. This is the typical family of the suborder Homoptera. Its members are of every conceivable form, and are described by Prof. Otto Lugger as "arched, compressed, depressed, hump-backed, spindle-shaped, pointed at both ends, inflated, hemispherical or conical, and besides this they are furnished with an endless variety of superficial attachments." They live principally on trees and bushes, and all possess great leaping powers, hence their common name. They are usually not sufficiently numerous to be destructive and have therefore little economic value.



FIG. 49. Buffalo tree-hopper (*Ceresa bubalus*).



FIG. 50. Pear-tree Psylla (*Psylla pyricola*). Enlarged.

in being of a more solid texture, with stouter legs, the hinder pair being especially strong and fitted for jumping. In their adult form, both sexes are winged. A peculiarity in some of the species of this family is the bifurcated antennæ. In these the feelers are split and end in two bristle-like points. Some of these species exude a honey-dew, and in this respect approach the aphids. The commonest and most destructive member of this family is the pear-tree Psylla (*Psylla pyricola*). This is a



FIG. 51. Larva of *Psylla pyricola*. Enlarged.

very small insect, not over a sixteenth of an inch in length, but it often occurs in such quantities as to do enormous damage to the pear orchards.

Family Aphididæ (Plant-lice). This family is closely akin to the foregoing, and in some of its many species is known to nearly every one; to all who have endeavored to grow flowers or vegetables, or who have noticed trees at all. It is a very extensive family, and includes

many species, some of which attack most forms of vegetation. In this family we have the phylloxera and the woolly-aphis, and many other well-known forms, all exceedingly destructive to vegetation. The largest species is about a quarter of an inch in length, and from this they range down until it requires a good eye, sometimes assisted by a magnifying glass, to see the smaller members. Some are subterranean,



FIG. 52. Aphids or plant lice. Winged and wingless forms. 1 and 3 natural size. 2 and 4 greatly enlarged.

living wholly underground; some are aerial, living on the tops of plants; while some are both, and pass one stage of their existence underground and another above.

Insects belonging to this family are soft-bodied, gregarious, and most numerous in the wingless form. They have absolutely no means of defense, being destroyed by thousands by every

change in the weather, blown to destruction by the winds and washed off by the rains. They have more enemies among predaceous insects than has any other family, being preyed upon in all stages by the ladybirds, which devour them externally, and by Braconids, which devour them from the inside. Many birds eat them, and, being utterly defenseless, they are beset by enemies on every hand. Why, then, are they not exterminated? For the reason that nature has made them so enormously prolific that they are enabled to withstand all the destructive forces which are at work against them, and still leave enough for a new start, for if but a single one is left, that is enough to stock the country with a new brood.

The aphid furnishes the most interesting study in the entomological world. It is a contradiction of all known laws in relation to propagation. The first brood, which appears very early in the spring, as soon as there is sufficient plant life to sustain it, is hatched from eggs which have been previously deposited in the crevices of the bark. These are all females. They commence the active work of their lives at once, and suck the plant juices and grow, casting their skin, as they become too large for it, about four times, by which time they have reached adult size and are ready to begin the second great object of their life—that of propagation.

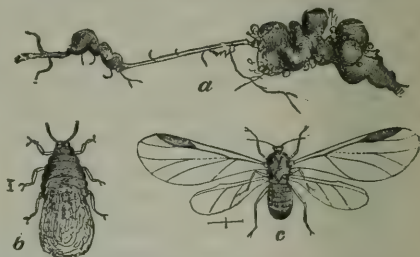


FIG. 53. Woolly aphid of apple (*Schizoneura lanigera*). Enlarged.

These females give birth to new broods, all of which are still females, and only females* are born. This peculiar propagation is continued throughout the summer. In the autumn, however, when the weather grows colder, the last births are both male and female, and these last born females only lay eggs, which remain dormant until the following spring, when they hatch out females, and the same process continues without end.

Some naturalists hold that if the conditions are right the aphid will continue to give birth to females indefinitely without the presence of males. Kyber records having had a rose aphid which produced young for four years, and from his careful experiments it has been asserted that under certain circumstances a female aphid may, in the entire absence of males, continue propagating to infinity, providing that the necessary conditions—food and heat—for the development of the young are not wanting.

The color of the eggs of the aphid, together with their rarity, makes them difficult to discover. During the months of February and March, when the leaf buds of the rose begin to swell, the eggs of the rose aphid may be seen like grains of gunpowder fixed within the crevices of the bark. A single insect hatched from one of those shining black eggs may be the progenitor of many billions of young during her lifetime. Latrielle, who is an authority on this branch of entomology, makes a curious calculation. He says that one female will produce young at the rate of about twenty-five a day during the summer months, and one aphid may be the mother of the enormous number of 5,904,000,000 during the month or six weeks of her existence. Tongard and Morren, equally good authorities, extend this number into quintillions, as being within the capabilities of a single mother's efforts. Professor Huxley makes a calculation which affords an approximate idea of what a quintillion of aphids might mean. Assuming that an aphid weighs as little as the one-thousandth part of a grain, and that it requires a man to be very stout to weigh more than two million grains, he shows that the tenth brood of aphids alone, without adding the products of all the generations which precede the tenth, if all the members survive the perils to which they are exposed, contains more ponderable substance than five hundred million stout men; that is, more than the whole population of China and the United States combined. Fortunately there are large numbers of carnivorous insects which prey upon the aphids and prevent their inordinate increase. The variations in temperature, winds, and birds also have a tendency to prevent their too rapid spread.

We have alluded to the fact that some species of aphids are subterranean, passing their entire existence underground. Among these are the Rhizobiinæ, which are found on the roots of shrubs and plants, and may be very injurious. These never come to the surface, are wingless, and seem to be cared for by ants, which aid in their distribution.

Another underground form is the dreaded *Phylloxera vastatrix*. This pest is known all over the world and has caused millions upon millions of dollars' loss by its depredations in the vineyards of Europe and America. The life history of this pest is given by Professor Marlatt, as follows:

"The life cycle of the phylloxera is a complicated one. It occurs in four forms in the following order: The leaf-gall form (*gallicola*), the root or destructive form (*radicicola*), the winged or colonizing form, and the sexual form. The leaf-gall insect produces from 500 to 600 eggs for each individual, the root-inhabiting insect not much above 100 eggs, the winged insect from 3 to 8, and the last sexed insect but one egg. This last is the winter egg, and may be taken as a starting point of the life cycle. It is laid in the fall on the old wood, and hatches, the spring following, into a louse, which goes at once to a young leaf, in the upper surface of which it inserts its beak. The sucking and irritation soon cause a depression to form about the young louse, which grows into a gall projecting on the lower side of the leaf. In about fifteen days the louse becomes a plump, orange-yellow, full-grown, wingless female, and fills its gall with small yellow eggs, dying soon after. The eggs hatch in about eight days into young females again, like the parent, and migrate to all parts of the vine to form new galls. Six or seven generations of these wingless females follow one another throughout the summer, frequently completely studding the leaves with galls. With the approach of cold weather the young pass down the vines to the roots, where they remain dormant until spring. The root is then attacked, and a series of subterranean generations of wingless females is developed. The root form differs but slightly from the inhabitant of the leaf galls, and the swellings or excrescences on the roots are analogous to those on the leaves.

"During late summer and fall of the second year some of the root lice give rise to winged females, which escape through cracks in the soil, on warm, bright days and fly to neighboring vines. These winged lice lay their eggs within a day or two in groups of two or four in cracks in the bark or beneath loose bark on the old wood of the vine, and die soon after. The eggs are of two sizes, the smaller and fewer in number yielding males in nine or ten days, and the larger the females of the only sexed generation developed in the whole life round of the insect. In this last and sexed stage, the mouth parts of both sexes are rudimentary, and no food at all is taken. The insect is very minute, and resembles the newly hatched louse of either the gall or the root form. The single egg of the larva-like female after fertilization rapidly increases in size until it fills the entire body of the mother, and is laid within three or four days, bringing us back to the winter egg, or starting point.

"This two-year life round is not necessary to the existence of the species, and the root form may and generally does go on in successive broods year after year, as in the case with European vines, on the leaves of which galls rarely occur. Under exceptional circumstances all of the different stages may be passed through in a single year. The young from leaf galls may also be easily colonized on the roots, and it is probable that the passage of the young from the leaves to the roots may take place at any time during the summer. The reverse of this process, or the migration of the young directly from the roots to the leaves, has never been observed."

We have dealt somewhat extendedly with the aphids, because they are among the most serious pests of the farmer and fruit-grower in our own State, as they are elsewhere in the Union.

Family Aleyrodidæ. In the aleyrodes we have a connecting link between the aphids and the scale insects. In the early stages of their lives, the larval form, the aleyrodes are true scale-bugs, and very strongly resemble certain species of *Lecaniums*. For a long time, members of this family were classed with the Coccids, but owing to very marked differences in the mature insects were erected into a separate family. They are very small insects, and in the larval form are sometimes quite pretty, having a dark center and being surrounded by a fringe of white, waxy filaments. In the mature stage, both sexes are winged, herein differing from the Coccidæ, in which only the male acquires wings. In this

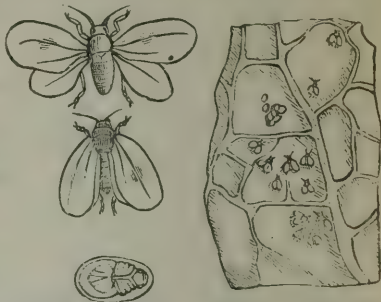


FIG. 54. White flies (*Aleyrodes* sp.). Natural size and enlarged.

stage they are small, white, four-winged flies, very strongly resembling minute moths. The wings and bodies are covered with a whitish powder, resembling flour. We have several species of this family in California, and they may be found quite commonly on the under side of the leaves of fuchsias, nettles, iris, and other plants. Where very numerous, they fly off in a white cloud like a cloud of dust when disturbed. None of our native species are especially injurious, but in Florida and other of the Southern states the *Aleyrodes citri* (the white fly), a species found upon citrus fruits, has proven a very destructive and dangerous pest and one that it has not been found possible to control.

Family Coccidæ (Scale-bugs, Mealy-bugs, etc.). We now come to a family more widely known, and, in California, more generally destructive than any other of the insect tribe. It is a very large family,

including something over fifteen hundred species, not all of which, however, are found in California.

The family Coccidæ is divided into nine subfamilies, each having its peculiarities of form and habits, which are set forth as follows:

Subfamily Monophlebinae. Of this subfamily, which comprises ten genera, we have a good representative in *Icerya purchasi* (the cottony-cushion scale), which is well known to almost every horticulturist in California. The general characteristics are: Males with compound eyes. Females with definite hairy anal ring. The insects are usually covered by a cottony matter of several shades of color and with a secretion of still longer filaments. Skin with rounded spinnerets and with long, scattered hairs. The lateral lobes of the extremity of the abdomen are fitted with a series of long, interlaced bristles.

Subfamily Margarodinae. This subfamily has been erected to accommodate a single genus—Margarodies—comprising about ten species. This subfamily is not represented in California. One very pretty species is found infesting roots in South Africa and is bead-shaped. They are very brilliant in color, being somewhat of a metallic green, and are collected by the natives, strung on stout thread and worn as ornaments.

Subfamily Ortheziinae. Under this subfamily are included three genera, of which the genus Orthezia is the most important and the only one represented in California. The female presents the following characters: Eyes simple, anal ring with hairs. Body more or less covered with cereous matter arranged in compact symmetrical plates. The eggs are carried in an elongated ovisac, which projects behind the body until they hatch. Insect active throughout entire life. Legs long, with fine hairs, one claw, and no digitules. Two or more long, slender, snow-white filaments project from near the posterior end. Color usually white.

Subfamily Phenacoleachiinae. This subfamily was erected to accommodate a single genus—Phenacoleachia—and is represented by a single species, which occurs in New Zealand on *Cupressus* sp.

Subfamily Conchaspinae. These are insects with a separate covering scale, which is formed entirely of secretory matter, not using the cast skins (exuviae) in forming the covering scale. Adult females retain limbs and antennae. A distinguishing feature of this subfamily is to be found in the mouth parts, as the lower part of the mouth (mentum) is composed of two parts, and is grooved out to accommodate the sucking tube of the insect. This subfamily contains but a single genus—Conchaspis—of which only four species have been recorded, none of which occur in California.

Subfamily Dactylopiinæ. This subfamily includes a large number of genera, something like fifty-two, of which thirteen occur in California. Among those found in this State are the following: *Asterolecanium*, *Pollinia*, *Kermes*, *Nidularia*, *Gossyparia*, *Eriococcus*, *Dactylopius*, *Ceroputo*, *Pseudococcus*, *Erium*, *Ripersia*, and *Antonina*. The most important of these is the *Pseudococcus* (mealy-bugs). The following may be of assistance in placing the species in their proper place: Abdominal extremity not cleft, usually with a pair of more or less prominent rounded tubercles, each bearing a long seta. No hinged plates above anal orifice. Larva with abdominal lobes. Female not secreting a waxy scale.

Subfamily Tachardiinæ. These insects are inclosed in a resinous cell, with three orifices. Adult female without legs, with the terminal segments produced into a tail-like organ, with the anal orifice at the extremity, which is surrounded by a broken hairy ring. A spine-like organ above the base of the caudal extension. This subfamily includes but two genera, comprising about twenty-three species, and is not represented in California.

Subfamily Coccinæ. This is another large subfamily, embracing some forty-eight genera, ten of which are represented in California, viz.: *Pulvinaria*, *Exæretopus*, *Ceroplastes*, *Vinsonia*, *Eucalymanatus*, *Coccus*, *Eulecanium*, *Saissetia*, *Physokermes*, and *Aclerda*. The main characters of the Coccinæ are as follows: Females keeping the form of the body, with segments distinct until the end, and also retaining the power of moving under certain circumstances while young. Either naked or simply covered with waxy filamentary material. Most of the females, after impregnation, take on a different form and become fixed to the host plant, and, once fixed, remain so for the rest of their lives. Under this subfamily are grouped some of the more destructive forms with which the fruit-growers of California have to contend. The principal ones being *Saissetia oleæ* (black scale), *Pulvinaria innumerabilis* (cottony maple scale), and *Coccus hesperidum* (soft orange scale), although this species is now not considered a pest.

Subfamily Diaspinæ. These insects have a separate covering-scale composed partly of secretionary matter and partly of the exuviae, which are the discarded skins shed at the periodical molts of the insect. Adult female without limbs. The form of the scales comprising this family are usually circular, varying to oblong. The eggs are deposited beneath the parent scale. Under this subfamily occur some thirty-five genera, among which are to be found many of the most destructive species in our State. The principal ones are *Chionaspis*, *Diaspis*, *Aulacaspis*, *Hemichionaspis*, *Fiorinia*, *Aspidiotus*, *Chrysomphalus*, *Pseudaonidia*, *Lepidosaphes*, and *Parlatoria*.

In treating of the different species of the scale-bug family, it will be well to call attention to the new classification. Our Horticultural Commissioners have struggled hard, in most cases, to inform themselves in regard to scale pests in California, and have learned to know them by their old names. Now, these names have been largely changed, the knowledge acquired by our commissioners is turned topsy-turvy, and they will have to learn the names of their old acquaintances over again, or fail to recognize them when they appear in print. Following is appended a list of the changes which have been made in the nomenclature of the more common of our California scales.

<i>Common Name.</i>	<i>New Name.</i>	<i>Old Name.</i>
Mealy-Bug.	<i>Pseudococcus.</i>	<i>Dactylopius.</i>
Black Scale.	<i>Saissetia oleæ.</i>	<i>Lecanium oleæ.</i>
Soft Brown Scale.	<i>Coccus hesperidum.</i>	<i>Lecanium hesperidum.</i>
Hemispherical Scale.	<i>Saissetia hemispherica.</i>	<i>Lecanium hemisphericum.</i>
Apricot Scale.	<i>Eulecanium armeniacum.</i>	<i>Lecanium armeniacum.</i>
Frosted Scale (Prune Scale).	<i>Eulecanium prunosum.</i>	<i>Lecanium prunosum.</i>
Red Scale.	<i>Chrysomphalus aurantii.</i>	<i>Aspidiotus aurantii.</i>
Yellow Scale.	<i>Chrysomphalus citrinus.</i>	<i>Aspidiotus citrinus.</i>
Oleander Scale.	<i>Aspidiotus hederæ.</i>	<i>Aspidiotus nerii.</i>
Purple Scale.	<i>Lepidosaphes beckii.</i>	<i>Mytilaspis citricola.</i>
Long Scale.	<i>Lepidosaphes gloverii.</i>	<i>Mytilaspis gloverii.</i>
Rose Scale.	<i>Aulacaspis rosæ.</i>	<i>Diaspis rosæ.</i>

These are a few of the changes that have been made in the nomenclature of this family, and the list presented above will aid our commissioners and those who learned under the old school to recognize their old friends under their new names.

In many members of this family there seems to be a sort of retrogression, and they go from bad to worse, from the time they are hatched out until they die. When first hatched they are perfectly formed insects, having the required six legs, well-formed antennæ, eyes, and mouth parts. They are lively in their motions and get around at a fairly good rate. In a short time, however, they settle down in a chosen place, on some form of vegetable, insert their beak and suck. Having no further use for legs and other organs needed in active life, they gradually lose them, molting in the meantime, and forming the coating which we know as a scale. In the last stage, however, there is a difference between the two sexes, for while the female never changes her position, being converted as it were into a mass of eggs and young at the end of her life, the male emerges from the scale form a perfect insect; usually a very pretty little creature, with a full complement of feet and wings, and all other organs except mouth parts. He can no longer eat, and is therefore not to be feared. His mouth parts disappear and in their places he acquires a new pair of eyes. This we presume is the better to enable him to find the female, for this is now all that is left in life for him, and he soon passes away.

This description will hardly apply to members of several of the sub-families, in which both sexes retain some powers of locomotion through life and do not become fixed, nor form a scale. A peculiarity of this family, too, is that while they belong to the four-winged insects, the perfect males have but one pair of wings, a pair of small hooks, known as halteres or poisers, taking the place of the other pair, and, unlike other members of this order, the males undergo a complete metamorphosis.

As the Coccidæ are treated of *in extenso* in another part of the present publication, under the title of "The Coccidæ of California," we will dismiss this family here, and refer our readers to that paper for a full account of them.

Order **NEUROPTERA.**

(The Nerve-winged Insects.)

In the old classification, this order included all insects with four more or less transparent wings, and these veined or netted. The lace-winged fly and the dragon-fly were marked types of the order. In all members the mouth parts are formed for biting. Aside from the winged resemblance, however, there were such marked differences in the diverse members of this order that several new orders have been constructed from it, and it is divided into from two to five minor orders, according to the importance attached by authorities to the development of different organs, and especially in relation to different methods of transformation. This order, or group of orders, is not of great importance to us, for aside from some beneficial insects which we find in it, the greater portion are neither beneficial nor injurious; we may therefore consider its members together under the old style.

In this order both pairs of wings are usually of the same size and of a similar membranous texture, and traversed with nervures, which are usually united by a number of smaller ones, so that the wings present a net-like appearance. In some of the members the metamorphosis is complete and in others incomplete, and upon this fact the order has been divided. The Neuroptera proper are divided into seven families: Mantispidæ, Raphidiidæ, Sialidæ, Coniopterygidæ, Myrmeleonidæ, Hemerobiidæ, and Chrysopidæ.

The family **Mantispidæ** is so named from the fact that the insects strongly resemble the praying mantis in the order Hemiptera. They are much smaller insects, however, and their possession of four strongly marked membranous wings gives them a place in the order under discussion. They have strong, grasping forelegs and are predaceous, living upon other insects. Only one member of this family is known in California, *Symphasis signata*, but it is not frequently met with.

The family **Raphidiidæ** is represented in California by an insect about half an inch in length, with a peculiarly shaped head and neck which protrude far in advance of the wings. It is a predaceous insect, lives largely on the larvæ of the codling-moth, and is one of the best of the native parasites of this pest. It is not a common insect, but is sometimes found under the bark of trees, where it takes refuge.

The family **Coniopterygidæ** comprises a few rare insects which have no economic importance, and are of interest only to the systematist.

The family **Sialidæ** includes the Dobson fly, which, in its larval form, serves as a bait for anglers. In this stage it is an aquatic insect, living upon other water insects. It has no economic value.

The family **Myrmeleonidæ** are the doodle-bugs, or ant-lions. They have the peculiar habit of setting a trap for their prey, usually in the path of the ants, and this they do by digging a pit in the shifting sand. When an ant gets over the edge of this pit he rolls to the bottom, where the doodle-bug grasps him in his jaws and sucks out the juices. In their matured form they strongly resemble dragon-flies.

The family **Hemerobiidæ** strongly resembles the lace-winged flies in appearance, but much larger and differently colored, being usually dark brown. They are predaceous, and, so far, beneficial.

The family **Chrysopidæ** includes the lace-winged flies, so well known to our orchardists. In their larval form they are commonly known as aphis-lions, from the fact that they are largely predaceous on aphids. The mature insect is a very pretty creature, with its delicate form, gauzy wings, and brilliant, prominent golden eyes. Upon being dis-

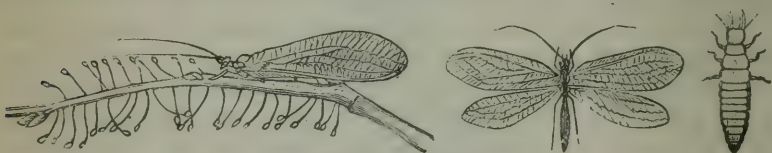


FIG. 55. Lace-winged fly.

turbed they emit a disagreeable fetid odor. Their eggs are white, are supported on long stalks, and are usually deposited on plants infested with aphids. The larvæ are active and extremely voracious. There are two or more broods during the summer, and the last brood winters in the pupa state protected by a compact, round, whitish cocoon.

There has been much confusion among entomologists in regard to the insects comprising this order, owing to the diversity of character of many of the insects classified under it originally, and this has resulted

in splitting it up into several minor orders, some of which are represented by a single family. Some authorities divide it into two sub-orders, the true Neuroptera and the Pseudo-neuroptera. In the former the metamorphosis is complete, and in the latter it is incomplete. In this classification of Neuroptera and Pseudo-neuroptera, the insects with incomplete metamorphosis are separated into *Ephemeroptera*, or mayflies; *Odonata*, or dragon-flies; *Plecoptera*, or stone-flies; *Platyptera*, the white ants, book-lice, and bird-lice. Comstock, however, erects separate orders for these, and does not recognize the Pseudo-neuroptera. As few of these are of great economic importance, and as this is not a scientific treatise, we give the minor orders place under the general title of Neuroptera.

Order **Mecoptera** includes but one family, the scorpion-flies, so-called because the last abdominal segment has a strong resemblance to the sting of the scorpion. It is not a sting, however, and contains only a set of grasping organs. These insects are of no economic importance.

Order **Trichoptera**, the caddice flies, in their larval stage, are found in streams and have the peculiarity of constructing for themselves shelters of particles of wood, gravel, and other substances. The larvæ remain in these structures, the head alone protruding, and are thus safe from outside foes. The material of which these structures are joined together is a silk spun by the worm, and the inside of the tubes is generally lined with the same substance. Another peculiarity of these insects is that under water they construct a web very similar to that of the spider on the surface.

Order **Ephemerida** includes the mayflies, which are very delicate insects that appear in enormous numbers on summer evenings on the margins of quiet streams and lakes. The mayfly is an aquatic insect, and spends its entire larval life in the water. In its perfect form it is a beautiful sprite-like insect, without mouth parts, its only object in life being to lay the eggs which are to produce a new generation. This is accomplished in a few hours and the insect passes away. They have no economic value. The metamorphosis is incomplete.

Order **Odonata** (Dragon-flies). Members of this order are easily recognized and are well known. They are, in their larval form, aquatic, and have an incomplete metamorphosis. They may be classed as beneficial, as they live almost wholly on mosquitoes in both their larval and mature stages, and are probably one of nature's most effective methods of keeping down these troublesome pests. Unfortunately, this insect has been credited with malignant powers, and ignorant people regard it as a dangerous insect. It is at once one of the most graceful,

beautiful, useful, and harmless of the insect tribe. It has no sting and no means of defense, except in its rapid flight, and may be handled with impunity by collectors. Aside from their work on mosquitoes, members of this order have no interest to our orchardists.



FIG. 56. Dragon-fly. Natural size.

Order Plecoptera (Stone-flies). These are insects having an incomplete metamorphosis, and which breed in great numbers in streams. They are known as stone-flies from the fact that they take refuge under stones in the streams, and are a favorite bait with anglers. Fish are very fond of them, but aside from this they are of no economic importance.

Order Isoptera includes the so-called white ants, or termites, which, by the way, are not ants at all, nor even remotely connected with them. Termites are very common insects in California, where they will be

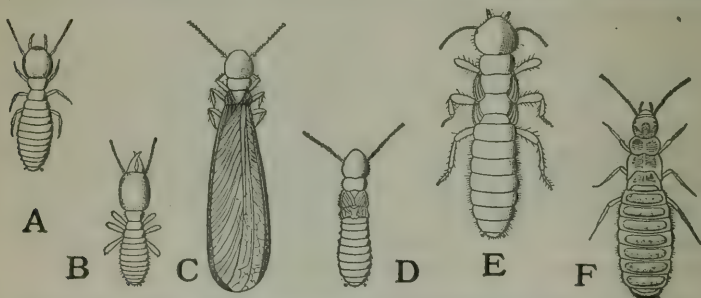


FIG. 57. Various forms of *Termes lucifugus*. A, adult worker; B, soldier; C, perfect winged insect; D, perfect insect after shedding the wings; E, young complementary queen; F, older complementary queen. Enlarged. (After Grassi and Sandias.)

found working usually on decaying wood, but sometimes attacking growing trees just beneath the surface of the ground. They are not, however, seriously harmful, and while some damage is reported from their attacks, this is not common. This order comprises some of the most remarkable and interesting forms of insect life, and it may be well to

deal more extensively with it. There are seven species found in the United States, of which four are confined to the Pacific Coast. None of these are of large size, usually being from one sixth to one fourth of an inch long. In the tropics, however, they attain a much larger size, and are among the most destructive of insects, in some cases being so destructive to wood that this material can be used very sparingly, if at all, in buildings. Comstock gives the following account of the life of the termites:

“A remarkable thing about the white ants is the way they are divided into classes, each class fitted to do a certain work for the colony. *First*, there is the class of workers, which is constituted of both sexes; they are wingless and of a dirty-white color, and while they resemble true ants somewhat, their waists are thicker. Their business is to bring food for everybody, feed and bring up the young termites, and build nests. *Second*, there is the class called soldiers; these, too, are of both sexes, and wingless, and look somewhat like the workers, only their heads are tremendous in size, being often nearly as long as the rest of the body, and their jaws are large and powerful. *Third*, is the royal class, called *kings* and *queens*. It would have been better to have called them fathers and mothers, as they are the parents of the colony, and do not rule it. This class when grown have wings, which lie flat upon the back when at rest, and may be twice as long as the body. In May or June in our common species this class swarms forth from all the nests of the neighborhood. After a flight of some distance the wings are shed, and a king chooses some queen near him and proposes that they start a kingdom of their own. But like mortal kings and queens they can not reign unless a kingdom is found for them, and so millions of these royal pairs die because they have no subjects. But sometimes a fortunate couple is discovered by some termite workers, who at once take possession of the wanderers and provide them with food and with shelter in the shape of a large circular shallow cell. In this they are really imprisoned, but are well cared for. Soon the queen or mother begins to develop eggs, and her body grows enormously. Finally, it is nothing but a huge sac filled with eggs, looking more like a potato than anything else, and is sometimes six or seven inches long. Of course, the poor queen can not move herself in the least, and if she were not fed would soon starve; but her king remains devoted to her, and her ladies and gentlemen in waiting do their best to make her comfortable; they carry away the eggs to other chambers as soon as they are laid, then care for the eggs, and feed the little ones when they are hatched. The young termites are active, and resemble the adult in form. If a nest becomes queenless, and the workers are unable to procure a queen, there are developed in the nest wingless sexual individuals, which are termed complemental males and females. But as each

complemental female lays only a few eggs, it requires several to take the place of a real queen.

"All white ants are miners, and avoid the light. They build covered ways wherever they wish to go. In hot countries they are a terrible pest, as they feed upon wood, and actually destroy buildings and furniture and libraries. They leave merely the outside portion of what they feed upon; and they have been known to enter a table through the bottom of the legs and to eat all the inner portions so that a slight weight crushed it to the floor. In Florida they do damage to orange and other trees by girdling them below the surface of the ground."

Order Corrodentia (Book-lice, etc.). These are tiny creatures, somewhat resembling the termites in appearance, only one family of which, the Psocids, are found in the United States. They are general scavengers and receive their common name of book-lice from the fact that they are sometimes found in libraries, attacking old and unused books. They are found in great numbers in many of our orchards, where they congregate in colonies. They lay their eggs in heaps on leaves and branches, and cover them with a web, giving vegetation a dirty appearance, as the dust finds lodgment on these webs. The dry climate of California is especially favorable to their propagation, but, aside from the fact that they give our trees a dirty appearance, they are of no importance to us from an economic standpoint.

Order Malophaga. This order has been erected for the bird-lice. We have alluded to these insects before, and little more need be said of them. They infest birds and sometimes are also found on animals,

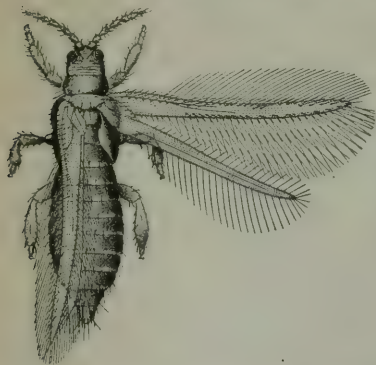


FIG. 58. Pear-thrips (*Euthrips pyri*). Greatly enlarged.

being known by the name "wool-eaters," which was given them because some species are found on sheep and goats. They are furnished with mandibulate jaws, and are, therefore, biting and not sucking insects. In this they differ from the true lice, which are suckers. Their metamorphosis is incomplete.

Order Physopoda (Thrips).

This is a small order of very small insects which has had a deal of trouble in getting located. Entomologists have located it in the Hemiptera, the Orthoptera, and the Neuroptera. Finally a "Thysanoptera" was created to take care of it,

and now it has come to be known as Physopoda. Whatever the name

of this group, its members while exceedingly minute are also exceedingly destructive. The various species in this order are distinctly different from those belonging to any other order, which accounts for the trouble of locating them when there were only the seven orders in which to place all insects, and the necessity at last of erecting an order for them.

These insects abound in flowers and flowering plants and can be found in great quantities in many blossoms. In some sections they infest pear, orange, and other fruit trees, and do much damage by injuring the blossoms, as they bite into the essential organs and prevent the fruit blooms from fertilizing and the fruit from setting. In the vineyards of this State one of the leaf-hoppers is called a thrips, but this is a misnomer, as the insect found in the vineyard is a hopper, and belongs to the Homoptera.

Order **LEPIDOPTERA.**

(Butterflies and Moths.)

A description of the members of this order is hardly necessary, as it is the best known of all the insect tribe. The butterflies are especially attractive to the non-scientific classes, as they comprise the most attractive and showy of all insects. We find them of all colors and all combinations of color, and of such varied forms that one becomes bewildered with their myriad beauties. They have been aptly termed the flowers of the insect world, and, certainly, in their varied hues and forms, they more resemble flowers than animals. Their name, Lepidoptera, is composed of two Greek words, *lepis*, a scale, and *pteron*, a wing, and means scaly wings, from the fact that the wings, in insects belonging to this order, are covered with minute scales.

As a rule, it is not difficult to recognize a member of this order, for while the species are very numerous, there are conspicuous general characteristics in shape, wing formation, etc., which are so strongly marked as to make them plainly recognizable even to the tyro. There are, however, some minor exceptions to this statement in the wingless forms, usually females, as the tussock-moth, the cankerworm, etc., and in the clear-winged moths, which so nearly resemble wasps that the beginner in entomology might be pardoned for mistaking them.

The order is again divided into two well-defined groups or suborders: the moths, or Heterocera, meaning variable horns, from the great variety of forms shown in their antennæ, and the butterflies, or Rhopalocera, or club-horns, in allusion to the form of their antennæ. The butterflies are all diurnal, or day-fliers, while the greater part of the moths are nocturnal, or night-fliers. Some moths fly in the daylight and many are on the wing during the twilight hours, between sundown and dark,

but by far the greater part of the members of this family are night-fliers.

Referring again to the antennæ, there is always a distinguishing feature here by which we can decide to which class either of these insects belongs, for while moths and butterflies, in some of their forms, so nearly approach each other that it is difficult to tell where to place them, the antennæ of the butterfly invariably end in a little club or knob, hence the name. The antennæ are always filiform, or thread-like, varying in thickness; but at the end there will be a knob, which is sometimes prominent, sometimes obscure, and varies in form in different species, but it is always present. With the moths, the antennæ always end in a point. In this group, there is a great variation in the form of the antennæ; they are feathered or branched, or filiform, sometimes very simple and sometimes very elaborate, but they invariably terminate in a point.

While, in their perfect state, this order is the most attractive of all the insect tribe, they are, in their larval stage, the most destructive of any. With the exception of the silkworm, whose products we have turned to our use, and a few minor species which are predatory, we may say that the whole order is destructive. They are vegetable feeders, and, in the form of caterpillars, often do enormous damage. Codling-moths, armyworms, cutworms, cankerworms, gypsy-moths, the brown-tail moths, and others of this kind, are too well known to our orchardists, while the housewife is troubled out of her life by the clothes-moth. They are a pest in everything, and do more damage than any of the other insect orders.

Another distinguishing feature is that, when at rest, the butterflies fold their wings perpendicularly over their backs, while the moths fold theirs horizontally. In the latter, the wings lie flat on the back, or are folded over it roof-like. There is one family of butterflies, commonly known as skippers, which seems to connect the two branches, and in these one pair of wings are folded, as in the butterflies, and the other lie flat, as in the moths.

The butterflies have well-marked peculiarities which separate them into natural groups, based on the character of the feet and the position of the antennæ. In the true butterflies, the head is very narrow, and the feelers are set close together on the top. The club on the antennæ is very prominent and well defined. In the skippers, which we have stated seem to form a connection between the two suborders, the head is much broader, the bodies stouter, and the antennæ, while ending in a club, are recurved and pointed, and they are widely separated and set close to the eyes.

It has been previously stated that all insects have six feet, from whence we have the name Hexapoda, applied to this section of the

insect world. In the case of some of the butterflies, it would seem at first glance that an exception was had to this rule. In many of them the fore legs and feet are aborted, and often not plainly visible. They are always present, however, even if indistinct. In these, the tibia or foot is represented by a brush, and these brush-footed butterflies are divided into two families: the Nymphalidæ, containing the moderate-sized and large species, and the Lycænidæ, small species, generally of a blue or coppery color, with the under side sometimes marked with hair-like streaks. These are commonly known as the blues, coppers, or hair-streaks. They are common in damp places and along watercourses.

There is a marked difference in the methods of transformation in the butterflies and moths. In the former, the pupa is known as a chrysalis; it is naked—not inclosed in a cocoon—and is always above ground, there being no subterranean forms. Usually the chrysalids are found attached to the under side of a limb, a stone, or some other convenient place, and usually pendent. They are, as a rule, obscure in color, although some are brilliantly marked with metallic colors, and some are ornamented with points like burnished gold.

The pupa of the moth is inclosed in a cocoon. This may be a silken web woven round it for its protection, the highest form of which we find in the cocoon of the silkworm, or it may be a mere case of hardened earth, silk-lined and buried.

The moths vary much more in their habits than do the butterflies, and are found in all places. Some are wood-borers, and pass their transformations in the trunks of the trees which have given them refuge; others are subterranean in their larval stage, and these construct cells of earth in making the change; others are plant feeders, and these may weave a cocoon in any available place. The butterfly is wholly aërial. Its larva is always found on the surface. It is not a borer or a burrower, with perhaps the exception of the genus *Megathymus*, one of the skippers, which in its larval stage is said to burrow in the underground stem of the yucca.

In the Lepidoptera the three principal divisions of the body are well defined. The head is small, rather broad in proportion to its length, and moves freely on the neck. The eyes are hemispherical and very prominent, of various colors in the different species, and sometimes showing a few hairs. Two ocelli are found in some of the moths, usually concealed beneath the hairy scales which cover the head, and are probably of no service as visual organs.

In their larval form, members of this order are popularly known as caterpillars, but the smooth species are often termed worms—which, by the way, like most popular names, is a misnomer—as cankerworms, apple-worms, cutworms, budworms, etc. They vary very much in size, form, and appearance, according to species. The body is usually

cylindrical, and is composed of twelve rings or segments, besides the head. The head is the most specialized part of the larva. It is usually covered by a horny plate, often divided down the middle into two equal parts. The jaws are broad and strong, serrated or toothed on the edges, with the under lip or labium well developed, while the maxillæ and palpi in most species are rudimentary. They differ very greatly from the mature insects; in fact, it may be said that they do not resemble them in any respect. In the larval form, caterpillars are vegetable feeders and are very destructive; their mouth parts are formed wholly for biting and chewing, while, in the perfect insect, these are entirely changed, and it lives by suction. The internal organs and all the external organs are changed in the process of transformation.

The first three segments behind the head are the thoracic segments, and these carry the jointed feet, which afterwards develop into the feet of the mature insect. These are known as the true legs. The remaining segments, usually nine in number, are known as the abdominal segments, and on these we find the false or prolegs, varying in number from two to five pairs. These are provided with a circle of minute hooks, in the place of feet, which enable the caterpillar to cling fast to the plants upon which it feeds. These prolegs disappear in the mature insect. Most caterpillars have sixteen legs, including the true and false legs. The loopers, or measuring-worms, however, have but ten, while the bag-worms have but six.

Suborder RHOPALOCERA. (Butterflies.)

While the moths are the most important branch of the Lepidoptera, greatly exceeding in number of families and species the butterflies, and are of much greater economic importance from either a beneficial or an injurious standpoint, yet the former are the more widely known and admired largely owing to the nocturnal habits of the greater part of the moths, and also to the fact that a very large portion of them are obscure in coloring, while nearly all the butterflies are attractive.

Butterflies are separated into five families, representatives of all of which are found in California. These are:

1. *Nymphalidæ*, the Brush-footed Butterflies.
2. *Lemoniidæ*, the Metal-marks.
3. *Lycanidæ*, the Blues, Coppers, and Hair-streaks.
4. *Papilionidæ*, the Swallow-tails, etc.
5. *Hesperiidæ*, the Skippers.

The family *Nymphalidæ* is distinguished from all other butterflies by the fact that in both sexes the first or prothoracic pair of legs is greatly dwarfed, useless for walking and carried folded up against the breast. On this account, members of this family are sometimes known as four-

footed butterflies. It is the largest of all the families, and has been divided into many subfamilies. It is generally composed of large or medium-sized insects, but there are some small species in it. Prominent in this family is the large Milkweed butterfly, or, as it is sometimes called, the Monarch (*Anosia plexippus*). This is a cosmopolitan



A



B

FIG. 59. A, *Anosia plexippus*, the "model"; B, *Basilarchia archippus*, the "mimic." Natural size.

insect, and is found nearly the world over. It is very common in California, and can often be seen on a summer day flying westward in large numbers. It is a large, red-brown insect, with the wing veins very broadly marked in black. The caterpillars, which are common on the milkweeds, are about an inch and a half in length, when fully grown, greenish in color, marked with black bars. It is pretty, even in its larval form, and the chrysalis is a most striking object, being marked with brilliant golden dots along the margin.

Family **Lemoniidæ**. Butterflies belonging to this family are mostly confined to the new world, and largely to the tropical sections. Its distinguishing features are that the males have but four walking feet,



FIG. 60. *Kallima inachis*. A, upper surface; B, with wings closed, showing resemblance to a leaf.

while the females have six, and the antennæ are longer than in the first-named family. They are usually small insects, but are very brightly colored.

The family **Lycænidæ** is a very large one of mostly small butterflies, and contains some of the most beautiful members of the order. Blue in various shades is a common color. In this family the males have four and the females six walking feet.

Family **Papilionidæ** (Swallow-tails). In this family both sexes have six feet, and in it we find some of the largest and most striking forms in our State. One of the most common and showy of this family in



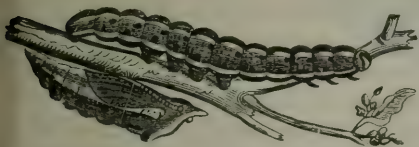
FIG. 61. Large white cabbage butterfly (*Pieris brassicae*).

our State is *Papilio turnus*, the large yellow swallow-tail, with a spread of wings over four inches. (See colored Plate I.) The ground color of its wings is bright yellow, crossed with broad dashes and streaks of black, with black border, inclosing crescent-shaped mark-

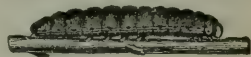
ings. Near the tips of the hinder wings are bright purple and yellow marks, which add to the beauty of this grand insect.

A second group of this family is the *Pierinæ*, which include the well-known cabbage-butterfly (*Pieris rapæ*). This is one of the worst pests

of all the butterfly tribe. It was imported from the Mediterranean region into Canada about the year 1868, and since that time has spread all over the American continent. It will be found in swarms over cabbage patches, alfalfa fields, and other sections, in which it finds its food plants, until the fields sometimes have the appearance of being in a snow storm. Its larva is the common green cabbage caterpillar. In

FIG. 62. Larva of *Pieris brassicæ*.FIG. 63. Small white cabbage butterfly (*Pieris rapæ*).

connection with the cabbage whites, we often find a bright yellow butterfly, known as the sulphur yellow. These belong to the genus *Colias* and are very common in alfalfa fields, as the larvæ feed upon clover. It is a green worm, very similar to the cabbage-worm, and so nearly the color of its food plant as to be difficult to find. In this State it feeds largely upon alfalfa, and while it does some damage to this crop, can not be regarded as a very serious pest.

FIG. 64. Larva of *Pieris rapæ*.

Family Hesperiidæ (Skippers). This family is of little economic importance to us. The genus *Megathymus* is said to have the habit, in its larval stage, of burrowing in the underground stems of the yucca, and, therefore, is somewhat of an anomaly among butterflies, as it is the only one which works beneath the surface. The family is interesting in the possession of certain characteristics which seem to connect the butterflies with the moths. Members of this family are small, with stout bodies, quick and powerful in flight, and have a peculiar jerky motion, from which their common name is derived. They have six well-defined feet in both sexes, and in their metamorphoses weave a light cocoon of a few silk threads, in this, as in many other respects, approximating the moths.

In North America alone there are over six hundred and fifty species of butterflies, but all belong to one or another of the families named.

Suborder **HETEROCERA.** (Moths.)

We now come to the second and more important division of the order Lepidoptera, the *Heterocera*, or moths. The species included under this division are far more numerous and of greater importance in every

way than are those classed as butterflies. Among the moths we find some of our most important insects from an economic standpoint; some few are also beneficial, as predaceous upon other pests; but by far the greater part of them are injurious to a greater or less degree, and some of them are among the most destructive, costly, and serious of all our insect enemies. The codling-moth, together with its destructive work, is well known to orchardists, and the bee-moth is a terror to the apiarist, methods to circumvent its destructive work racking the brains of our beemen. The Mediterranean flour-moth has, on many occasions, put large and costly flouring-mills out of business by so obstructing the machinery with its webs that it could not be operated. The clothes-moth and its destructive work are well known to every housekeeper, and so the list might be almost indefinitely extended.

As stated before, as most of these insects are nocturnal they are not so well known as the butterflies, which fly only in the light, but they are by far the more numerous, covering a wider range of families and species, and working their destructive operations in more diverse ways than the other members of the order.

The moths with which we are acquainted in the United States are divided into forty-three families, as follows:

- | | | |
|-------------------|---------------------|---------------------|
| 1. Sphingidæ. | 16. Bombycidæ. | 30. Ægeriidæ. |
| 2. Saturniidæ. | 17. Platypterygidæ. | 31. Pyralidæ. |
| 3. Ceratocampidæ. | 18. Geometridæ. | 32. Pterophoridæ. |
| 4. Syntomidæ. | 19. Epiplemidæ. | 33. Orneodidæ. |
| 5. Lithosiidæ. | 20. Nolidæ. | 34. Tortricidæ. |
| 6. Arctiidæ. | 21. Lacosomidæ. | 35. Yponomeutidæ. |
| 7. Agaristidæ. | 22. Psychidæ. | 36. Gelechiidæ. |
| 8. Noctuidæ. | 23. Cochliidiidæ. | 37. Xylorictidæ. |
| 9. Nycteolidæ. | 24. Megalopygidæ. | 38. Cœcophoridæ. |
| 10. Pericopidæ. | 25. Dalceridæ. | 39. Blastobasidæ. |
| 11. Dioptidæ. | 26. Epipyropidæ. | 40. Elachistidæ. |
| 12. Notodontidæ. | 27. Zygænidæ. | 41. Tineidæ. |
| 13. Thyatiridæ. | 28. Thyrididæ. | 42. Hepialidæ. |
| 14. Liparidæ. | 29. Cossidæ. | 43. Micropterygidæ. |
| 15. Lasiocampidæ. | | |

Family **Sphingidæ** (Hawk-moths). These moths fly at twilight, and are very noticeable because of their habit of hovering over flowers, from which they extract nectar by means of their extraordinary tongue, which is sometimes several times the length of the insect. Its larva is the large green worm often found on tomatoes, grapes, tobacco, etc. The caterpillars are peculiar in the possession of a sharp, curved horn on the last segment of the body, or in its place a hard eye-like spot. When at rest, some of them have the habit of elevating the

body and drawing back the head, giving them somewhat the resemblance of the Sphinx, from which they take their name. Some of the largest of the moths are found in this family, which includes many genera and species.



FIG. 65. White-lined Sphinx moth (*Dellephila lineata*). Natural size.

The family **Saturniidae** includes some of the largest and most beautiful of our moths, and the Emperor moth can be taken as a type of this family. The larva forms a cocoon of silk and the insect is sometimes called the wild silkworm. Species of this family are not uncommon in our State, although, being a nocturnal insect, it is not so commonly met with as some of the day-fliers, and when found is sometimes considered as rare by the finder. One of the most striking members of the family which is found here is the *Samia cecropia*. The larva of this moth is a very large caterpillar, and is generally found on the wild shrubbery, although it sometimes attacks fruit trees. Its favorite fruit plant is the Cascara sagrada, or wild coffee, of our foothills.

The family **Ceratocampidae** comprises moths of large or medium size which do not produce cocoons, but undergo their metamorphosis underground. They are short-bodied and hairy, and usually beautifully colored in tints.

The family **Syntomidae** is of little interest to us, as its members are more objects of curiosity to the professional entomologist than to the producer, being in no sense of economic importance. They are small to



FIG. 66. Caterpillar of white-lined Sphinx moth. Slightly enlarged.

medium sized insects, diurnal in their habits, and frequent flowers. Many of them strongly resemble wasps in their form and markings, and are sometimes mistaken by the uninformed for those insects.

The family **Lithosiidæ** consists of small or medium sized insects, which feed principally upon lichens. They pupate in silken cocoons, in which the hairs of the larva are mixed. They are not, as a rule, destructive to cultivated plants, and so can be dismissed from further consideration here.

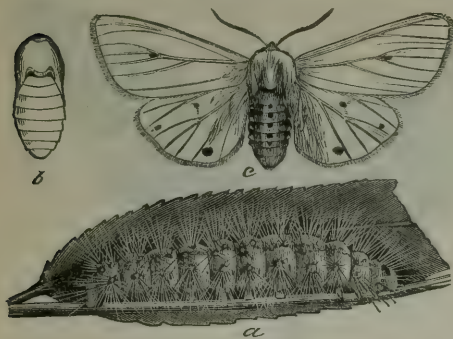


FIG. 67. Yellow bear (*Spilosoma virginica*). a, larva; b, pupa; c, moth.

The family **Arctiidæ** is a very large one, being represented by thirty-eight genera and over two thousand species, of which there are some hundred and twenty species in the United States. It in-

cludes the so-called woolly-bears and tiger-moths. They are stout-bodied moths with moderately broad wings and usually spotted or striped. Some of them are very highly colored and others are white. They are mostly nocturnal and are attracted to the light. Their larvæ are covered with long hairs, which grow in bunches, and they are very general feeders, being found on a wide range of vegetables. The Arctiidæ are represented in our State by the fall web-worm, although the family is a very numerous one with us.

The family **Agaristidæ** consists of day-flying moths, usually of moderate size, and it contains some of the most beautiful members of the insect world, although the most beautiful members of it are found in the tropics. In California the wood-nymphs are common, and are representative of this family here.

The family **Noctuidæ** includes a very large number of

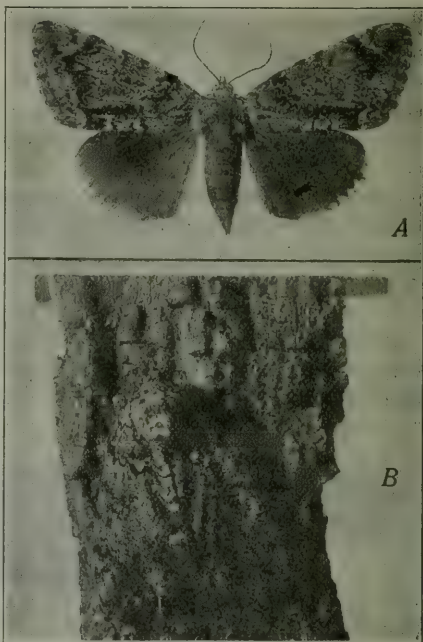


FIG. 68. *Catocala lacrymosa*. A, upper surface; B, with wings closed, and resting on bark. Reduced.

genera and species, there being hundreds of the former and thousands of the latter. The common name is owlet-moths, given them from their nocturnal habits, and their soft-downy appearance. In both respects they resemble owls. In their larval form they are injurious to vegetation, and are among the worst of our insect enemies in this order. The cutworms, which are so destructive to young plants, belong to this family. Many of the moths are dull colored, but, at the same time, the family gives us some of the most beautiful of insects. The catocalas, or underwings, also belong here. The members of this family have very distinct characteristics, by which they may be recognized, and the venation of the wings is especially very constant.

The family *Nycteolidæ* is a small one, resembling the *Noctuidæ* in many respects, and is represented in the United States by only two genera.

The family *Pericopidæ* somewhat resembles the wood-nymphs, but has a different wing venation. They are not common, and in our State are represented by *Gnophælia vermiculata*, a beautiful moth found in the foothill sections.

The family *Dioptidæ* is represented by only one species, and that a California one, the common live-oak moth (*Phryganidia californica*). This is the light-colored weak moth which appears in such great numbers on the live oaks and sometimes entirely defoliates them.

The family *Notodontidæ* includes a number of families of moths of moderate size, ranging up to two inches spread of wing. They strongly resemble the owlets, from which they differ principally in wing venation.

The *Thyatiridæ* are another family resembling the owlets, but which present sufficient difference to class it as a separate family.

The family *Liparidæ* is of interest to us, as it includes among its members the tussock-moth (*Hemerocampa vetusta*), which is very widely distributed and a very common pest in California. The females of this genus are wingless, or, at least, possess wings of a very rudimentary form. The female deposits her eggs on the cocoon from which she has emerged, and covers them with a frothy mass, after having performed which duty she dies. In spite of the common prejudice against caterpillars, it must be acknowledged that the caterpillar of the tussock-moth is a beautiful insect, with its bright yellow color, the coral red protuberances on the last dorsal segments, and the four creamy brush-like tufts on its back, with the two black plumes on the anterior, and one on the posterior section of the body. Altogether, as a caterpillar, it is remarkable for both form and coloring.

The gypsy-moth (of which we give a beautiful illustration in colored Plate XI), whose work of devastation in the Eastern and New Eng-

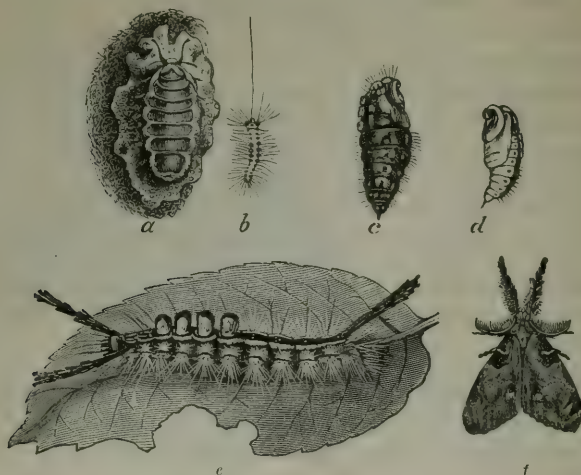


FIG. 69. Tussock-moth (*Hemerocampa retusta*). a, female moth on cocoon; b, young caterpillar; c, female pupa; d, male pupa; e, larva on leaf; f, male moth.

land States has attracted the attention of the whole country, belongs, also, to this family.

The family *Lasiocampidæ* is of interest to us principally from the fact that in it we find the tent-caterpillars. The most prominent members of this family are well known from their habit of forming a

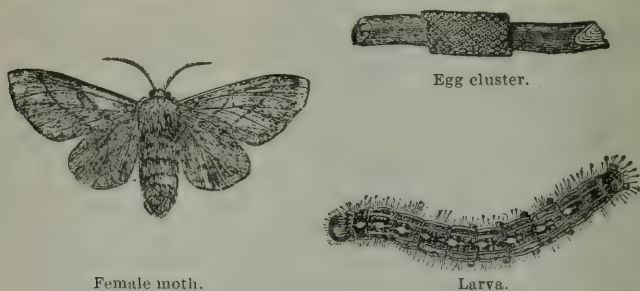


FIG. 70. Tent-caterpillar (*Clisiocampa sylvatica*).

covering or tent, in which they congregate, returning to it, as to a common home, after they have gorged themselves on the foliage of the trees which they infest. When they outgrow their tent, they form another. The orchard tent-caterpillar (*Clisiocampa americana*) is sometimes a very serious pest in our fruit orchards, especially apples,

sometimes entangling the whole tree with its webs. They live in communities, feed in droves, and are capable of doing great damage, unless checked.

The family **Bombycidae** includes the true silkworms. The true silkworm (*Bombyx mori*) appears to be an invention of man in the insect world. Its origin is unknown, none of its species existing in the wild state, and it has been so long under cultivation that it can not live unless cared for by man.

The family **Platypterygidæ** has a few representatives among us, but they are of no economic importance.

The family **Geometridæ** includes those caterpillars commonly known as loopers, inch-worms, measuring-worms, etc. They are all vegetable feeders and very destructive. In it we find the currant span-worm, the spring and fall cankerworms, and many others too well known to our fruit-growers. Over eight hundred species are known to exist in the United States

and Canada. The caterpillars lack all save one pair, or in some cases two pairs, of the prolegs found in other



FIG. 71. Fall cankerworm (*Alsophila pomctaria*). a, male moth; b, female moth; c, joints of antennæ of female, enlarged; d, segment of body of female, enlarged; e, larva.

caterpillars, and in moving are compelled to make the peculiar motions which give them their popular names. They first extend the body its full length, then bring the posterior end close up to the forelegs, looping the body in the middle, then stretch out the fore part of the body again, and continue these motions until they reach their desired destination. The moths have slender bodies, small heads, and very broad, thin wings. In many species the females are wingless, as in the cankerworms.

The family **Epiplemidæ** is a small one, closely related to the Geometers, but of little importance to us.

The family **Nolidæ** is another small one of rather small moths, which are of little interest except to the systematic entomologist.

The family **Lacosomidæ** is a small one, and consists of moths peculiar to the western hemisphere. It is thus described by Holland: "While the perfect insects show structural resemblances to the Platypterygidæ, the caterpillars, which have the habit of constructing for themselves portable cases out of leaves, which they drag about with

them, resemble in some respects the Psychidæ. The young larva of *Cicinnus melsheimeri*, immediately after hatching, draws together two small leaves with strands of silk, and makes between them its hiding-place. Afterwards, when more mature, it detaches two pieces of leaves, and makes out of them a case which it carries about with it, and which it can desert at will. When at rest it ties the case to a station selected with a few strands of silk, which it bites off when it desires again to start on a journey among the branches. The larva of *Lacosoma* makes a case by doubling a leaf at the midrib, cutting it off at the petiole, and taking it with it as a portable house. There are only two genera of this family in our fauna. It is more abundantly represented in the tropics of South America."

The family **Psychidæ** is of more interest to us, however, as in it we find the bag-worms, or basket-worms, so called from the curious habit the larvæ have of making for themselves a case, or basket, or shelter, composed of pieces of leaves, grass, or fragments of wood or other vegetable substances. These fragments are carefully joined together and lined with silk, spun by the insect. In this case the caterpillar lives securely, and carries it along wherever it goes, much as the snail does its shell. It does not do much damage in our State, as it confines itself to conifers and is not very common. When the bag-worm has attained its full growth, it attaches the bag to a twig and changes to a pupa within it. The male emerges a full-winged insect, but the female is wingless and never leaves the sack, laying the eggs for a new generation within the house she has inhabited during her life.

The family **Cochlidiidæ** consists of slug-like caterpillars, and contains a number of interesting, modest green or brown moths. They are usually of small size and very densely clothed with scales or hair. The larvæ resemble slugs in their general form, being usually oblong in shape and flattened. They have no visible legs and move like slugs. Some of these larvæ have stinging powers, and can inflict a sharp, burning sting when carelessly handled.

The family **Megalopygidæ**, or flannel moths, is a small family of whitish moths, having their wings densely clothed with long, curly hairs resembling bits of flannel. Their larvæ have ten pairs of legs—three pairs of true legs and seven pairs of prolegs—a larger number than in any other family of lepidopterous larvæ. The cocoons have a trap door, through which the moth escapes after it has passed its metamorphosis.

The family **Dalceridæ** is a small one, of no interest to the fruit-grower.

The family **Epipyropidæ** is of interest to us from the fact that it is a family of parasitic moths. Among all the vegetable pests of this order,

it is so pleasant to find one that does something toward redeeming its reputation by being of some service in checking pests.

Of the family *Zygænidæ* but few species occur in the United States, and none are destructive to fruit trees.

The family *Chalcosiidæ* is represented by but a single insect, an obscure moth known as *Gingla laterculæ*, found in Arizona.

The family *Thyrididæ* is a small one, and consists of small moths characterized by the presence of small white or yellowish translucent spots on the wings.

The family *Cossidæ* is of more interest to us, for in this we find some of the most destructive of the moth family. To this belong the goat-moths or carpenter-moths, as they are popularly known. In their larval stages they live in the roots and trunks of trees and sometimes do great damage to the tree which they infest. In some cases, in the East, orchard trees have been killed in great numbers by the ravages of these moths. They are said to remain in their larval stage for three years, before they have attained their growth. They pass their transformation in the burrows which they have eaten out in the wood, and when ready for the change the larva forces itself partly out from the burrow. When the moth has emerged, the empty pupa skin can be seen protruding from the burrow. The species most common in California is *Prionoxystus robiiæ*. It is a large gray moth, much resembling the sphinx-moth in general appearance, and flies by night. They are destructive to elms, locusts, and forest trees, but have not as yet been reported as doing damage to fruit trees in our State.

In the family *Ægeriidæ* we have the clear-winged moths—a family utterly unlike any other branch of the Lepidoptera, and many of the members more resembling wasps than moths. They are of small size, with slender bodies, and fly only by day and frequently in the brightest light. They are all borers, and among them are some of our most destructive pests, the Western peach-root borer (*Sanninoidea opal-escens*), the Eastern peach-root borer (*S. exitiosa*), the currant borer (*Alcathoe caudatum*), and many others, being representative of the family. Many of the matured insects are very beautiful, and most of them are remarkable on account of their protective mimicry, resembling, as they do, insects of different orders, especially bees, wasps, and flies. This strong resemblance to stinging insects often protects members of this family from danger to which their day-flying habits would otherwise expose them. Yet, in spite of their threats of danger, which are carried out in their acts as well as in their coloring, they are harmless, and it is all a mere bluff on their part to frighten their enemies.

The worst representative of this family which we have in this State is the peach-root borer (*Sanninoidea opalescens*). The following description of the different stages of this insect will aid those who are troubled with this pest in detecting it:

Egg.—The egg is very minute, not exceeding $\frac{1}{4}$ mm. in length, oval, light brown in color, and, when seen through a lens, ornamented with hexagonal sculpturing. The eggs are deposited on the bark of the tree, at or near the surface of the ground; rarely they are laid high up on the trunk or even in the crotches of the trees. This last phase is generally found in the grafted trees, where gummy exudations have occurred and where grafting has somewhat soured the sap.

Larva.—The young larvæ, on hatching, are very active and immediately burrow into the tree, generally entering the cracks in the bark



FIG. 72. Peach-root borer (*Sanninoidea opalescens*).

at or below the surface of the ground. Here they remain constantly feeding on the bark, at first near the surface, surrounding themselves with gum, or coagulated sap, and gradually enter the sapwood, enlarging their burrows as they increase in size. The full-grown larva is pale yellow, about one inch long, tapering with a brown head. After attaining its growth, the borer ascends in the burrow to or above the surface of the ground, as the case may be, and begins to spin a cocoon.

Cocoon.—This is made up of a silken web mixed with castings and earth glued together, and is of a brown color, from $1\frac{1}{4}$ to $1\frac{1}{2}$ inches long.

Pupa.—The pupa within the cocoon is shiny, light brown, with numerous spines on the abdomen. When about to emerge the pupa is pushed out of the cocoon, and soon the adult moth emerges.

Moth.—To the novice this insect would appear more like a blue wasp than a moth. The female differs so much from the male that they might be taken for two distinct species. The female has bluish-black, opaque front wings, while the hind wings are transparent, like those of a wasp; the margin of both wings has a bluish-black fringe; antennæ, head, thorax, and abdomen are very dark steel blue, almost black; wing expanse, $1\frac{1}{2}$ inches. The male has fore wings nearly transparent, with upper margin and tips black; hind wings are transparent, like those of female; the body is bluish black; the abdomen is much narrower than that of female and more elongated; legs are black, with yellow tufts on femur and tibia; wing expanse, $1\frac{1}{4}$ inches.

The family **Pyralidæ** includes moths generally of small size, some so small in fact as to be classed as micro-lepidoptera. It has been divided into a great number of subfamilies, genera, and species, so that it would be impossible in a limited space even to mention them all. It contains, however, a number of species injurious to plants, among them the leaf-crumplers, leaf-rollers, case-bearers, and several fruit-worms.

In the family **Pyralidæ**, and subfamily **Galleriinae**, we find that pest of the bee men, the bee-moth (*Galleria mellonella*). This pest is described by Prof. C. V. Riley as follows: "During the daytime these moths remain quietly ensconced in some angle of the hive, but as night approaches they become active, and the female uses her best endeavors to get into the hive, her object being to deposit her eggs in as favorable a place as possible. Wire gauze contrivances are of no avail to keep her out, as she frequently commences flying before all the bees have ceased their work. But even if she were entirely prevented from entering the hive, she could yet deposit her eggs on the outside, or, by means of her extensive ovipositor, thrust them in between the slightest joint or crack, and the young worms hatching from them would readily make their way into the hive. The moment the worm is hatched, it commences spinning a silken tube for its protection, and this tube is enlarged as it increases in size. The worm cuts its channels right through the comb, feeding on the wax, and destroying the young bees on its way. When full-grown, it creeps into a corner of the hive, or under some ledge at the bottom, and forms a tough, white cocoon of silk mingled with its own black excrement. In due time the moth emerges from this cocoon. A worm-infested hive may generally be known by the discouraged aspect which the bees present, and by the bottom board being covered with pieces of bee-bread mixed with the black, gunpowder-like excrement of the worm. * * * If a hive is very badly infested with the worms, it is better to drive out the bees and secure what honey and wax there may be left than to preserve it as a moth breeder to infest the apiary. If put into a new hive, the bees may do something; and if they do not, there is no loss, as they would have perished, finally, from the ravages of the worm."

The family **Pterophoridæ** includes those graceful, elegant little moths commonly known as plume-moths, from the fact that their wings are divided in such a manner as to suggest feathers. Sixty species are known in the United States. They are vegetable feeders, but do little damage to fruit.

The family **Tortricidæ** is so named from its habit of rolling up the leaves of plants upon which the insects feed, and on this account they have received the common name of "leaf-rollers." It must be remembered, however, that not all leaf-rollers belong to this family, nor are

all of its members leaf-rollers. The family includes a number of sub-families, genera, and species. Many of them live in plants or burrow



FIG. 73. Codling-moth (*Carpocapsa pomonella*), showing variations. All natural size.

into fruits or the stems of plants, and in this family we find that most destructive of all fruit pests, the codling-moth (*Carpocapsa pomonella*). This one pest causes a loss to the fruit-growers of America running into tens of millions of dollars annually. While the other members of this family

are hurtful to plants, none of them, nor all together, have attained the unenviable prominence of the codling-moth.

The family **Yponomeutidæ** is of moderate size, containing about sixty species in the United States. It is of little economic value.

The family **Gelechiidæ** consists of small moths, many if not most of them being injurious to vegetation. One of these, an introduced species, by the way, is the potato-moth, which is becoming a very severe pest in this State. In this family, too, is found the destructive peach-twig borer (*Anarsia lineatella*). This pest, like all our worst insects, was probably introduced into California from Japan, of which country it seems to be a native.

The families **Xylorietidæ**, **Ecophoridæ**, **Blastobasidæ** and **Elachistidæ** are generally small families of small insects. Their different peculiarities have caused them to be assigned to separate families, but, except to the systematic entomologist, they are of little interest.

In the family **Tineidæ**, however, we have some members which are of direct interest to us. This is a very large family, generally of small moths, although some of them attain moderate size. These insects have narrow wings bordered with a fringe, and some of them, although exceedingly small, are very beautiful. Some of the members of this family are so minute that they attain their full growth and undergo their metamorphosis within the tissue of the leaves in which they live. Some of them, when they appear in great numbers, are very destructive. When it is considered that the leaves of trees are often no thicker than a sheet of paper, and that they consist of an upper and a lower surface,

or skin, and that on the fleshy part of the leaves, between these two layers, these insects feed and live and pass through all their changes, it will be understood how minute they, or some of them, are. It is in this family, too, that we find that greatest of all pests to the careful housewife, the clothes-moth (*Tineola bisselliella*). This is not the only culprit, however, for while to the disgusted housewife, who finds her woollens eaten full of holes, there is but one clothes-moth, the entomologist recognizes several species, all guilty of like destruction. Among these are the case-bearing clothes-moth (*T. pellionella*), the tube-building clothes-moth (*T. tapetzella*), and the naked clothes-moth (*T. bisselliella*), mentioned above.



FIG. 74. Cigar case-bearer (*Coleophora fletcherelli*).

The family **Hepialidæ** is a small one, composed of large or moderate sized moths. Its members are not sufficiently numerous to be of importance economically.

The **Micropterygidæ**. The last family of this branch of the order Lepidoptera is one of little importance to our readers. This family is remarkable only for the reason that it reveals certain anatomical features which are thought to point out an early connection between this and other orders.

Order DIPTERA.

(Two-winged Flies.)

Like that of the other orders of insects, the name of this order is composed of two Greek words, *dis*, two, and *pteron*, wing. As before stated, the wing peculiarities have been taken by entomologists to divide the orders of insects, and in this order most of the members have but two wings, while in all others, as a rule, there are four wings present. But even to this rule there are exceptions, as we have shown, for in most of the orders some of the members are wingless, while in some, as in the male of scale insects, there are two-winged insects. But the rule works in the Diptera to this extent, that most of its members have two wings and no more. There is in them what appears to be the rudiments of another pair, in a pair of little knobbed hooks, known as halteres, which occupy the place of hinder wings in the members of other orders. These halteres are present even in those few species in which the fore wings are entirely absent.

As with the word "bug," so with the word "fly"; it is wrongly used. To the average person, either of these terms may mean almost any kind of an insect, the latter, of course, being applied to insects with wings

which are not butterflies or moths. The name "fly," however, is only properly applied to members of the order Diptera.

Considering the number of individuals and the number of species, flies very greatly exceed any other order. They are common everywhere, in the houses, fields, swamps, and plains. Their members swarm in every place ever penetrated by man. Within this order are some of the most serious pests with which we are troubled, and they attack alike our animal and vegetable products, and man himself suffers more from them than from any other of the orders. We can escape in some manner our insect enemies in the other orders, but not always the Dipterons.

In this order we have the mosquito family, some members of which spread disease and death in the germs of yellow fever and malaria. It may be safely asserted that this family alone is the source of greater suffering, hardship, and even death to mankind than any other one cause. This order, too, furnishes the dreaded fruit-flies, one of the most destructive pests with which the fruit-grower has to cope, and which fortunately has not yet obtained a foothold in California. The disreputable botfly; the sheep-tick, a wingless form; the Hessian-fly, which causes a loss to the farmers of the United States of \$100,000,000 annually; the ox warble fly, which causes a loss as high as \$40,000,000 on hides, and others too numerous to mention, but most injurious to a greater or less extent, all belong to this order of two-winged flies. At the same time, there are many of its members which are friendly to man and which give us some of our most valuable beneficial insects. Among these are the Tachnid flies, one of which is the principal check on the locusts, and without whose work California would suffer severely every season from the locust pest. The Syrphus flies are another of our friendly families which feed upon the aphids and serve largely to keep them down.

As indicating the vast numbers of this order, it may be stated that there are already over 40,000 described species, and it is estimated that this number would be increased to 350,000 if all the species were known.

All the members of this order are suctorial insects, and their mouth parts are formed to this end. The methods of different species in procuring their food, however, differ widely. Some simply absorb fluids, or reduce their food to a fluid state, in order to absorb it, as with the house-fly; others are provided with a piercing beak, with which they are enabled to drill a hole into their victim and suck his blood, as with the mosquito. Some absorb the juices of vegetables, others of animals, and others again have no choice but to take whatever comes handiest.

The larvæ of flies are known as maggots. They are usually footless grubs, and pass through a perfect transformation. In some cases the eggs hatch within the body of the female, and the young maggots are

produced alive, and, in other cases even, the female gives birth to the young in the pupa form. As a rule, however, there are the usual well-defined periods of the insect life. With many of the flies, as in the case of meat-flies, the eggs hatch very soon after deposition, and the insect passes through all its changes in a very short time. In this we see a wise provision of nature, which arranges that the fly shall pass through its young stage and reach perfection while its food is available. If it were to remain long in its larval stage, its food supply would putrefy, and dry up before the insect matured, and the young fly would die of starvation.

Flies are adapted to various conditions, and breed under all circumstances. Some are aquatic, as the mosquitoes; some subterranean, as the crane-flies. Many breed in dirt and filth, and some swarm in cesspools, as the rat-tailed larvæ—the young of a *Syrphus* fly—and we have seen masses of maggots crawling in the crude oil running from the wells, and apparently well satisfied with conditions which would have knocked out any other form of insect life.

One of the most terrible of the dipterous pests is the so-called screw-worm (*Comptosmyia macellaria*). This is a common species throughout a large portion of our country, and ordinarily feeds upon dead or decaying vegetable matter. Under some circumstances, however, it attacks living animals, and in the Southern and Southwestern states occasionally becomes a terrible pest. On such occasions it lays its eggs on man or animals wherever there is the slightest trace of a wound, bruise, or offensive discharge of any kind. The larvæ bore directly into the living flesh, causing intense pain as well as suppurating sores. Living larvæ are produced, as well as eggs almost ready to hatch, and in any opening from which there is a discharge of any kind eggs may be deposited. Sleeping humans with an offensive breath, or with a fetid discharge from the nostrils or mouth, have had eggs laid at these points, and larvæ have made their way into the head in some cases, causing the death of the individual. Eggs have also been laid in the ears of uncleanly people, and the channels and passages of these organs have been penetrated into the head and destroyed. Animals are troubled in the same way, and where the insects are abundant their attacks often become fatal. The following, which appeared in a San Bernardino paper several years ago, gives a very vivid account of the work of this dreaded insect: "George Madden, a Western Union Telegraph lineman, was brought to the county hospital from the desert afflicted with a most loathsome complaint, actually being eaten up alive by thousands of minute worms which have hatched from the eggs laid in his nostrils while he was asleep. A description of his condition is too revolting to be printable. Madden states that three weeks ago he was employed by the telegraph company at Los Angeles and was

sent to the Arizona desert. At night he was considerably pestered by gnats, but had no idea of the terrible danger to which he had been exposed until a week later, when he was seized with dizziness. He was taken to Needles, where it was discovered that the gnats had deposited eggs in his nostrils and that they were hatching. The poor fellow was brought here, where everything possible is being done to allay his sufferings, but no hope is entertained for his recovery. This is the second case of the kind treated here."

The Diptera are divided into two suborders, the Orthorrhapha, in which the insects make their escape from the pupa case either through a T-shaped slit near the head, or in fewer species through a crosswise slit between the seventh and eighth abdominal segments. The second suborder is the Cyclorrhapha, in which the insect, after passing its metamorphosis, escapes from the pupa case through an opening made at the head part of it. These two suborders are divided into families, according to Comstock's classification, which we have adopted, as follows:

Suborder **ORTHORRHAPHA.**

1. Psychodidæ, the Moth-like flies.
2. Tipulidæ, the Crane-flies.
3. Blepharoceridæ, the Net-winged Midges.
4. Dixidæ, the Dixa-midges.
5. Culicidæ, the Mosquitoes.
6. Chironomidæ, the Midges.
7. Mycetophilidæ, the Fungus-gnats.
8. Cecidomyiidæ, the Gall-gnats.
9. Rhyphidæ, the False Crane-flies.
10. Orphnephilidæ, the Solitary-midge.
11. Bibionidæ, the March-flies.
12. Simuliidæ, the Black-flies.
13. Tabanidæ, the Horse-flies.
14. Stratiomyiidæ, the Soldier-flies.
15. Leptidæ, the Snipe-flies (in part).
16. Acroceridæ, the Small-headed flies.
17. Nemestrinidæ, the Tangle-veined flies.
18. Asilidæ, the Robber-flies.
19. Midaidæ, the Midas-flies.
20. Apioceridæ, the Apiocerids.
21. Bombylidæ, the Bee-flies.
22. Therevidæ, the Stiletto-flies.
23. Scenopinidæ, the Window-flies.
24. Empididæ, the Dance-flies.
25. Dolichopodiæ, the Long-legged flies.
26. Lonchopteridæ, the Spear-winged flies.

Few of the families of this suborder are of interest to us from an economic viewpoint, as most of those mentioned have no direct bearing upon our welfare; they may, therefore, be dismissed with a bare mention. Some, however, are of more importance, as among them we find some of our most beneficial insects, our friends, as well as some that are very destructive, or, at least, very injurious to us.

The family **Psychodidæ** consists of small flies very much resembling moths in appearance, and are often found on the under side of leaves.

The family **Tipulidæ** includes the crane-flies, sometimes popularly called daddy-long-legs. The larvæ of these flies live in the ground and are very tough and wiry, resembling wireworms in this respect. They live on grass and grain roots and may become very destructive. Sometimes they are so numerous as to kill out lawns in which they have become established. There are a large number of species, ranging in size from a gigantic insect, an inch and a half in length, with a spread of leg several inches in diameter, to some not larger than mosquitoes, which they greatly resemble in general structure. This family is representative, so far as the structure is concerned, of a large group, the *Midges*, which resemble them. In these the bodies are long and tapering, the legs generally very long and usually widely spread, so that the insect has the appearance of walking on stilts.

The family **Blepharoceridæ**, the net-winged midges, includes several families of aquatic insects, somewhat resembling mosquitoes in form, but different from them in wing venation. They breed in swiftly running water, and in some species there are two forms of females, one of which is blood-sucking, while the other lives by sipping nectar.

The family **Dixidæ** is another family of midges also resembling mosquitoes, and differing from the former family in wing venation.

The family **Culicidæ** is one altogether too well known, as it is in this that we find the whole abominable race of mosquitoes. This is not a very large family, although it is perhaps one of the worst enemies with which the animal world, including man himself, has to contend. Members of this family are found the world over. In some sections of the tropics they are so bad as to render the places infested by them uninhabitable, and miners



FIG. 75. Adult female of *Culex pipiens*, enlarged. (Miss. Agr. Exp. Station.)



FIG. 76. Female of *Anopheles punctipennis*, enlarged. (Miss. Agr. Exp. Station.)

in far northern Alaska report them as the severest plague of that section. Explorers have not yet penetrated sufficiently far to the north or south to escape the mosquito. Every one dreads this pest. Their droning sound in the still hours of the night always brings with it a feeling of irritation and dread, and the poisonous

wounds inflicted by them are well known to everybody. It has now been definitely proven that the bite of the common mosquito, *Culex irritans*, with all its pain and irritation, is the lesser evil inflicted by the members of this family, for there is now no doubt that they are active agents in the spread of malaria and yellow fever, and perhaps of other malignant contagious diseases. To the non-entomologist a mosquito is a mosquito, but to the entomologist there are numerous species included under this title, all of varying degrees of badness, ranging from bad to

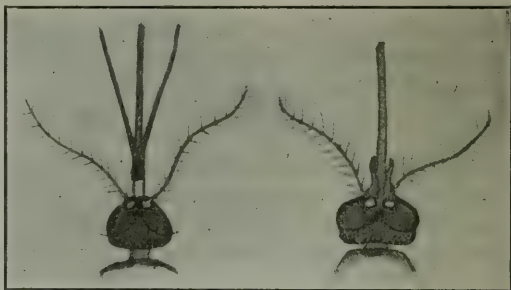


FIG. 77. At left, head of male *Culex*; at right, head of female *Culex*, enlarged. (Miss. Agr. Exp. Station.)

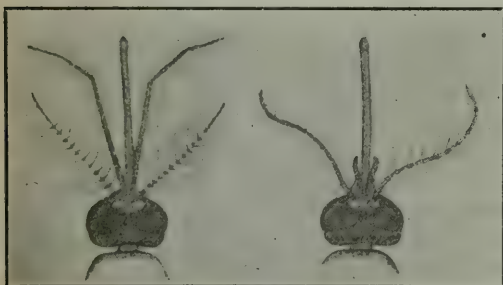


FIG. 78. At left, head of *Anopheles*, showing appendages; at right, head of *Culex*, showing appendages. Enlarged. (Miss. Agr. Exp. Station.)

worse and worst, the plagued *pipens*, which annoy us so, not being among the worst. The malaria-spreading mosquito is known as *Anopheles maculipennis*, while that to which we owe the dissemination of yellow fever goes by the name of *Stegomyia fasciata*. It would seem that the

blood-sucking propensity of the mosquito family is an acquired taste, for while all that can, absorb our blood with that of other warm-blooded animals, they breed in countless billions in swamps and marshes, far from any warm-blooded animals, and there they live and die without tasting blood.

The mosquito breeds in water, and the so-called wigglers found in stagnant pools are the young form or larvæ. While aquatic in their mode of life, these larvæ are air-breathing, and have to come to the surface for a supply of air. For this reason they frequently come to the top, stick out their breathing apparatus, which is a sort of tail-like tuft, and after absorbing the supply of air, disappear in the depths of their breeding-pool again. It is for the reason that the larvæ are compelled to come to the surface to breathe that pouring coal oil over stagnant pools will keep them down and is the most effective remedy for this evil.

The family **Chironomidæ** are the true midges, small mosquito-like insects. They differ from the former family in their wing markings and habits, not being addicted to blood sucking. Sometimes they are so numerous as to be annoying, but otherwise they are neither good nor bad.

The family **Mycetophilidæ** consists of small to medium insects, generally resembling the mosquito in structure. The larvæ live upon fungi and decaying vegetable matter.

The family **Cecidomyiidæ**, the gall-gnats, are small insects, including the smallest of this order. Their common name indicates their habits. Many of them are very serious pests to the farmer, for in this family are many which attack crops, as the clover-leaf midge and the wheat midge, both of which do great damage to crops, and here we have that worst of all grain pests, the Hessian-fly. It is impossible to accurately estimate the amount of damage actually inflicted upon our farmers annually by this pest, but it runs into the hundreds of millions. Fortunately the wheat-growers of California have not been troubled much by this insect, due, probably, to the habit of burning over old stubble in the fields, by which means the eggs are destroyed.

The **Rhyphidæ**, the false crane-flies; the **Orphnephilidæ**, the solitary-midges; the **Bibionidæ**, the March-flies; and the **Simuliidæ**, the black-flies, are all families of little importance except to the entomologist.

The family **Tabanidæ** includes the horse-flies. These are well known and are one of the worst pests of our domestic animals during the summer season, when they sometimes attack horses in swarms and cause them much trouble. These insects have such sharp mandibles

that they can pierce the skin as soon as they alight, and man himself often suffers from their attacks. In their larval, as well as in their mature, form, these insects are carnivorous.

The family **Stratiomyidæ**, or soldier-flies, is so named from the bright-colored stripes borne by some members. These flies are common in the vicinity of swamps, and are both carnivorous and vegetarian.

The family **Leptidæ** embraces the snipe-flies, so called from the fancied resemblance to those birds, due to a lengthened abdomen. The members of this family are predaceous, and frequent low shrubbery and grass. The larvæ live in the earth, decaying wood, and sometimes in water, and in this form they are always predaceous.

The family **Acroceridæ** are the small-headed flies, peculiar-looking insects, in which the head is disproportionately small in comparison with their bodies.

The family **Nemistrinidæ** are medium-sized insects, some of them resembling horse-flies.

The family **Asilidæ** includes the robber-flies, of which there are so many species, and all are predaceous, preying upon other insects. They live largely upon moths, and in their larval form prey upon the larvæ of beetles. They are not at all discriminating in their choice of food, however, and attack many insects. They are mostly large flies, some species being an inch or more in length. Usually they are long, with a sharp, tapering abdomen, although some species are short and stout and somewhat resemble a bumblebee in form. From their predaceous habits and their voracious appetites, they may be classed as beneficial insects.

The **Midaidæ**, the midas-flies, which resemble the robber-flies somewhat in appearance; the **Bombylidæ**, the bee-flies, in which family there are many which strongly resemble bees in color and markings; the **Therevidæ**, or stiletto-flies, are all families of little importance except to the professional entomologist.

The **Scenopinidæ**, or window-flies, are so called from their habit of congregating in the windows. They are small insects with a long, slender body, much sharper than the common house-fly, and in the larval form are sometimes found under carpets and in decaying wood.

The last family in this suborder is the **Lonchopteridæ**, or spear-winged flies, and one of little interest to us.

Suborder **CYCLORRHAPHA.**

The second suborder into which the Diptera are divided is the *Cyclorhapha*, which includes all those flies which make their escape from the pupa case, or larval skin, by a round opening formed in the top by the imago pushing out its head, the first suborder which we have been considering escaping through a slit made in the back.

1. Syrphidæ, the Syrphus-flies.
2. Pipunculidæ, the Big-eyed flies.
3. Platypezidæ, the Flat-footed flies.
4. Phoridæ, the Humpbacked flies.
5. Conopidæ, the Thick-head flies.
6. Estridæ, the Botflies.
7. Muscidæ, the Muscids.
8. Hippoboscidæ, the Louse-flies.
9. Nycteribiidæ, the Bat-ticks.
10. Braulidæ, the Bee-louse.

The family first to be considered here is the **Syrphidæ**, in which we find several beneficial species. This is a very large family and includes over 700 species so far named and described. They are moderate-sized insects and are great mimics, many of them strongly resembling bees, wasps, and other insects. In fact, the *Eristalis tenax*, or drone-fly, so strongly resembles the honey-bee that it is frequently mistaken for it, the principal difference being in the fact that it is a dipterous insect, while the bee has four wings. Another difference is that this insect has no sting, although its strong resemblance to the honey-bee admonishes the ignorant to avoid it. The larva of this fly lives in cess-pools and decomposing filth of any kind. It is provided with a long breathing tube, which is a continuation of the abdomen, and it is commonly known from this appendage as the "Rat-tailed larva."

A common member of this family is a black and yellow banded insect, much resembling a yellowjacket, which may be seen hovering motionless in the air over flowers on a summer day, making a sudden dart occasionally in one or another direction. The larva of this is predaceous on aphids, and is one of the many beneficial insects to which we owe so much.

The larvæ of the different species of Syrphus-flies have various feeding habits; some, as stated above, are predaceous on aphids; some feed on decaying animal and vegetable matter; some are found in the nests of ants, and others in the nests of bumblebees and wasps.

The **Pipunculidæ**, or big-eyed flies, are remarkable mainly for the disproportionate size of their eyes, which seem to swell the head beyond the size of the body. They frequent plants and are parasitic on bugs.

The **Phoridæ**, or humpbacked flies, is a family of small insects, the larvæ of which are parasitic.

The **Conopidæ** is a family of large-headed flies, any of which in their mature form resemble wasps in general appearance, having the abdomen elongated and connected with the thorax by a slender pedicel. They are common among flowers, and their larvæ are parasitic on bumblebees and wasps.

The family **Æstridæ** consists of the botflies. The members of this family are medium to large in size, of heavy build, resembling bees in general structure, and the family contains some of the worst pests which our four-footed animals have to struggle against. In this family is found the botfly of the horse, the warble of the ox, the sheep gadfly,

and their kindred, which, in their larval stage, live upon the intestines or muscles of quadrupeds.

The reproduction of these insects is one of the freaks of nature, and is accomplished in the most roundabout manner. The female of the horse botfly lays her eggs on the legs or other handy portions of the



FIG. 79. Horse botfly (*Estrus equi*). a, female; b, male. Both enlarged.

horse, and so well does the animal know his enemy that horses will run in terror from them. The eggs are small yellowish bodies, furnished with hooks, by which they are attached to the hairs of the horse, usually the lower portion of the legs. It is wonderful, too, with what rapidity a fly will attach her eggs to the selected spot. We have watched them in action, and seen them dart at the spot and away again, not even resting, but in the short contact an egg was securely placed. The eggs are taken into the mouth of the horse, which licks itself, and the moisture and warmth cause them to hatch at once. The irritation occasioned by them causes the animal to swallow them and then they attach themselves to the coating of the stomach, where they remain until they have attained their larval growth, which requires eight or ten months. They are then passed, and fall to the ground, going through their pupa stage underground.

The ox warble is also taken into the stomach of the animal, but works its way between the muscles until it reaches the back, where, just beneath the skin, it grows rapidly until it has reached its full larval growth, when it enlarges an air hole, which it had already made in the skin, and passes out, dropping to the ground and going through its transformation underground.

The family **Muscidæ** is the largest of the whole order, including about one third of all the species of Diptera known. The common house-fly belongs to this family. Comstock separates this family into two divisions, the *Calyptrate Muscidæ* and the *Acalyptrate Muscidæ*, and under each of these divisions there are several subfamilies.

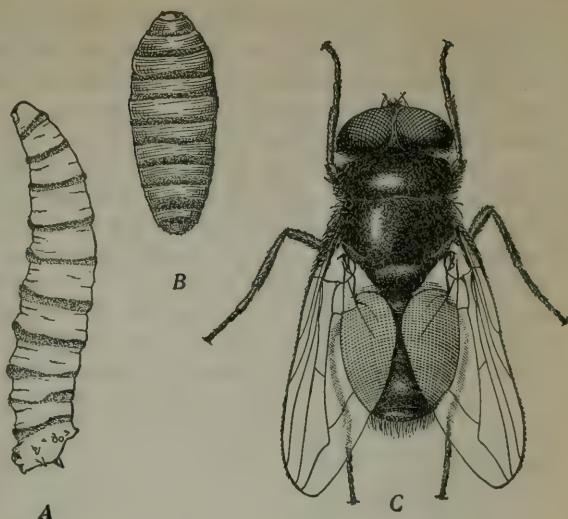


FIG. 80. *Formia regina*. A, larva; B, puparium; C, imago.

The subfamily **Tachininae** is one of the most beneficial of the order Diptera. The subfamily includes a number of species, several of which are found in California. In their larval form they are parasitic, and

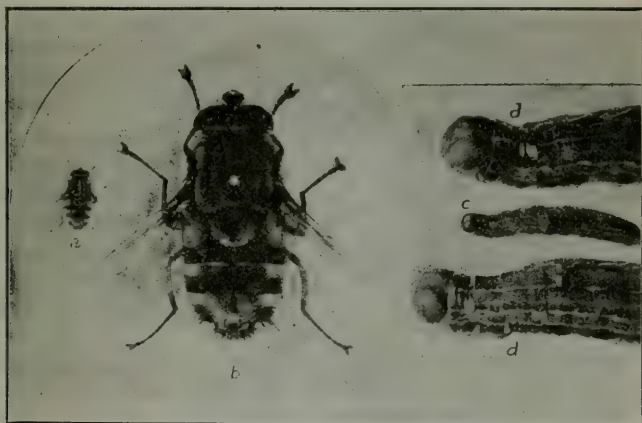


FIG. 81. Red-tailed tachina fly (*Winthemia l-pustulata*), a parasite of the armyworm. a, fly, natural size; b, fly, enlarged; c, armyworm, natural size, upon which eggs have been laid; d, parasitized armyworms, enlarged. (After Slingerland.)

lay their eggs upon the larvæ of other insects, largely on caterpillars, upon which the female fly lays her eggs. These eggs soon hatch out small footless grubs, or maggots, which at once proceed to bore their way

into the body of their host, where they remain until they have attained their growth. We have often been disappointed when, after caring for a choice specimen of caterpillar, until it passed into the chrysalis state, and were watching anxiously for it to come out, to have a small handful of Tachnid flies reward us for our pains.

In California one species of Tachinidæ is a most effective check upon the locust pest. This is the *Masicera pachytyli* Sk., and where there is a flight of grasshoppers these flies will be found in countless numbers, and the grasshopper which escapes them is rare. It is the natural enemy of the grasshopper, feeding most voraciously on the adipose tissues of its victim, but avoiding the vital parts. It feeds in the thorax and abdomen, and frequently three or four may be found in a single grasshopper. A grasshopper infested by these maggots soon shows signs of feebleness, ceases feeding, and dies in a short time, the maggots escaping often before the death of the host insect. The maggots, after extricating themselves from the grasshopper, enter the ground to pupate, and emerge in five or six days as perfect flies.

There is no more effective check upon cutworms and other lepidopterous pests than the *Tachina* flies.

The subfamilies *Sarcophaginæ*, the flesh-flies, and *Dexiinæ*, the nimble-flies, are of less importance to us.

The subfamily *Museinæ*, however, embracing the house-flies, and other species equally obnoxious, forces itself more upon our consideration.

The house-fly (*Musca domestica*) is known by every one the world over. It is a highly sociable insect, and clings to mankind with a tenacity more to be repudiated than admired. Its breeding places are around stables, and a female will lay from 120 to 160 eggs. The larvæ attain their growth in from five to seven days, pass through their changes in another five to seven, and then make a line for our houses. Keep-

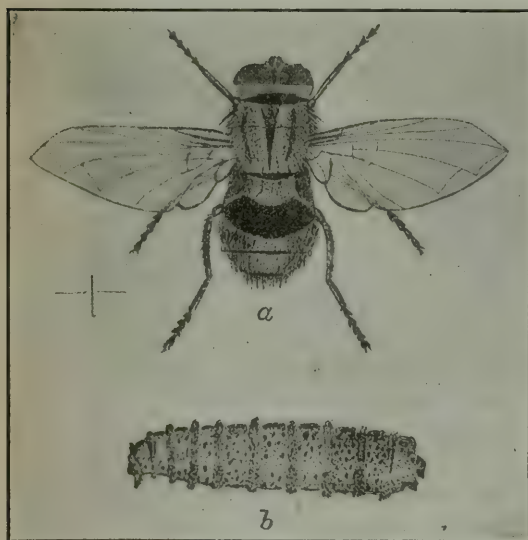


FIG. 82. Screw-worm fly (*Comptosia macellaria*), enlarged.
a, adult fly; b, larva. (After Francis.)

ing the stables clean, and removing all rubbish from around the house will do much to prevent them.

The stable-fly (*Stomoxys calcitrans*) resembles the house-fly, but its mouth parts are made for biting, while the house-fly is a sucker. Severe bites, and sometimes poisonous ones, are inflicted by this insect, for which the house-fly gets the blame.

The horn-fly (*Hæmatobia serrata*) is another dipterous pest of cattle.

The screw-worm (*Comptosia macellaria*), to which we have before alluded, belongs also in this subfamily; as does the blowfly (*Caliphora vomitoria*), the largest of the common species, with a deep blue, almost black body, always coming in swarms when there is an odor of cooking cabbage or decomposing meat.

The subfamily **Anthomyiinae** is a very large one, including the cabbage-maggot, onion-fly, and many others which infest vegetation. Some of its members are parasitic on other insects, and others infest decaying vegetation. Some of these resemble house-flies, but differ from them in structure.

The second division of the Muscidae is the **Acalyprate Muscidae**, and this includes the fruit-flies, the dreaded *Trypeta ludens* among others.

Most of the flies belonging to the subfamily **Trypetinae** are small, although some of them are at least medium in size. They are characterized by their peculiar wing markings, which are shaded, mottled, banded, or striped. They vary in color

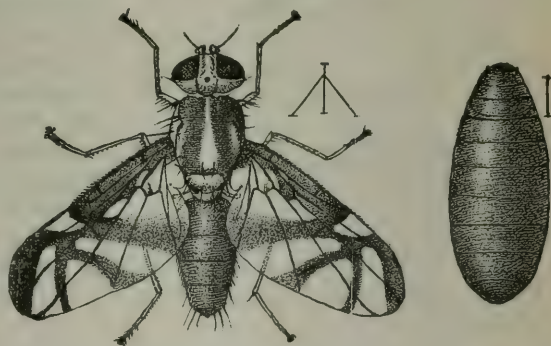


FIG. 83. *Trypeta acidusa*. Puparium at right, adult at left, greatly enlarged. (After Howard.)

from light brown to nearly black, and the family is well represented in the United States. It must not be supposed that because *T. ludens*, *T. pomonella*, and several others of our fruit pests belong to this family, all are pests on fruit. It is true that most of the fruit-flies belong here, but a very large number of the species live in galls which they form in the stems of wild plants, and are not noticeably injurious.

The cheese-maggot (*Piophilæ casei*) belongs in this group, as do also the vinegar or pomace flies—small, yellowish flies, common about decaying fruit.

The family **Hippoboscidae** includes the louse-flies. Some of these are winged and some wingless. They are parasitic upon birds and mammals. The best known member of this family is the sheep-tick, a wingless species, which lives upon sheep.

The family **Nyeteribiidae**, or bat-ticks, are, as their name implies, parasitic on bats. They, too, are a wingless species.

The family **Braulidae** includes the bee-louse, a minute wingless creature, infesting the honey-bee.

Order SIPHONAPTERA.

This is an order erected to take in the fleas. These insects have many peculiarities in common with flies, and at one time were considered as degraded Dipterons. The order contains but a single family, **Pulicidae**. There are a number of species, however, afflicting various

animals. The dog and cat have their special fleas, and man another, the latter being the *Pulex irritans*, a description of which is not necessary for California readers.

The *Chigoe*, a small species, common in warm climates, is sometimes a very serious pest. The female has a habit of burrowing into the flesh, between the toes of the natives, or others, when opportunity

allows. In this position, with her abdominal end protruding, she swells with eggs to the size of a pea, when the eggs are obtruded and shed on the ground. Unless removed, these pests sometimes cause great suffering.



FIG. 84. Cat and dog flea (*Ctenocephalus canis*). A, larva (after Kunckel d'Herculais); B, adult. Length of adult, 2 mm.

Order COLEOPTERA.

(The Beetles.)

The Coleoptera, or beetles, are, perhaps, not so familiar to the general observer as the butterflies and moths, although they outnumber them in species two to one, for they are generally obscure in their habits in both larval and adult stages, and when seen are usually avoided on account of their unfriendly, or, in some cases, disagreeable aspect. But they are so numerous, over 12,000 species being known, and so easily collected and preserved, that the amateur collector of insects is attracted to them nearly as much as to the Lepidoptera.

Beetles are characterized by the possession of a pair of horny wing-covers, called elytra, which meet in a straight line down the back, and beneath which is a single pair of membranous wings. They possess biting mouth parts, and the metamorphosis is complete. The earwigs are the only insects that might be mistaken for beetles, but as they possess a pair of pincers-like appendages at the end of the body, they may be readily distinguished from them.

The name Coleoptera is derived from the Greek *coleos*, a sheath, and *pteron*, a wing. The name refers to the sheath-like structure of the elytra, which were formerly believed to be modified wings, but which are now known to be homologous to the plates, or paraptera, which exist at the bases of the wings of the lower orders of insects. The true wings are membranous, and are efficient organs of flight in most species. When at rest they are folded beneath the elytra. In those species which have no true wings, the elytra serve only as a protection to the soft abdomen. The mouth parts are evenly proportioned, no part being over-developed at the expense of others, as in the Lepidoptera or Hymenoptera. The upper lip, or labrum, is usually distinct; the upper pair of jaws, or mandibles, are strong and fitted for seizing or gnawing; the lower jaws, or maxillæ, are composed of several distinct pieces, and bear prominent palpi; the lower lip, or labium, is also complicated in structure, and bears prominent palpi. The antennæ of beetles are extremely varied in form, being serrate, clavate, moniliform, or irregular, as the case may be. The tarsi, or feet, have from three to five joints, the last joint usually terminating in a pair of claws.

Since Coleoptera possess no easy means of identification, entomologists have had to separate groups and species by means of obscure specific differences in the structure of organs and parts of the body. The antennæ, mouth parts, and sclerites or plates of the body are usually employed, but such a mass of technical terminology has, of necessity, piled up on this account that the ordinary student of Coleoptera is much mystified.

The eggs of beetles are laid where the larvæ, upon hatching, will find an abundance of food suited to their needs. It may be on leaves, twigs, decaying logs, carrion, fresh water, or underground. The larvæ are known as grubs, wireworms, water-tigers, and the like. They usually possess six thoracic legs (some species have more), biting mouth parts, and simple eyes. The larval life lasts from a few weeks in some species to three years in others. After several molts they change into pupæ, either underground or in or on the food, using the last larval skin as a pupa case, or constructing a rough cocoon of earth and bits of wood and vegetable matter.

Only such of the eighty families as possess especial interest or economic importance can be treated, even briefly, in a short discussion.

The order is divided into two primary groups or suborders, *Coleoptera genuina* and *Rhyncophora*. *Coleoptera genuina* includes the typical beetles, with the mouth parts all present, and the head not elongated into a beak or rostrum. In the *Rhyncophora*, or snout beetles, the head is elongated, the labrum is indistinct, and the palpi are reduced to small processes. These two suborders are further divided into sections, tribes, families, genera, and species.

Suborder COLEOPTERA GENUINA. Section PENTAMERA.

The beetles in the section Pentamera all have five tarsal segments in all the feet. The **Adephaga**, one of the four tribes in this section, are the carnivorous beetles, and embrace four important families.

The members of the family **Cicindelidæ** are characterized by their metallic colors with light markings on the wing-covers, their graceful forms, rapidity of movement, and alert habits. They are commonly seen running and flying swiftly about sandy, sunny places. Both larvæ and adults are noted for their rapacity and ferocity, and these traits, combined with the curious markings on the elytra, have given them the name of tiger-beetles. The larvæ of tiger-beetles are repulsive in appearance, possessing large heads, which are bent at right angles downwards from the body and furnished with immense jaws and sprawling legs. They live in the sand in vertical burrows several inches deep, and in these they lie in wait ready to grasp any unwary insect that comes within their reach. To keep themselves from being pulled out by a larger insect than themselves, they possess two strong small hooks on the back of the fifth body segment. The pupal stage is passed in the burrow, also in the last larval skin. The tiger-beetles, especially the larvæ, are beneficial to the fruit-grower, as they devour quantities of injurious caterpillars.



FIG. 85. Tiger-beetle (*Cicindela rapan*).

The **Carabidæ** are a family of flat, smooth beetles, usually shining black, greenish or brownish in color, with small heads, prominent slender antennæ, sharp mandibles, clubbed antennæ and conspicuous eyes. They are active and swift runners, ready to bite when caught. Most of them hide by day under boards, stones and the like, seldom taking to flight, and hunting their prey at night. The larvæ of many species live in the ground, where they destroy quantities of burrowing insects. The pupal stage is passed in rough cells in the earth, the emerging adults pushing their way to the surface.

The "searcher" or "caterpillar hunter," *Calasoma scrutator*, is one of the most familiar and beneficial of the Carabids. It is especially

destructive to tent-caterpillars, climbing the trees at night and feeding on them. Other species are predaceous on cankerworms and cutworms.

The bombardier-beetles (genus *Bruchina*) possess an organ at the tip of the abdomen by which when disturbed they spurt out, "with a popping sound and puff of smoke," an ill-smelling, acrid fluid. *Harpalus* is a large genus, any species of which destroys large numbers of the larvæ of the codling-moth and plum-curculios.



FIG. 86. *Calasoma* sp.

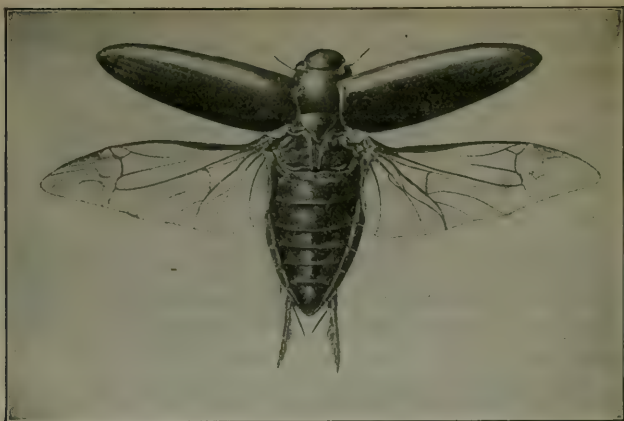
The *Dytiscidæ* are a family of carnivorous water-beetles of some three hundred species, common in all our streams and ponds, many of them from one to two inches long and quite conspicuous. They possess a single pair of eyes, long, slender antennæ, are flatly convex in shape and brown or black in color; the swimming hind legs are long, broad, and heavily fringed with hairs, and their air supply under water is carried in a bubble under the elytra, held in by means of fine hairs. The larvæ are long and slender, and on account of their voracity are called water-tigers. They breathe through a pair of spiracles at the top of the body, coming to the surface frequently for the purpose. The pupal stage is passed in a rough cocoon in the bank of the stream or pond.

The *Gyrinidæ*, or whirligigs, are the small, metallic, steely black beetles seen swimming in circles on the surface of ponds and still pools. They are peculiarly characterized by the possession of compound eyes on each side of the head, which are distinctly divided into two parts by the sharp lateral margins of the head. They are of slight economic value, though destroying some mosquito larvæ.

Tribe Clavicornia.

This tribe comprises those beetles which have clubbed antennæ.

The family *Hydrophilidæ* are the "water-scavengers," usually black in color, though some have orange or red markings along the margins, convex above, flattened below, smooth and polished, and possessing short antennæ, which are clavate or clubbed. Certain of the smaller species are small, and have a rough body wall, and crawl on the bottom of ponds and streams instead of swimming, and still others are land forms. One species, *Hydrophilus triangularis*, is often seen flying about electric lights. All live on decaying matter, but are of slight economic importance.

FIG. 87. *Hydrophilus triangularis*. Natural size.

The family **Staphylinidæ**, or rove-beetle family, is a large and widely distributed group, its members being characterized by the possession of short, leathery wing-covers, which leave the abdomen exposed. They live in decaying animal or vegetable matter, excrement, or in flowers.

In the spring, certain tiny flower-inhabiting forms take to flight in great swarms, get in the eyes of travelers and become very annoying on account of their acrid body-fluids.

FIG. 88. Rove-beetle (*Staphylinid* sp.).

The **Silphidæ**, or "burying-beetle" family, are found on carrion and in fungi. The antennæ are terminated by a short spherical club, in which are the very sensitive organs of smell, and the wing-covers are slightly shortened. The thick-bodied beetles, black marked with red, and with the habit of digging under small animals until they are buried, belong to the genus *Necrophorus*, and are the burying-beetles proper.

The genus *Silpha*, or roving carrion-beetles, are short, broad, flat, black in color, and have longitudinally grooved elytra.

The **Cucujidæ** are a family of small beetles, light brown in color, flat and narrow in shape, well fitted for their habitat under the bark of trees. One species, *Silvanus surnamensis*, the saw-toothed grain-beetle, infests stored grain and dried food products of all sorts.

The **Dermestidæ** are the beetles commonly known as the buffalo-moths and carpet-beetles. They are small, stout, oval forms with weak legs, and feed in all stages on stored animal and vegetable products, dried insect specimens, furs, feathers, stuffed animals, and on cheese.

and dried meats. Among the worst pests in this family are *Anthrenus scrophulariæ*, the carpet-beetles, known in the larval stage as the buffalo-moth; *A. varius* and *A. museorum*, the museum pests; and *Dermestes lardarius*, the larder-beetles.

The family **Parnidæ** are generally known as "water-pennies," on account of the flat, crustacean-like larvæ, which cling to stones. The adults are non-swimming, but crawl about on submerged objects.

Tribe **Serricornia.**

This tribe is composed of beetles with slender, serrated, saw-toothed antennæ.

The **Buprestidæ** is an important Serricorn family, both economically and numerically, its members being commonly known as the metallic wood-borers. These beetles have a compact, elongate body, short, serrate antennæ; the head is deeply inserted in the prothorax, and they are always metallic and iridescent in their coloration. Their larvæ are flat-headed, legless, tadpole-shaped wood-borers, making broad, shallow galleries and chambers under the bark of trees.

The apple-tree borer (*Chrysobothris femorata*) is a greenish-black beetle, half an inch long, which lays its eggs on the bark of apple, peach, plum, and several forest trees. The newly hatched larvæ bore through the bark to the sapwood, where they burrow around and often girdle the tree. The Sinuate pear-borer is another very serious pest in the Eastern States.

The **Elateridæ** resemble the Buprestidæ in shape, but their lack of metallic colors, being usually blackish, brownish, or grayish, and the



FIG. 89. Flat-headed apple-tree borer (*Chrysobothris femorata*).



FIG. 90. Click-beetles (*Elaterids*) and larva (wireworm).



FIG. 91. Firefly (*Photinus pyralis*). a, larva; b, pupa in underground cell; c, adult; d-f, enlarged details of larva.

backward projecting angles of the prothorax, readily distinguish them from that family. On account of their power of springing up in the air when laid down backwards, they are called click-beetles. The larvæ are the "wireworms," and are long, slender, slightly flattened, and

leathery in texture. The larvæ live underground, and require two or three years to complete their growth. They are very destructive to sowed grain, root crops, meadow land and strawberries.

The insects commonly called fireflies are not flies at all, but beetles belonging to the family **Lampyridæ**. Only a few species are luminous, however, and these belong mainly to the genus *Photinus*. (See Fig. 91.)

The soldier-bugs are diurnal members of this family, of the genera *Chauliognathus* and *Telephorus*. *T. bilineatus* does much good in the Eastern States, as it eats quantities of plum-curculio larvæ.

The family **Cleridæ** are called "checker-beetles," or "flower-beetles," from the conspicuous black, white or red checkered markings on the body, and from their habit of living on flowers. The antennæ are serrate or slightly clubbed, and from the slenderness of the body and their habits of running swiftly about they look decidedly ant-like. With one exception, those of the genus *Necrobia*, the larvæ are all predatory on the larvæ of wood-boring insects and in bees' nests. *Necrobia rufipes*, the red-legged ham-beetle, lives on ham and other stored animal products; but, on the whole, the family is a very useful one.

The **Ptinidæ** are nearly all injurious forms, living on dried vegetable matter. They are small brownish beetles, with strange tastes in the selection of foods. The drugstore-beetle (*Sitrodrepa panicea*) attacks all sorts of drugs and herbs, many of them noxious and poisonous to us. *Lasioderma serricornea* lives on tobacco in any form, and is called the cigarette-beetle. Others are destructive to books and paper, or are borers, such as the apple-twigg borer. Certain species, belonging mainly to the genus *Aniobium*, have gained the name of "death watches," on account of their habit of rapping their heads against wood or some hard object.

Tribe **Lamellicornia**.

This tribe contains two families, the **Lucanidæ** and the **Scarabæidæ**.

The **Lucanidæ** are rather rare, curiously formed beetles, with elbowed, clubbed antennæ, and large, often branched mandibles. From the latter character they have received the name of stag-beetles. The larvæ are white grubs living in decaying wood, while the adults live upon honey-dew, and on sap which flows from wounds in trees.

The **Scarabæidæ** is, numerically, a very large family, and its numbers vary greatly in shape, size, and feeding habits. They all have antennæ with a club at the tip composed of from three to seven lamellæ, and the fore tarsi are formed for digging. The larvæ are white grubs, which live in decaying vegetation or excrement, or in the ground on

the roots of plants. There are two groups in this family: the scavengers, of which the tumble-bugs are examples, and the leaf-chafers, represented by the "May-beetles" and "June-beetles." *Macrodactylus subspinosus*, the rose-chaffer, a yellowish beetle with pale red legs, does great damage to roses and grapes and other flowers and fruits.

The genus *Lachnosterna* contains the "June-beetles," or "bugs," from whose attacks lawns and root-crops suffer.

The rhinoceros-beetles belong to the genus *Dynaste*, and are so named on account of large horns on the head, and another larger horn, accompanied by two smaller ones, projecting forward from the prothorax.

There are several genera of flower-beetles, one of the commoner forms being the "bumble flower-beetle," *Uphoria inda*. It is yellowish brown and hairy, and in early spring is seen flying near the ground with a loud buzzing noise.

Section TETRAMERA or PHYTOPHAGA.

This section comprises those beetles which, apparently, have four segmented tarsi, the fourth segment being so fixed with the third as to be indistinguishable. There are four families under this section, and among them are very many of our worst crop enemies.

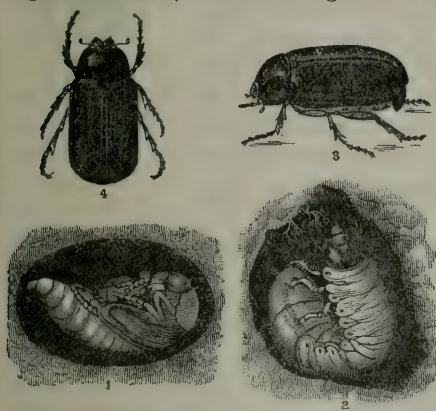


FIG. 94. June-bug or white grub. 1, pupa; 2, larva; 3-4, adults.

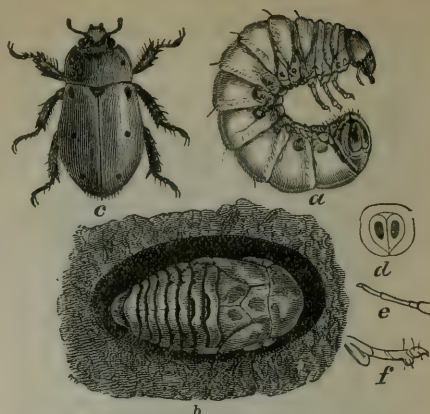


FIG. 92. Grapevine beetle (*Pelidnota punctata*). a, larva; b, pupa; c, beetle; d, antennae; f, leg, enlarged.



FIG. 93. Rose-chaffer (*Macrodactylus subspinosus*).

The family **Chrysomelidæ** is one of the largest of the beetle families and probably contains more injurious forms than any other. They are generally small, oval forms, strongly convex above, possessing small heads and widely separated antennæ. The adults, when disturbed, have

the habit of folding up the legs and dropping inert to the ground.

The Colorado potato-beetle, asparagus-beetle, and elm-leaf beetle are some very destructive species which have not yet reached California.

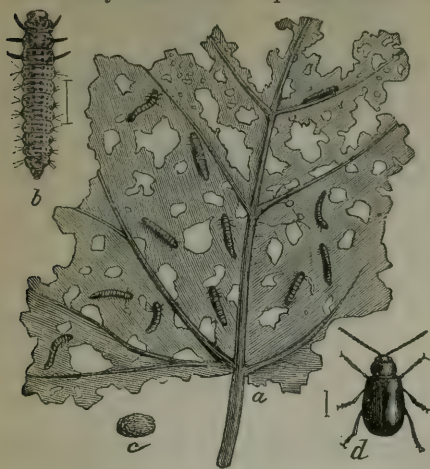


FIG. 95. Grapevine flea-beetle (*Haltica chalybeus*).

feeding on cucurbits, represent these destructive insects. *Lena californica* is a small blue beetle found on dock, and *Lena scripta* on willow.

The black-legged tortoise-beetle (*Cassida nigripes*) represents a genus of bright golden-colored Chrysomelids of a peculiar shape, which are most often found feeding on the leaves of the sweet potato.



FIG. 96. Black-legged tortoise-beetle (*Cassida nigripes*).

The family **Bruchidæ** is small, and consists of beetles which are short and chunky, with the elytra cut off behind, with small head, and thighs swollen as if from jumping, and which in all stages live on stored seeds.



FIG. 97. Bean-weevil (*Bruchus obtectus*).

Bruchus pisi, commonly known as the pea-weevil, and *B. obtectus*, the bean-weevil, are cosmopolitan species.

The **Cerambycidæ** have antennæ as long or longer than the body, and are primarily a wood-boring family, being commonly called the long-horned wood-borers. The bodies of these beetles are usually cylindrical and elongate, though some are flattened, and their mandibles are stout and sharp-pointed. The larvæ are known as the round-headed borers, to distinguish them from the flat-headed Buprestids. Over 600 species are known, most of them living in dead or dying wood, although some attack healthy tissue.

The round-headed apple-tree borer (*Saperda candida*) is a pale-brown beetle, with two broad whitish longitudinal stripes. The larval life is three years, the first part being spent in the sap-wood and the later, and pupal stages, in the heartwood. The "pruners" are species living in and eating out the hearts of twigs of maple, oak, apple, pear, plum, and other trees, so that the wind blows them to the ground.

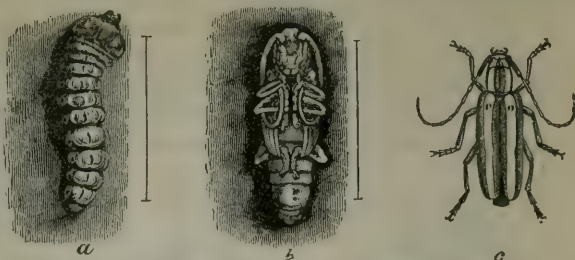


FIG. 98. Round-headed apple-tree borer (*Saperda candida*).
a, larva; b, pupa; c, imago.

Our great sugar and yellow pines are attacked by a large Cerambycid, *Ergates spiculatus*. The genus *Prionus* has some large species, the larvæ of which are two and one half to three inches long and which live in the roots of apple and cherry trees, and of grape and black-berry vines.



FIG. 99. California pine-borer
(*Prionus californica*).

Section TRIMERA.

This section contains only one family, the all-important beneficial one, the *Coccinellidæ*, or ladybirds. They are small, hemispherical beetles, usually red or yellow with black spots, or black with red or yellow spots. The tarsi have only three joints, so that if confused with certain Chrysomelids, as they sometimes are, this character serves to readily distinguish them. With one exception, the genus *Epilachna*, they are all predatory, both larvæ and adults, on plant-lice, scale insects, and other soft-bodied plant-feeding insects. The larvæ are slender and fusiform in shape, with roughened spiny bodies, often prettily marked with blue, black, and orange.

Hippodamia convergens is a very common native form, feeding principally on plant-lice (aphids). It is yellowish red in color, with six black spots on each wing-cover. *Coccinella californica* is a similar form, but more rounded and lacking the spots. *C. sanguinea* is a small, blood-red form. *C. abdominalis* is the ashy gray ladybird with seven small black spots on the thorax and eight on each wing-cover. *Chilocorus bivulnerus*, the "twice-stabbed," is a large black ladybird, with a large red spot on each wing-cover, very destructive to the armored

scales. *Coccinella oculata* is a still larger form often taken for the "twice-stabbed" ladybird. *Exochomus pilatei*, "Pilate's ladybird," also resembles the "twice-stabbed," but the under side of the abdomen is black instead of red. It feeds on black scale, but does not increase rapidly. *Psyllobora 20-maculata*, the "20-spotted ladybird," is a common species, feeding on young scale and the red spider.

Of the ladybirds introduced by the State Commission of Horticulture, *Vedalia cardinalis*, *Rhizobius ventralis*, *R. twoombæ*, *Novius koebelei*,



FIG. 100. *Novius koebelei*.

Orcus chalybeus, *Cryptolæmus montrouzieri*, *Scymnus vagans*, *S. marginicola*, *Rhizobius debilis*, *Rhizobius lopantha*, and *Hyperaspis lateralis* have proved the most successful. *Vedalia cardinalis* and *Novius koebelei* have completely subjugated the cottony-cushion scale. *Orcus chalybeus* is effective against

the yellow scale. *Rhizobius ventralis* is a very useful destroyer of the black scale. *Scymnus vagans* is an enemy of the red spider. *Rhizobius lopantha* makes some headway against the purple scale, and *Cryptolæmus montrouzieri* cleans up the mealy-bugs in greenhouses. The other species are general feeders.

If it were not for these industrious enemies of our fruit and vine pests, California would be far from ranking to-day the chief fruit-producing State of the Union.

Section HETEROMERA.

This section is a rather miscellaneous lot of beetles, including several small obscure families, as well as two large ones. All those beetles which have the front and middle feet with five tarsal segments and the hind feet with four are included in it.

The family *Tenebrionidæ* are the "darkling beetles." They are usually dark brown or black in color, oblong or oval in shape, have the head more or less inserted in the prothorax, and, on account of their long legs, are very awkward in their movements. Both adults and larvæ are scavengers, the latter much resembling wireworms in appearance. The common pinch-bug, *Eleodes* sp., which when disturbed stands on its head and emits an ill-smelling fluid, is a familiar type. The meal-worm beetle (*Tenebrio molitor*), bred by bird fanciers for food, and *Tenebrio obscurus*, found about stored grain products, are cosmopolitan species.

The family **Meloidæ** are called blister-beetles, because their bodies when dried and pulverized are used therapeutically as blisters. In the adult stage they feed on plant tissue, and are sometimes injurious. In the larval stage many are, however, markedly beneficial, such as the larvæ of *Epicauta vittata*, which live on the egg pods of grasshoppers. The life cycle of many species has reached a highly specialized development and their study is exceedingly interesting.



FIG. 101. Striped blister-beetle (*Cantharis vittata*).

The **Stylopidae** is an obscure family, most of its forms being parasites on wasps.

Suborder RHYNCHOPHORA.

The suborder Rhynchophora, or snout-beetles, consists of beetles characterized by the peculiar prolongation of the front of the head into a beak or snout, at the end of which the mouth parts are situated. The curculios, bill-bugs, and most of the weevils belong to this suborder, and are great pests, living as they do on vegetable matter, stored products, and the like.



FIG. 102. Fuller's rose-beetle (*Aramigus fulleri*).

The family **Otiorhynchidæ** are the beetles which have a scar on the front of the upper side of each mandible. Fuller's rose-beetle, a species attacking roses and orange trees, is a familiar type.

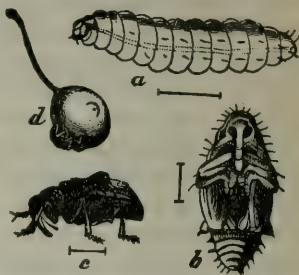


FIG. 103. Plum curculio (*Conotrachelus nenuphar*). a, larva; b, pupa; c, adult; d, curculio at work.

The family **Curculionidæ** lack the scar, and are the typical curculios and weevils. The cotton-boll weevil, strawberry weevil, and the plum-curculio are well-known pests belonging to this family.



FIG. 104. Pine-tree scolytus (*Scolytus pyri*).

The **Calandridæ** include the bill-bugs and rice and granary weevils. The latter two forms, *Calandria oryzae* and *C. granaria*, are world-wide in distribution and do immense damage to stored grain.

The **Scolytidæ** are the engraver-beetles. According to Pinchot, the annual losses caused by these insects total nearly \$100,000,000. The Monterey pines of California are attacked by two species, *Dendroctonus valens* and *Tomicus plastrographus*, to such an extent that entire forests have been killed by them. Others, such as the fruit-bark beetle, attack and kill peach and plum trees.

Order HYMENOPTERA.

(Bees, Wasps, Ants, Saw-flies, etc.)

This, of all the orders, is the one which may be said to be wholly beneficial to man, for while, as there is a black sheep in every flock, there are injurious species in the Hymenoptera, they are so largely the exception to the rule that we may say that the order Hymenoptera is the one wholly beneficial order of insects. In this order we find the several species of honey-bees, which supply us with honey and wax; an immense number of parasitic insects, which keep down any redundancy on the part of the injurious species; and the ants, which act as scavengers. The whole of the wasp family are beneficial, for, in providing for their young, the larger members stuff their cells with spiders, caterpillars, and other insects, and they are all predaceous in some form. It is in this order, too, that we find the highest development of the social instinct, for many of the species are so constituted that they can not exist except in communities, and in these communities we find the most perfect system of division of labor imaginable. With the social bees, for instance, we have one mother bee, whose sole duty is to supply the eggs from which the stock of workers is to be kept up; the drones, or males, whose sole duty is to act as fathers of the hive; the third class are the workers, and these are again divided into outside workers, inside guards, nurses, and other classes, each of which has its special duties to perform, and upon the proper performance of which the welfare of the whole community depends—and they never fail in their duty. In this order, too, we find the only class of insects which care for their young. In all others the eggs are laid as it happens. Usually instinct directs the female to choose a position which will supply food for the young when hatched, but, this done, she is through with them and gives them no more care. But in this order we have species which diligently watch over the eggs, take charge of the young when hatched, attend to them, feed them with proper food, and watch over them in every stage of their growth until they have passed through all the changes, entered the ranks of the mature workers and are ready, in their turn, to perform the same duties for their successors.

The name Hymenoptera is compounded of two Greek words, *hymen*, membrane, and *pteron*, wing. The name is not altogether distinctive, however, as all insects possessing membranous wings are not members of this order, but all members of this order have four membranous wings. A peculiarity of this order is that the hinder pair of wings are provided with a series of hooks, with which they catch the fore wings, and thus the two pairs are connected closely together. Another feature is that while in all other insects the mouth parts are made for either biting or sucking, in this order they are so arranged as to be of use for both purposes.

The three divisions of the body are well defined. The head is, in many species, movable on the thorax, while the thorax is sharply divided from the abdomen; in some cases, as in the wasps, being joined by a mere thread-like process.

The metamorphosis of the Hymenoptera is complete. The eggs are not remarkable for either form or color, and are usually somewhat oblong. They are laid in various positions, according to species, in some cases being deposited in the bottom of cells prepared to receive them; in others, as in the parasitic species, being attached to or placed in the body of their victims. In all, except the two lower families, the larvæ are maggot-like creatures, footless, and incapable of extended motion, and, in many cases, wholly dependent for their existence upon the care of the adults.

This order is divided into two suborders, the *Terebrantia* and the *Aculeata*. The former comprises a number of parasitic insects, as the ichneumons, braconids, chalcids, etc., the gall-flies, saw-flies, etc.; while the latter includes the stinging forms, as bees, wasps, and ants.

Suborder TEREBRANTIA.

In the modern system of classification it has become the rule to commence with the lower forms and work upward to the higher, and, for this reason, the Hymenoptera, being recognized as the highest developed of any of the members of the insect world, is placed at the top of the list. In this arrangement the various orders and families may be compared to a pyramid, in which the less specialized, lower, and baser kinds form the foundation, and in which there is a constant ascent until the capstone is reached, and, in this case, this is the higher order of Hymenoptera. So, in accordance with this plan, the suborder Terebrantia, which is the less specialized of the two suborders, and contains the lower forms of the order, takes its place first in our consideration, and in this the lower families are first noticed.

Comstock gives us the following synopsis of the suborder Terebrantia:

THE BORING HYMENOPTERA. Suborder Terebrantia.

The Plant-eating Hymenoptera.

The Saw-flies. Family Tenthredinidæ.

The Horn-tails. Family Siricidæ.

The Gall-inhabiting Hymenoptera.

The Gall-flies. Family Cynipidæ.

The Parasitic Hymenoptera.

The Trigonalids. Family Trigonalidæ.

The Ichneumon-flies. Family Ichneumonidæ.

The Stephanids. Family Stephanidæ.

The Braconids. Family Braconidæ.

The Ensign-flies. Family Evaniidæ.

The Chalcid-flies. Family Chalcididæ.

The Proctotrupids. Family Proctotrupidæ.

Family **Tenthredinidæ** (Saw-flies). In this family the females are provided with a pair of saws, which are concealed in a cavity of the abdomen when not in use. With these she cuts a slit in the leaves or

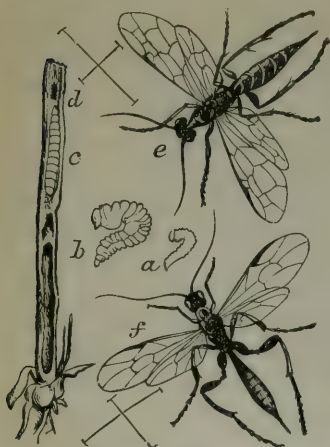


FIG. 105. Corn saw-fly (*Cephus pygmaeus*). a, larva; b, larva, enlarged; c, larva in wheat stalk; d, frass; e, adult female; f, its European parasite (*Pachynerus calcitrator*). (From "Insect Life.")

stems of plants upon which she lay her eggs, and it is this fact which gives its common name to this family. The larvæ are small, slimy-looking insects, somewhat resembling caterpillars, but they have from twelve to sixteen pro-legs, while caterpillars, with one exception, have but ten. They are a serious pest upon plants infested by them, and examples of this family



FIG. 106. Currant-worm (*Pristophora grossulariæ*)

may be instanced in our common cherry-slug (*Eriocampa cerasi*) (which also infests the pear), the rose-slug, and the currant-worm.

Family **Siricidæ** (Horn-tails). This family is closely connected with the foregoing family, but differs from it in the shape and uses of the ovipositor. Instead of being a sawing instrument, as in the former, it is a very complicated and effective boring tool, by means of which the female can drill a hole in the hardest wood, in which she deposits her egg. The habits of the larvæ are also very different, those of the horn-tails being boring insects, and they sometimes do great damage to forest timber and shade trees. Members of this family are of large size, the pigeon tremex (*Tremex columba*), which is not uncommon in our State, being as large around as a pencil, and sometimes an inch and a half in length.



FIG. 107. Cherry-slug (*Eriocampa cerasi*). a, larva on leaf and larva enlarged; b, adult saw-fly.

These two families are practically all of this order which are injurious, or not beneficial to man. The gall-flies, which come next, when very numerous, may do some damage to vegetation, but the extent of this is trifling.

Family *Cynipidæ* (Gall-flies). In this family we have one of the mysteries of the natural world. Here we have a minute insect, in some cases almost microscopic in size. This insect will puncture a twig or leaf of a tree, and at once the whole character of the part so punctured is changed. In the oaks, for instance, we see galls known as oak apples, and often they are as large as big apples, and these are formed for the purpose of supplying sustenance to the tiny maggot of a gall-fly. What kind of fluid is injected to cause this change? It certainly is wonderfully powerful, as the amount injected must be so infinitely small as to be past our comprehension, for it is but a part of the insect and this is not large enough to be noticed. More than this, each species creates a special kind of gall, and an entomologist can tell what species of insect did the stinging by the shape, color, and general appearance of these strange swellings. Now, how is it that the plant will accommodate its growth to the peculiar requirements of each one of the different species of these minute insects?

It must not be understood, however, that all the members of this family are gall-makers, or that there are no galls caused by other insects. In fact many of the other orders have gall-makers, as the aphids, the mites, etc.; but there is this difference: in other galls there are external openings, while in the galls made by members of this family they are closed and contain the larvæ of the insect until they have attained their growth. In some cases the insect goes through its transformations within the gall, and in others it makes its escape and changes in the earth.

Family *Ichneumonidæ*. We have now come to a family of especial interest to the fruit-growers and farmers of California as well as elsewhere, for in the *Ichneumonidæ* are found the greater number of our beneficial insects; that is, they are of benefit to us, as they prey upon species which devour and destroy our vegetable products. It is to this family that Swift's oft misquoted lines apply:

"Naturalists observe, a flea
Hath smaller fleas that on him prey,
And these have smaller still to bite 'em,
And so proceed *ad infinitum*."

It should be borne in mind that there are two classes of beneficial insects, the *parasitic* and the *predaceous*. In the latter the insect pounces upon his victim wherever he catches him, that is, if he happens to be hungry, and devours him on the spot. The parasitic insects, however, have a neater way of doing business. In their proceedings they are not so coarse as the predaceous varieties, although they accomplish their work more effectively. They attach themselves early in life—in fact, the mother usually brings about the match—and, once attached, they remain until there is nothing left of their victim worth

bothering about. They are quiet and insidious in their efforts, but never let go. Some of them get on the inside of their host, in which case they eat him out of house and home before they quit; in other cases they take an attachment on his outside and cling closer than a brother so long as he has a drop of blood in his body. But, however they do it, the result is the same to us; they get away with our foes, so we declare them our friends. But, bearing out Swift's doggerel, there



FIG. 108. *Thalessa lunator*, ichneumon parasite of pigeon tremex (*Tremex columba*).

are other parasites on these—secondaries, or hyperparasites, we call them—and some parasites on these again—tertiaries. So that, in importing beneficial insects, we are always very careful to see that there are no secondaries to escape and prey upon them before they are turned loose. Usually, when the egg is laid upon the body of the victim insect, as soon as it is hatched the young larva proceeds to work its way to the inner portions of its host, where it lives secure and waxes fat on his substance. By a strange instinct, however, it carefully avoids the vital portions, and so the host insect lives in misery until its parasite has acquired its growth, when it dies.

While some of the members of this family are of small size, many of them are large, for parasitic insects. The *Caliephialates messer* Grav., of which we give an excellent colored illus-

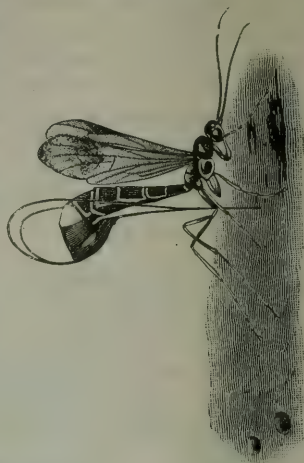


FIG. 109. *Thalessa lunator* drilling a hole in a tree-trunk in order to deposit eggs in the burrow of the pigeon tremex (*Tremex columba*).

tration elsewhere, is a member of this family. This is a new species in the United States, introduced for work on the codling-moth, of which it has been found a very effective parasite.

The females of some species of this family are remarkable-looking insects, having an exaggerated ovipositor, which appears like a long tail. This, when folded, looks like one piece, but is really composed of three pieces: the ovipositor proper, and two guards, which form a sheath. The ovipositor itself is composed of three parallel pieces, one

above and two below, joined together; near the end they are toothed like a saw, and between them is the egg passage. In the larger species, the females seem possessed of a special sense by which they ascertain whether their victim has already been attacked. If it contains an egg, they abandon it for another. This, for the reason that the food supply would not be sufficient for two large larvæ. With the smaller species, however, it is not uncommon for the female to lay a number of eggs on one victim. But it is not alone in their larval stage that insects are attacked by parasites, for they are subject to it at any stage of their existence, from infancy to age. Even in the egg, they are not immune, for there are egg parasites—minute insects, which lay their eggs within the eggs of other insects, which are eaten out by their internes.

The family **Stephanidæ** contains a few rare insects of no importance in this discussion.

The family **Braconidæ**, however, is a different matter, for this is a very extensive family of, generally, very small to medium sized insects, containing several thousand described species. All are parasitic on other insects, and in this we find many of the secondary and tertiary parasites. This family, in the older classifications, is included in the Ichneumonidæ, but well-defined differences in the two classes have led to the creation of the new family of Braconidæ. As parasitic insects, however, their habits of life are very similar, and to their efforts is largely due the fact that we are not entirely eaten out by the destructive pests. One of the chief checks on the aphids of our gardens is a minute member of this family, the genus *Aphidius*. Examine a twig or leaf infested with plant-lice, and you will see many of them bloated and white. Look closely and you will see a minute circular hole in the abdominal end. It is from this hole that the insect, after having eaten out the aphid, and gone through all its changes on the inside of the victim, has escaped. Gather a few



FIG. 110. Tomato-worm (*Phlegelthontius sexta*), bearing cocoons of the parasitic *Apanteles congregatus*. Natural size.

of these aphid-infested leaves or twigs, place them in a small vial, and cover it with gauze. In a short time you will find numbers of a tiny, dark-colored insect, looking like a miniature wasp. This is a Braconid of the genus *Aphidius*. There are millions of them at work; each one eats an aphid, and afterwards lays hundreds of eggs on other aphids, which, in their turn, eat up their hosts. These insects of the parasitic class are usually small, and often so minute as to escape observation; but insignificant as they appear, we owe our very existence to them, for without their constant efforts we would be reduced to a condition of starvation by the hordes of pests, which, having no checks, would increase with enormous rapidity and soon overwhelm us like a flood.

The family *Evaniidæ* is a small one, closely connected with the *Ichneumonidæ*, but differing from them in structural characters. Its habits are similar, as it is parasitic.

The family *Chalcididæ* is an immense group, composed largely, but not wholly, of parasitic insects. As a rule, the members of this family are exceedingly small, many of them being microscopic, and some even requiring a high-power lens to bring them into view. Notwithstanding

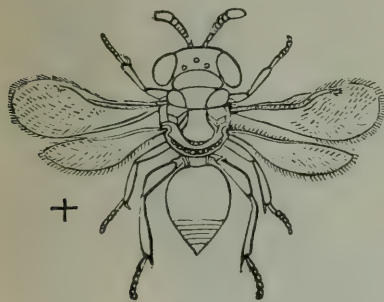


FIG. 111. *Tomocera californica*, a chalcid parasite of black scale (*Saissetia oleæ*). Female, very greatly enlarged.

their minute size, however, they rank among the best friends the fruit-grower has, for they make up in numbers what they lack in size, and to the destructive pests of the fruit-grower they are as "terrible as an army with banners," for within the ranks of the *Chalcididæ* is comprised the largest number of species of any of the parasitic Hymenoptera, extending into many thousands. The members of this order are very small, and, as a rule, lack the attractive beauty of some of the larger insects, and so have

been much neglected by entomologists. Dr. L. O. Howard, Chief of the Bureau of Entomology of the United States Department of Agriculture, has devoted much time to the study of this family, and to him, more than to any one else, science is indebted for its knowledge of this interesting and valuable group. Most of the species are parasitic, and most of them confine their attacks to one class of insects. Some of them, unfortunately, attack some of our beneficial insects, so that they are not wholly beneficial from our viewpoint.

In speaking of this family Professor Howard says: "Nowhere in nature is there a more marked example of the co-relation between

structure and habits than occurs in this family. This co-relation descends to the relation between the parasites and their hosts, so that it is possible for an experienced person on seeing a new species of Chalcid fly to tell precisely what kind of an insect it will be found to be parasitic upon. For example, the species of the genus *Copidosoma* are always parasitic within naked caterpillars. Those of the genus *Bothriothorax* are always parasitic in small dipterous larvæ. The economic importance of the group is great. They are the most effective parasites of many of our most injurious insects. For example, in a certain year in the cotton fields of northern Florida ninety-five per cent of the eggs from which would have hatched the voracious cotton-caterpillar were killed by the minute Chalcid parasite, *Trichogramma pretiosa*."

In our own State, the different species of this family form one of the most efficient checks on scale pests, usually burrowing into the scale and eating it out. How exceedingly minute some of them are is indicated by the fact that the red, yellow, and San José scales are all parasitized by members of this family, and, within the bodies of these insects, none of which are larger than the head of a pin, these little flies have ample room to live, grow, pass through all their changes, and emerge as perfect insects. We have often found from three to five parasites belonging to this group snugly ensconced within the body of a soft brown scale, and there was ample room for all without crowding.

Some of the Chalcids attack larger insects, and the cabbage-butterfly is largely kept down by the efforts of one of them, *Pteromalus puparum*, which lays its eggs on the caterpillar and reduces it to a state of "innocuous desuetude." One branch of the family closely approaches the gall-flies in structure and habits.

The family **Proctotrupidæ** contains the smallest members of the Hymenoptera. They are all parasitic, many of them being parasitic on the eggs of other insects. How small they are may be understood by the statement that, in some cases, as many as half-a-dozen of them will live and pass through all their changes within one minute egg of an insect, moth, butterfly, or bug. Some live in the larvæ of other insects, some exist wholly in the nervous system, others in the digestive tract. The largest of them is not over one twenty-fifth of an inch in length, while the smallest (*Alaptus excisus*) measures between six and seven one-thousandths of an inch.

Suborder ACULEATA.

We now come to the second branch or suborder of the Hymenoptera, which includes the species armed with stings. Most of our readers have made acquaintance with them, as the group includes the wasps,

hornets, bees, and ants. These are divided into families as follows, according to Comstock's classification:

THE STINGING HYMENOPTERA. Suborder Aculeata.

The Pelecinus. Family Pelecinidæ.

The Cuckoo-flies. Family Chrysididæ.

The Ants. Superfamily Formicina.

Family Formicidæ.

Family Poneridæ.

Family Myrmicidæ.

The Digger Wasps. Superfamily Sphecina.

The Velvet-ants. Family Mutillidæ.

The Scoliids. Family Scoliidæ.

The Sapygids. Family Sapygidæ.

The Spider-wasps. Family Pompilidæ.

The Thread-waisted Wasps. Family Sphecidæ.

The Ampulicids. Family Ampulicidæ.

The Larrids. Family Larridæ.

The Bembecids. Family Bembecidæ.

The Nyssonids. Family Nyssonidæ.

The Philanthids. Family Philanthidæ.

The Mimesids. Family Mimesidæ.

The Mellinids. Family Mellinidæ.

The Pemphredonids. Family Pemphredonidæ.

The Crabronids. Family Crabronidæ.

The True Wasps. Superfamily Vespina.

The Guest Wasps. Family Masaridæ.

The Solitary Wasps. Family Eumenidæ.

The Social Wasps. Family Vespidæ.

The Bees. Superfamily Apina.

The Short-tongued Bees. Family Andrenidæ.

The Long-tongued Bees. Family Apidæ.

It is in this suborder that we find the fullest development of the social instinct. With the social bees, wasps, and ants, every interest is sacrificed for the good of the community. Here

"None is for himself,
But all are for the state."

None of the members of this suborder are of direct importance to us, being beneficial only incidentally. The wasps are all predaceous, many of them preying upon the larvæ of injurious species, while the work of the bees is too well known to need enlargement in these pages. Probably we owe more to this group for their work in the pollenization of plants and fruits, perhaps in the cross-fertilization of species—hybridization—and probably even the production of new species, than for any

other benefits they render us. Were it not for their labors in this direction, aided by other insects, true, and perhaps to some extent by other means, it is not improbable that a very large part of the vegetable world would perish and man and other members of the animal kingdom suffer correspondingly. A cursory glance at the various families comprising this suborder is, therefore, all that is required in this place.

The family **Peleciniidæ** is a very small one, in which the distinguishing peculiarity is the great length of the abdomen in the female.

The family **Chrysididæ**, better known as the cuckoo-flies, have the habit of the bird after which they are named, of laying their eggs in the nests of other wasps and leaving them to be fed by the owner of the nest. As the larva develops, it either turns out the proper occupant of the cell or devours it. They are beautiful insects, the body being a brilliant metallic green.

Superfamily **Formicina**. (Ants.)

The ants have been erected into a superfamily called Formicina, and this superfamily is divided again into three families: the **Formicidæ**, **Poneridæ**, and **Myrmicidæ**. Ants are so distinct from all other insects, and so well known to most people, that no description is needed here. There is but one other class of insects likely to be mistaken for them, the Termites, which are not ants at all, although called "white-ants." These do not at all resemble ants in appearance, either in form or in color, but being communistic insects have somewhat the habits of ants in this regard. Termites resemble ants in the fact that they congregate together in immense numbers, and are divided into different classes, each class having separate and well-defined duties to perform in the community. Aside from this their habits are entirely different.

All the species of ants are composed of three classes of individuals: males, females and neuters, or workers, which latter are really undeveloped females. All ants live in communities of greater or less extent, and in some cases these colonies are exceedingly populous. By what system of laws these densely populated communities are governed is unknown, but it is known that each class performs its appointed duties without let or hindrance and that all move smoothly and harmoniously. The workers perform all the work of the colony, and their numbers exceed the other classes many times over. There are usually several perfect females whose sole duty is to maintain the strength of the colony, and for a short time during the early summer a great number of young females and males are produced. These quit the nest together, never to return. They are the ones which found new colonies, and out

of thousands which start forth, vast numbers of them perish, falling a prey to birds and other causes. There is much that is fascinating in the life of an ant, and these insects have been a great favorite with entomological students even from the time of Solomon, as is indicated by his advice: "Go to the ant, thou sluggard; consider her ways and be wise." Many books have been written of them, and when we consider their intelligence and that in many respects they resemble man, it is not strange that we should be interested in them. We find among them a perfect system of government; also a highly specialized division of labor, many of our trades being represented, such as architects, builders, agriculturists, tailors, masons, and many other trades corresponding to those followed by man. The rare intelligence exhibited by ants in attending to and caring for their young is astonishing. They watch the eggs and larvæ night and day, and remove them from place to place, as they require more or less light, warmth, and moisture. When an ants' nest is disturbed the workers first of all secure the young and take them to a place of safety, this instinct being even greater than that of self-preservation, for they will risk the greatest dangers and their own lives for the eggs and cocoons of the young insects. That they are able to communicate and transmit intelligence is evident, too, and this is done by means of their antennæ. They play like children when they have leisure, and have so many striking peculiarities that there is a charm in them for those who are not interested in entomology.

They have, however, little economic importance, for, except incidentally, they are neither hurtful nor beneficial. If anything rather the former, as, in their efforts to get the exudation of honey-dew from aphids and scale-bugs, they often spread these insects into new locations, and they sometimes prey upon the soft larvæ of some of the lady-birds, and thus keep down our beneficial insects. The small red ant found in the house becomes a pest by reason of its enormous numbers, which increase in the summer. This is essentially a domestic species, having its nests in the walls and floors of our houses. It is sometimes very difficult to trace it, but usually by careful watching the location of the nest can be found, when it may be driven out by the application of coal oil to the runways.

Superfamily **Sphecina**. (Digger-wasps.)

The next superfamily is the Sphecina, and is composed of the solitary wasps, the digger-wasps, or *Fossores*. This name is given to them from the fact that each female makes a nest for herself, usually by burrowing in the ground or boring into wood. Some, as the so-called mud-daubers, construct tubes, while others use any suitable tunnels they can find, or even utilize the hollow stems of plants, in which to deposit

their eggs and provide for their young. These nests are usually provided with food for the young wasps in the form of the preserved bodies of other insects or spiders. Many species provision their nests with caterpillars, others with spiders. The parent wasp possesses some kind of fluid which she injects into the victim, and which renders it apparently senseless, but which, instead of killing, preserves its life, and it will remain in this condition perfectly fresh until required by the larvæ of the wasps for food.

Comstock gives us fourteen families under the superfamily Sphecina, to most of which only a passing allusion is necessary.

The family **Mutillidæ** are the velvet-ants. The females are wingless and strongly resemble ants in appearance, but their bodies are covered with a dense growth of hair, which has given them their common name.

The family **Scoliidæ** very strongly resembles the foregoing family. Members of this family do not build a burrow, but find the larvæ of other insects in the ground, and upon these they lay their eggs, which, hatching, consume the host insect. So far, this wasp may be regarded as beneficial.

The family **Sapygidæ** is a small one, the members of which are usually found in the nests of bees. It has no economic importance.

The family **Pompilidæ** includes about a hundred and twenty species, and they are commonly known as the spider-wasps, on account of their habit of provisioning their nests with spiders, which they sting and reduce to a dormant condition. They are generally slender insects with long legs, and usually brilliantly colored and beautifully marked. While generally of moderate size, some of the species are very large, and here we find the well-known tarantula-hawk (*Pepsis formosa*).

The family **Sphecidæ** comprises the thin-waisted wasps, and includes the well-known mud-daubers. These are commonly known as the thread-waisted wasp, on account of the thin, thread-like process which connects the abdomen with the thorax, and which is composed of the first two segments of the abdomen. This family is a very conspicuous one and embraces about seventy species in the United States, most of them well known from their peculiar form and habits. They build their cells from mud, and stock them with spiders or caterpillars, after first depositing an egg in the bottom. When hatched, the young larva finds an abundance of preserved food awaiting it, and remains in the cell until it has passed through all the changes, when it emerges a perfect insect.

The family **Larridæ** is composed of moderate-sized insects, which frequent sandy locations.

The family **Bembecidæ** includes some of the larger forms of this order. They make their nests in burrows, which they excavate in sandy places, and store them with flies. The larger species attack cicadas, and one may often be seen carrying away a cicada larger than itself.

The families **Nyssonidæ** and **Philanthidæ** are two groups of insects having the same general characters and habits as the foregoing, but differing in points of structure and wing venation.

The families **Mimesidæ**, **Pemphredonidæ**, and **Crabronidæ** are rather borers than diggers, although classed with the digger-wasps. They usually burrow into the stems of pithy shrubs and form their nests therein. As in all the other members of this order, these nests are stored with the preserved remains of other insects, so that all may be classed as beneficial.

Superfamily **Vespina**. (True Wasps.)

The true wasps are included in three families, grouped together in the superfamily **Vespina**. Insects belonging to this superfamily are all winged, and when at rest fold their wings lengthwise like a fan. The legs are not suited for burrowing. It is in this superfamily that we find the paper-wasps and nest-builders.

The three families under this group are the **Masaridæ**, the **Eumenidæ**, and the **Vespidæ**. The first of these is a small family of no importance in this place.

The second is a family of solitary wasps, the members of which vary in their habits, some being builders and some burrowers. Some of them build nests of mud, while others bore tunnels into wood in order to provide for their young.

The third family is of more interest, as it includes the social wasps, the nest-builders, and paper-makers. It is here that we find our well-known friends, the yellowjackets. These belong to the genus *Vespa*, and most of our readers, especially those who live in or have been in the country, are very familiar with their appearance and not unfamiliar with their mode of defense. Their nests, which are sometimes attached to buildings, trees, or fences, are made of paper, and are very elaborate specimens of architecture. Being social insects they accomplish some great works, and it is no uncommon thing to find one of these nests as large as a water-bucket. Sometimes they make their nests underground, either excavating a hole for the purpose, or taking possession of one already formed.

Superfamily **Apina.** (Bees.)

We now come to the bees, the last and highest of the Hymenoptera. It is here that we find the greatest intelligence displayed in the insect world. No insect has been so thoroughly studied as the bee. Books and libraries have been written about bees, and the most wonderful stories told of their intelligence, which would seem to far exceed anything we can call instinct and to closely approach human reason. They present to us the highest known type of social life, and the most perfect form of government.

Bees have been placed under the superfamily Apina, which is divided into two families, the **Andrenidæ** and the **Apidæ**, or the short- and the long-tongued bees. The habits of members of the different families vary greatly. Some are solitary, making a nest for themselves, and storing it with honey and pollen. Others can live only in communities. Some are very small, one of the mining-bees measuring but from one hundredth to three hundredths of an inch in length.

So far as relates to agriculture, bees are beneficial. They are not parasitic, like some of the other families of the order, although there are some bees parasitic on others, but in their work of gathering honey they are one of the greatest agencies in nature in the fertilization of plants.

Many species of both families are troubled by parasitic or cuckoo bees. These build no nest for themselves, but look out for a nest of the mason, carpenter, or other bee. When she discovers one at work, she watches, and as fast as the cells are completed, lays an egg at the bottom. This egg hatches before the egg of the rightful owner, and the larva of the intruder proceeds to eat the provisions stored by the careful mother of the rightful owner, and finally consummates its evil work by eating the young of the nest-builder.

Of the social bees, including the honey-bee, little need be said here, as the subject is too great to be handled in a few pages, and our object is merely to draw attention to the science of entomology, not to enlarge upon it, and also to draw special attention to those families which are either directly beneficial or injurious to our orchards.

The foregoing will serve to give our readers some general idea of the important science of Entomology. As stated at the commencement, the work is not designed to be thorough in any respect, and pretends only to give an introduction to this great science. Those of our readers who wish to follow it to a greater extent are referred to the following works:

“Entomology for Beginners,” by A. S. Packard; “American Insects,” by Vernon L. Kellogg; “Manual for the Study of Insects,” by John

Henry Comstock; "Economic Entomology," by John B. Smith; "The Insect Book," by L. O. Howard; "The Moth Book" and "The Butterfly Book," by W. J. Holland, and "Entomology, with Special Reference to its Biological and Economic Aspects," by Justus Watson Folsom.

Very many other excellent works on entomology might be recommended, but the above or any of them will be found valuable to the student of this science. In addition to these are the many excellent publications issued from time to time by the Federal Government, which can be secured by the student upon application.

THE COCCIDAE OF CALIFORNIA.

By EDWARD K. CARNES.

About sixteen years ago the State Board of Horticulture published a list of the Coccidæ (scale insects) of California, giving some twenty species found in the State. At that time comparatively little was known, by the residents of the State, about scale bugs or the amount of injury that could be caused by them; yet, to-day, there is no other single family of insects that is as important to the horticulturists of the world as are these minute creatures, and we can not know too much about them.

As a group they are very unattractive to the average entomologist, and even more so to the average horticulturist, yet a knowledge of the species and the best known methods of combating their attacks is a very essential part of the education of every successful fruit-grower. Fruit-growing is a competitive business, and the successful grower must avail himself of every opportunity to gain knowledge that will be of assistance to him in his business; therefore, it has been deemed advisable to bring before his notice the following list of species occurring in California, with illustrations and short descriptions of the more important varieties, in order to enable the grower to recognize and distinguish between the destructive species and those that are not so destructive. Since the first list was published, and especially during the last few years, there has been a very active period among the growers, orchardists, nurserymen, and those having greenhouse interests, to gain a knowledge of "scale insects." This activity has not been prompted by a love of the study of this particular branch of entomology, but purely as a business proposition, for these seemingly insignificant insects are capable of causing an enormous loss to the orchard, vineyard, nursery, or field in which they have gained a foothold. It must be remembered that each scale insect, after it has settled on the trunk, branch, or leaf of its particular host plant, virtually turns itself into an automatic pump and extracts the sap which is so vital to the life and growth of the tree. Usually the damage is done before the infestation is discovered, as many of our growers are absolutely without the slightest knowledge of scale insects. A tree, plant, or shrub will put forth every effort to sustain itself against the attack of the insect and will not show any immediate damage from the insects at work upon it, but even the strongest tree must ultimately yield to the persistent pumping of its life sap by the enormous number engaged in the work, and will suddenly

collapse and die. This damage and loss might easily be overcome had the grower possessed a slight knowledge of the nature and work of scale insects, for remedial measures could have been applied at the first notice of their presence and their ravages stayed. It is partly with the idea of presenting this knowledge to the grower that the writer has deemed it advisable to publish the following list of 132 species which have been reported from this State, but of which list only 114 are actually found here. This list, with the illustrations and descriptions, it is hoped will enable the grower to recognize the destructive species and, with this knowledge at hand, avoid the danger and loss which their presence, unmolested, would eventually cause.

By personally collecting over the State, and with the kindly assistance of many residents of the State who are interested in the study of Coccidæ, and who have sent many specimens from various localities, the writer has been able to bring together the present authentic list.

The nomenclature of the "Coccidæ of the World," by Mrs. Fernald, has been followed in connection with the classification of the species. In this valuable work on Coccidæ, California has been credited as the habitat of several very destructive species which, in fact, are not to be found in the State, having been reported from quarantine only; other species are found only in greenhouses; and still others, the presence of which I have personally investigated, are to be found in California which are not given in the catalogue mentioned; these latter species I have added to the list of California Coccidæ. Undoubtedly additional species could be added to the list by closer investigation and collecting, as several new species are being prepared for publication, but which I am sorry to say will not be completed in time for this report. Additional species will be added to the list from year to year as they are discovered or described. The writer has only included the species known to exist in California at the present time.

For the descriptions and classification of the species mentioned the writer has freely consulted most of the leading entomological works on the subject of Coccidæ, and wishes to acknowledge the aid received from the efforts of the many able writers who have contributed to this subject; also, takes this opportunity to thank all those persons who have assisted in the work and made it possible to compile the present list.

While the primary object of this paper is to serve as a list for the benefit of fruit-growers, at the same time it is hoped that it may be useful to those students of Coccidæ who are making a study of the California forms. The scientific descriptions may not be of much benefit to the former class, yet they are indispensable to the latter in determining species, and have been added to encourage the study of this most important family. At the same time, the writer has endeavored

to make the descriptions as plain as possible so that the average person can determine the different species with some degree of accuracy.

It must be remembered that when viewing one of the Diaspinæ externally, we are not looking at the real insect, but by carefully lifting up the shell-like covering the real culprit will be discovered underneath, as this covering only serves as a protection for the insect itself. Under the shell, the scale-bug appears as a legless, wingless, and almost shapeless form. For close study, by advanced students, it is removed from under the scale which covers it, and boiled in a solution of potash until colorless; it is then placed for about two hours in a water bath, and then mounted on a glass slide in glycerine jelly. The specimen is now ready for classification, and with the aid of a good compound microscope the distinguishing features can be easily recognized.

The descriptions of the more important species have been given, also reference has been made to others where the descriptions were not available. Illustrations of many of the species have also been added. Because of the fact that the amount of space which has been allotted to this paper is limited, the author has not been able to make it as complete as the importance of the subject demands; however, it is hoped that it will serve the purpose for which it is intended.

COCCIDAE OF CALIFORNIA.

(Scale Insects and Mealy-Bugs.)

Order HEMIPTERA. Family COCCIDÆ.

The following list of 132 species has been recorded, in the entomological literature of the world, as occurring in California. Those species included in this list designated by an asterisk (*) have been reported from quarantine and are not established in this State:

Subfamily MONOPHLEBINÆ.

SPECIES.

HOST PLANT.

<i>Icerya purchasi crawii</i> Ckll.	Orange, Lemon, Grape-fruit, Acacia, Pittosporum, Laburnum, Broom, Rose.
<i>Icerya purchasi maskelli</i> Ckll.	Food plants, same as above.

Subfamily MARGARODINÆ.

<i>Xylococcus quercus</i> Ehrh.	<i>Quercus chrysolepis</i> .
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Subfamily ORTHEZIINÆ.

<i>Orthezia insignis</i> Dougl.	<i>Coleus</i> , <i>Verbena</i> , <i>Chrysanthemum</i> , <i>Citrus</i> , <i>Tomato</i> , <i>Strawberry</i> . (In greenhouse.)
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Subfamily DACTYLOPIINÆ.

SPECIES.	HOST PLANT.
<i>Asterolecanium quercicola</i> Bouche	Oak.
<i>Lecaniodiaspis rufescens</i> Ckll.	Adenostoma oblongifolia.
<i>Cerococcus ehrhorni</i> Ckll.	Live Oak.
<i>Cerococcus quercus</i> Coms.	Oak.
<i>Pollinia pollini</i> Costa	Olive.
<i>Kermes austini</i> Ehrh.	Quercus oblongifolius.
<i>Kermes cockerelli</i> Ehrh.	Quercus lobata.
<i>Kermes galliformis</i> Riley	Oak.
<i>Kermes nigropunctatus</i> Ehrh., Ckll.	Oak.
<i>Gossyparia spuria</i> Modeer.	Elm.
<i>Eriococcus adenostomæ</i> Ehrh.	Adenostoma fasciculatum.
<i>Eriococcus araucaria</i> Mask.	Araucaria excelsa, A. bidwillii.
<i>Eriococcus artemisiæ</i> Kuw.	Artemisia.
<i>Eriococcus palmeri</i> var. A. Ckll.	Eriogonum fasciculatum.
<i>Dactylopius coccus</i> Costa.	Cactus sp.
<i>Sphærococcus distichlium</i> Kuw	Distichlis maritima.
<i>Phenacoccus artemisiæ</i> Ehrh.	Artemisia californica.
<i>Phenacoccus simplex</i> King.	Atriplex.
<i>Phenacoccus stachyos</i> Ehrh.	Stachyos bullata.
<i>Phenacoccus kuwanæ</i> Col.	Lichen on Picea breweriana.
<i>Ceroputo bahiæ</i> Ehrh.	Bahia.
<i>Ceroputo yuccæ</i> Coq.	Yucca sp.
<i>Ceroputo yuccæ ceanothi</i> Ckll.	Ceanothus oliganthus.
<i>Pseudococcus aurilanus</i> Mask.	Araucaria bidwillii.
<i>Pseudococcus azalæ</i> Tins.	Azalea. (In Japanese nursery.)
<i>Pseudococcus calceolarie</i> Mask.	New Zealand Flax. [etc.
<i>Pseudococcus citri</i> Risso.	Orange, Lemon, Ivy, Coleus, Croton,
<i>Pseudococcus crawii</i> Coq.	Sagebrush.
<i>Pseudococcus ephedræ</i> Coq.	Ephedra californica.
* <i>Pseudococcus iceryoides</i> Mask.	Fagus fusca.
<i>Pseudococcus longispinus</i> Targ.	Fern, Croton, Cycas revoluta, and many other plants.
<i>Pseudococcus maritimus</i> Ehrh.	Eriogonum latifolium.
<i>Pseudococcus pseudonipæ</i> Ckll.	Cocanut Palm. (In greenhouse.)
<i>Pseudococcus quercus</i> Ehrh.	Quercus chrysolepis.
<i>Pseudococcus ryani</i> Coq.	Cupressus macrocarpa.
<i>Pseudococcus salinus</i> Ckll.	Grass.
<i>Pseudococcus sequoiæ</i> Col.	Redwood. [decurrens.
<i>Pseudococcus andersoni</i> Col.	Cupressus goveniana, Libocedrus
<i>Pseudococcus dudleyi</i> Col.	Cupressus macnabiana.
<i>Erium eriogoni</i> Ehrh.	Roots of Eriogonum.
<i>Ripersiella kelloggi</i> Ehrh., Ckll.	Roots of Bunch-grass.

SPECIES.	HOST PLANT.
<i>Rippersia festucae</i> Kuw.	Festuca scabrella.
<i>Rippersia villosa</i> Ehrh.	Quercus agrifolia.
<i>Antonina crawi</i> Ckll.	Bamboo.

Subfamily COCCINÆ.

<i>Pulvinaria bigeloviae</i> Ckll.	Bigelovia.
<i>Pulvinaria camelicola</i> Sign.	Camellia. (In greenhouse.)
<i>Pulvinaria ehrhorni</i> King.	Willow, Alder.
<i>Pulvinaria innumerabilis</i> Rathv.	Apple, Pear, Grape, Willow, etc.
<i>Pulvinaria psidii</i> Mask.	Fern, Pittosporum. (In gr'nhouse.)
<i>Pulvinaria rhois</i> Ehrh.	Rhois diversiloba. [tum.
<i>Exæretopus caricis</i> Ehrh.	Carex breweri, Trisetum subspica-
<i>Ceroplastes ceriferus</i> Anderson.	Camellia. (In greenhouse.)
<i>Ceroplastes cistudiformis</i> Town, Ckll.	Pepper-tree.
<i>Ceroplastes cirripediformis</i> Comst.	Pepper-tree.
* <i>Ceroplastes floridensis</i> Comst.	Citrus, Mango, Anthurium.
<i>Ceroplastes irregularis</i> Ckll.	Atriplex sp.
<i>Vinsonia stellifera</i> West.	Orchids, Ferns, Cocconut Palms. (Orchid in greenhouse.)
<i>Eucalymanatus perforatus</i> News.	Kentia Palms. (In greenhouse.)
<i>Coccus hesperidum</i> Linn.	Orange, Lemon, Grape-fruit, Ole- ander, Ivy, Maple, Laurel, etc.
<i>Coccus ventralis</i> Ehrh.	Tuberous plants. (In Japanese Nursery.)
<i>Eulecanium adenostomæ</i> Kuw.	Adenostoma fasciculatum.
<i>Eulecanium armeniacum</i> Craw.	Apricot, Peach, Plum, Pear, Prune, Cherry, Grape, etc.
<i>Eulecanium cerasorum</i> Ckll.	English Walnut, Pear.
<i>Eulecanium crawii</i> Ehrh.	Acer macrophyllum.
<i>Eulecanium magnoliarum</i> Ckll.	Virginia Creeper, Grape.
<i>Eulecanium pruinatum</i> Coq.	Prune, Apricot, Peach, Plum, Haw-
<i>Eulecanium pubescens</i> Ehrh.	Oak. [thorn, Rose, Apple.
<i>Eulecanium quercitrionis kermoides</i> Tyr.	Oak.
<i>Eulecanium tulipiferæ</i> Cook.	Cherry.
<i>Saissetia filicum</i> Bdv.	Ferns.
<i>Saissetia hemisphærica</i> Targ.	Orange, Cycas revoluta, Ferns.
<i>Saissetia hemisphærica hibernacu-</i> <i>lorum</i> Bdv.	Ferns, and various hothouse plants.
<i>Saissetia nigra</i> Nietn.	Palms. (In greenhouse.)

SPECIES.	HOST PLANT.
<i>Saissetia oleæ</i> Bern.	Olive, Orange, Lemon, Grape-fruit, Peach, Prune, Plum, Apricot, Apple, Pear, Pomegranate, Oleander, Rose, Pittosporum, and many other plants and shrubs.
<i>Physokermes insignicola</i> Craw.	<i>Pinus insignis</i> .
<i>Physokermes concolor</i> Col.	<i>Abies concolor</i> .
<i>Physokermes taxifoliæ</i> Col.	<i>Pseudotsuga taxifolia</i> .
<i>Aclerda californica</i> Ehrh.	<i>Andropogon furcatus</i> .
<i>Aclerda tokionis</i> Ckll.	Bamboo.

Subfamily DIASPINÆ.

* <i>Chionaspis citri</i> Comst.	Orange.
* <i>Chionaspis difficilis</i> Ckll.	Elæagnus.
<i>Chionaspis ortholobis</i> Comst.	Willow.
<i>Chionaspis pinifoliæ</i> Fitch.	Pine and other coniferous trees.
<i>Chionaspis quercus</i> Comst.	Oak.
<i>Chionaspis salicis-nigræ</i> Walsh.	Willow, Ceanothus.
* <i>Chionaspis wistariæ</i> Cooley.	Wistaria. (From Japan.)
* <i>Howardia biclaris</i> Comst.	Orange.
<i>Diaspis bromeliæ</i> Kuw.	Pineapple.
<i>Diaspis carueli</i> Targ.	Juniper, Cupressus.
<i>Diaspis cattleyæ</i> Ckll.	Cattleya.
* <i>Aulacaspis crawii</i> Ckll.	Elæagnus umbellata.
* <i>Aulacaspis pentagona</i> Targ.	Flowering Peach, Plum, Sago-palm.
* <i>Aulacaspis pentagona auranticolor</i> Ckll.	[Japan.] Osmanthus illicifolia. (From
<i>Aulacaspis rosæ</i> Bouche.	Rose, Blackberry, Raspberry. (Infesting the canes.)
* <i>Phenacaspis aucubæ</i> Cooley.	Aucuba. (From Japan.)
* <i>Phenacaspis chinensis</i> Ckll.	Quercus. (From China.)
* <i>Phenacaspis cockerelli</i> Cooley.	Palm. (From China.) [Japan.]
* <i>Phenacaspis latissima</i> Ckll.	Distylium racemosum. (From
<i>Hemichionaspis aspidistræ</i> Sign.	Aspidistar lurida. [Japan.]
* <i>Leucaspis japonica</i> Ckll.	Broom, Maple, Peonia. (From
<i>Leucaspis cupressi</i> Col.	Cupressus goveniana. [nifica.
<i>Leucaspis kelloggi</i> Col.	<i>Pseudotsuga taxifolia</i> , <i>Abies mag-</i>
<i>Fiorinia fioriniæ</i> Targ.	Cocoanut-palm, Camellia, Ferns, Ficus sp.
<i>Epidiaspis piricola</i> Del Guer.	Pear, Plum, Apple, Peach.
<i>Aspidiotus æsculi</i> Johns.	<i>Æsculus californica</i> .
<i>Aspidiotus hederæ</i> Vall.	Oleander, Ivy, Lemon, Asparagus, Fern, Cycas revoluta, Palms, Orchids, Camellia.

SPECIES.

HOST PLANT.

<i>Aspidiotus juglans-regiæ</i> Comst.	English walnut.
* <i>Aspidiotus ostreæformis</i> Curt.	Pear, Apple.
* <i>Aspidiotus perniciosus</i> Comst.	Apple, Pear, Peach, Quince, Apricot, Plum, Hawthorn, Rose, Currant, Raspberry, etc.
* <i>Aspidiotus perniciosus albopunctatus</i> Ckll.	Orange, Plum. (From Japan.)
<i>Aspidiotus rapax</i> Comst.	Willow, Holly, Ivy, Acacia, Orange, Pittosporum, Camellia, Palms, Ferns, etc.
<i>Aspidiotus californicus</i> Col.	<i>Pinus sabiniana</i> , <i>P. ponderosa</i> , <i>P. lambertiana</i> , <i>P. attenuata</i> .
<i>Aspidiotus coniferarum shastæ</i> Col.	<i>Cupressus macnabiana</i> .
<i>Aspidiotus ehrhorni</i> Col.	Under lichens on <i>Abies concolor</i> , <i>Libocedrus decurrens</i> .
<i>Aspidiotus florenciæ</i> Col.	<i>Pinus ponderosa</i> .
<i>Pseudaonidia duplex</i> Ckll.	Camellia. (In Japanese nursery.)
* <i>Pseudaonidia pæonia</i> Ckll.	Peony. (From Japan.)
<i>Chrysomphalus aonidum</i> Linn.	Palms. (In greenhouse.)
<i>Chrysomphalus aurantii</i> Mask.	Orange, Lemon, Grape-fruit, Rose, <i>Cycas revoluta</i> , and species of Palms.
<i>Chrysomphalus aurantii citrinus</i> Coq.	Orange, Oleander, Palms.
<i>Chrysomphalus tenebricosus</i> Comst.	Maple, Apple.
<i>Targionia bigeloviæ</i> Ckll.	<i>Bigelovia brachylepis</i> .
* <i>Odonaspis bambusarum</i> Ckll.	Bamboo. (From Japan.)
<i>Lepidosaphes beckii</i> Newm.	Orange, Lemon, Grape-fruit, Palms.
<i>Lepidosaphes crawii</i> Ckll.	<i>Quercus cuspidatus</i> .
<i>Lepidosaphes gloverii</i> Pack.	Orange.
<i>Lepidosaphes ulmi</i> Linn.	Apple, Pear, Plum, Willow.
<i>Parlatoria pergandii</i> Comst.	Orange.

DESCRIPTION OF THE MORE IMPORTANT SPECIES, WITH NOTES.

Accompanying the descriptions of the more important species in the following pages will be found a number of illustrations, which will give the reader a fair idea of the general appearance of the different forms of scale insects, as well as a colored plate showing members of each of the principal subfamilies represented in California.

For the convenience of the County Horticultural Commissioners and Inspectors, as well as of others interested in this study, a number of plates have been added, showing original drawings of the last abdom-

inal segments of many of our more important species. In the study of scale insects, especially those members of the subfamily Diaspinæ, in order to make final determination of the species the first requisite is a good microscope. The last abdominal segment of the adult female presents peculiar organs, designated by distinct names. These terms must be recognized by their various names in order to accurately determine any given species from the technical description. A glossary of the scientific terms used in the descriptions of the Coccidæ is presented herewith. On Plate III will be found an illustration of the last abdominal segment of an adult female Diaspinæ, showing the form and position of the terms used. By careful study of this figure, aided by the glossary, the technical descriptions will lose their mystification to the beginner, and after a little practice any intelligent person, aided by the microscope, will be able to identify species with some degree of accuracy.

When the determination of a scale insect is wanted, first observe the name of the host plant upon which it is found, then turn to the list of species and note what scales are found upon that particular plant in California. In case there are several species, note the general description of the scale in hand and compare it with the illustrations, and, in many cases, the determination may be made from this alone. If this is not sufficient, read the description of the female, and in this case the final determination calls for the use of the microscope. By following the description and referring to Plate III the various organs used in the determination of the species will be seen and made clear. The descriptions have been systematically arranged according to subfamily and genus.

GLOSSARY OF TERMS USED IN DESCRIPTIONS.

- Abdomen.** All the hinder part of the insect, the third of the three main divisions of the body (head, thorax, and abdomen).
- Anal Lobes; Anal Plates.** A small pair of triangular processes forming a valve which covers the anal orifice.
- Anal Orifice.** The external opening of the intestine.
- Anal Ring.** A circumscribed ring encircling the anal orifice.
- Anal Tubercles.** A pair of prominent rounded processes on each side of the anal orifice.
- Antennæ.** A pair of jointed organs or feelers situated on the head.
- Appendages.** General term for antennæ, mouth parts, and legs of an insect.
- Bicuspid.** Having two points.
- Carina.** A keel or ridge.
- Carinated.** Keeled, ridged, or ribbed.
- Castaneous.** Shiny, reddish brown.
- Caudad.** Situated toward the tail.
- Cephalæ.** Pertaining to the head.
- Cephalothorax.** The anterior part of the body, comprising the head and thorax.
- Chitinous.** Consisting of a horny substance present in the skin and harder parts of insects.

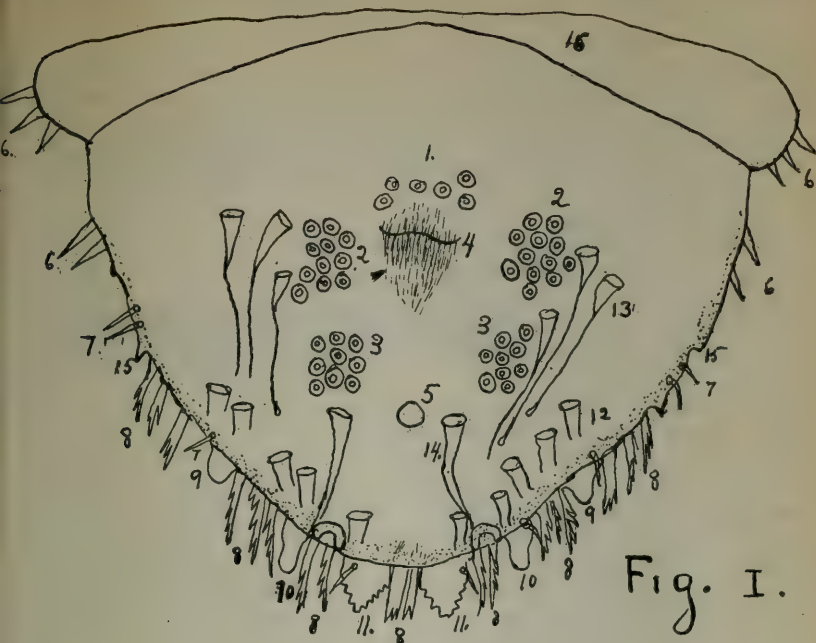


Fig. I.

FIG. 1. PYGIDIUM OF FEMALE DIASPINÆ.

Circumgenital glands or spinnerets (in groups 1, 2, 3).

- | | |
|---|---|
| 1. Median group. | 12. Tubular spinnerets. |
| 2. Upper laterals. | 13. Trumpet-shaped filiform spinnerets. |
| 3. Lower laterals. | 14. Trumpet-shaped tubular spinnerets. |
| 4. Genital aperture. | 15. Marginal prominence. |
| 5. Anal aperture. | 16. Abdominal segment. |
| 6. Spine-like plates. | |
| 7. Spines. | |
| 8. Fimbriated plates. | |
| 9. Third pair lobes. | |
| 10. Second pair lobes. | |
| 11. First or median pair lobes—serrate. | |

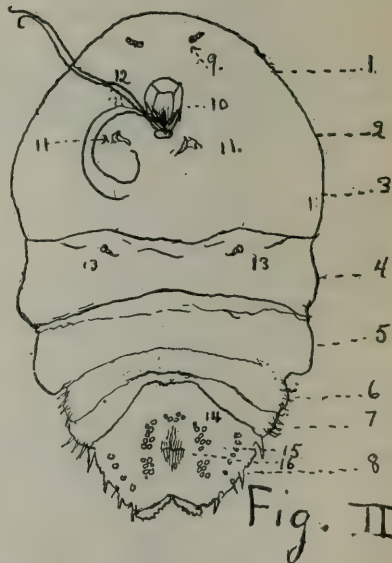


Fig. II

FIG. 2. BODY OF FEMALE DIASPINÆ.

- | | |
|------------------------------|---|
| 1. Head. | 11. Anterior spiracles. |
| 2. Prothorax. | 12. Rostral setæ. |
| 3. Mesothorax. | 13. Posterior spiracles. |
| 4. Metathorax. | 14. Spinnerets or circumgenital glands. |
| 5, 6, 7. Abdominal segments. | 15. Genital aperture. |
| 8. Pygidium. | 16. Pores of tubular spinnerets. |
| 9. Antennæ. | |
| 10. Rostrum. | |

C. T. P., del.

Circumgenital Glands. Small circular glands in distinct groups around the genital orifice.

Coxa. The basal joint of the leg.

Depressed. Flattened from above downward.

Digitules. Appendages frequently present on the feet of Coccidæ.

Dorsal. Relating to the back or upper parts of the body.

Dorsal Scale. The part of the covering scale that lies above the scale proper and the part seen when viewing a scale externally; between this and the ventral scale is found the female.

Dorsum. The back or upper part of the body.

Exuvix. The discarded skins shed at the periodical molts.

Femur. The thigh or upper part of the leg.

Filliform. Thread-like.

Honey-dew. A sweet, sticky substance exuded by the Coccidæ and other insects.

Inclined. With marginal slits or notches.

Laterad. Toward the side.

Larva. The immature insect.

Lobe. Any prominent rounded process. (See illustrated plate.)

Mesad. Situated toward the middle.

Mesal. Relating to the middle.

Metamorphosis. The transformations of an insect during its development.

Ocelli. The simple or supplementary eyes.

Oviparous. Producing eggs.

Ovoviviparous. Producing eggs which are hatched within the body of the parent.

Parasitized. Containing parasites.

Pellicles. The "exuvix" or cast larval skins.

Plate. Any broad, flattened piece.

Processes. Any prominent portions of the body not otherwise definable.

Pupa. The chrysalis or resting stage of an insect.

Pygidium. The compound terminal segment of the body. (See illustrated plate.)

Rostral Setæ. The four long, hair-like processes which together form the sucking tube.

Secretion. Matter produced by the various glands of the body, more particularly the cottony, waxy, silken substances of which the coverings of many scale bugs are composed.

Segments. The transverse divisions of the body.

Serrated. With margin notched like a saw.

Seta. A stout hair or bristle.

Spiracles. The respiratory organs.

Tarsus. The terminal joints of the legs.

Thorax. The second or main division of the body; that part which bears the legs and wings when present.

Tibia. The single joint of the leg immediately succeeding the "femur" and preceding the "tarsus."

Truncate. With end having appearance of being abruptly cut off.

Ventral. Relating to the under surface of the body.

Ventral Scale. The under part of the covering scale, between the insect and the plant.

Subfamily **MONOPHLEBINÆ.*****Icerya purchasi crawii* Ckll.**

Female (after forming ovisac).—Light pinkish or yellowish red; the margin orange, with bunches of short black bristles; the back is largely covered with yellowish-white secretion. Ovisac somewhat larger and longer than *maskelli*; femora decidedly more slender.

On orange, lemon, grape-fruit, acacia, pittosporum, broom, rose.

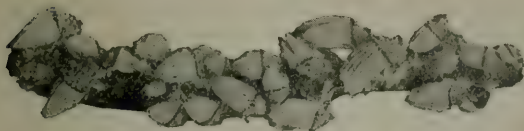


FIG. 1. *Icerya purchasi crawii*. Females on orange twig.



FIG. 2. Male of *Icerya purchasi crawii*.

***Icerya purchasi maskelli* Ckll.**

Female (after forming ovisac).—Slate gray or very dark purplish gray, sometimes brownish in the middle, with marginal dull orange spots. Back little covered by secretion. More hairy at the cephalic end than *crawii*. Ovisac not so large as in *crawii*, tinged with yellow just behind the body of the insect. It is *purchasi* in the strict sense and agrees very nearly, though not entirely, with Maskell's description.

Food plants: same as *I. crawii*.

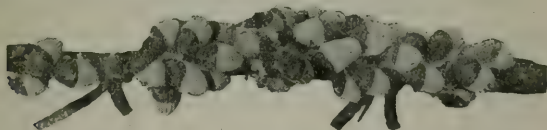


FIG. 3. *Icerya purchasi maskelli*. Females on orange twig.

The two species above mentioned are well known to almost every resident of California, and are commonly known as the cottony-cushion scale, the white scale, or the fluted scale. Until the introduction of their natural insect enemy (*Novius* [*Vedalia*] *cardinalis*) this pest engaged the attention of our citrus-growers more than any one thing, but within a few short months after its introduction, *N. cardinalis* had the pest practically controlled and has held it so for many years. To-day it is hard work to find enough of the scale to keep the breeding cases in our Insectary supplied with food. The two species mentioned are usually associated with each other on the same tree. They may be distinguished in the adult stage, however, as one is a light form and the other dark.

Subfamily **MARGARODINÆ.****Xylococcus quercus** Ehrh.

The specimen taken in October is very dark in color, blackish, the markings being only faintly indicated.

Egg quite large, of a light orange color.

Young larvæ dark orange-red, active, body broadly oval, about $\frac{2}{3}$ mm. long. Legs and antennæ light brown, well developed. Antennæ short, 6-jointed. Joint 1 stoutest, joint 6 longest, and joint 4 shortest. Formula: 6 5 1 2 3 4. Joints 2 and 5 with three bristles. Joint 6 with numerous long stout bristles. Legs moderately long, with femur quite swollen. Tarsus longer than tibia. Digitules of tarsus fine hairs; those of claw long stout clubs curved upward. Each segment of abdomen bears a backward-directed short stout spine. On each side of anal tube is a long fine bristle. Anal tube large, with numerous stout spines. Stigmatal tubes well developed.

Female (second stage).—Body crimson, shiny, nearly spherical, about $1\frac{1}{2}$ mm. long, 1 mm. broad, surrounded by cottony and waxy secretion. Antennæ and legs wanting. Anal tube well developed, producing a glassy rod, like a stout white hair, rather brittle. Last segment of body dark brown. When cleared in KHO, surface of body finely granulated, more so near caudal end. Stigmatal tubes are large and well defined. There are numerous spines and gland openings scattered over the body.

Third and fourth stages very similar to second stage, but larger in each case than the preceding, and varying in the further development of stigmatal and anal tubes, glands, spines, etc.

Adult Female.—Head, thorax, legs, and antennæ reddish brown, abdomen blackish brown, segmentation distinct. There is a distinct constriction between the thorax and abdomen. Length of body about $5\frac{1}{2}$ mm., breadth $2\frac{1}{2}$ mm., quite convex above. Ventral side of abdomen concave, with revolute margins. Insect quite active. When ready to deposit eggs crawls into some crevice and produces a cottony cushion, on which it rests and secretes considerable white cotton over its entire body. Antennæ 9-jointed. Joint 1 longest and broadest, next in length is 2, then joint 9, and then 3. Joints 4, 5, 6, 7, and 8 are subequal, and are a little shorter than 3. Formula: 1 2 9 3 (4 5 6 7 8). Legs long and stout. Tibia twice as long as tarsus, both very hairy. Claw long and stout. Digitules fine hairs. Body sparsely covered with long stout spines, especially along the margin and caudal end. Stigmatal tubes very prominent. Anal opening simple and quite large.

Adult Male.—About 3 mm. long and $1\frac{1}{2}$ mm. broad, slightly pubescent. Color of abdomen reddish brown. Mesothorax black, with four raised

knobs. Front part of head black, eyes very prominent, strongly faceted, black. Legs and antennæ black and very hairy. Ventral surface of abdomen dark brown, segmentation distinct. Mesosternum black, a small black line on poststernum, and an irregular black patch on metasternum. Abdominal brushes with long stout glassy bristles about 6 mm. long. Style short, stout, and conical. Antennæ 10-jointed, very hairy, reaching beyond end of abdomen. Joint 2 shortest, joints 3 and 10 a little longer, and the other joints subequal. Each joint with numerous hairs. Wings large, about 3 mm. long and 1 mm. broad, expanse about 7 mm.; smoky, slightly pubescent, with a costal space blackish brown, halteres resembling small wings with several hooks. Legs long, stout, and very hairy. Femur much shorter than tibia. Tibia about four times as long as tarsus. Digitules fine hairs. Claw long, slender, and well curved. Digitules short clubbed-shaped hairs.

On *Quercus chrysolepis*.

This wonderful insect is of little economic importance and requires close inspection to detect its presence. A long white, thread-like protuberance is first noticeable coming out of the cracks of the bark on the oak while the female is buried underneath.

Subfamily ORTHEZIINÆ.

Orthezia insignis Dougl.

(Colored Plate II.)

Adult Female.—Body broad oval; width, 1.2 mm.; length, 1.5 mm., exclusive of lamellæ; ochreous, mottled to dark green; distinctly segmented. Arranged around the body, beginning with the second thoracic segment, are white, waxy plates or lamellæ. In the adult female the lamellæ are united posteriorly, forming a long, parallel-sided marsupium, which contains the eggs and young. The arrangement of the lamellæ can be better shown by a figure (See colored Plate II) than by a description. Antennæ 8-jointed, all fulvous except the black, somewhat fusoid eighth joint; the first joint is very stout, the second the stoutest and shorter than the remaining ones. Legs light brown, the darker tarsi bearing numerous fine spines.

Adult Male.—The slender, dusky body is about 1 mm. in length, and bears two large ovate, transparent wings with two veins united at the base. Wing expanse, 2.5 mm. The last segment bears on each side a long, white filament.

This insect is strictly a greenhouse species, and sometimes is very destructive to coleus, verbena, and chrysanthemum.

Subfamily **DACTYLOPIINÆ**.**Pollinia pollini** Costa.

This scale was introduced in 1887 from Italy on a shipment of olive trees, but its presence was not noticed until 1893, when the trees were destroyed and a careful search made for any other infestation. None has been noticed since that time, although a careful inspection has been made many times since, and it is reasonable to suppose that it was eradicated.

Kermes austini Ehrh.

Female Scale.—Spherical, about 4.5 mm. broad, 4 mm. long, 4 mm. high. Dorsum slightly covered with a waxy secretion. Scale not gibbous and segmentations indistinct, indicated by brown dots when seen through a lens. Color light brown, with several irregular white stripes running parallel with the segments. There is a distinct groove on the caudal portion of the scale, which is distinctly marked with brown. Scale more or less pitted; pits generally marked dark brown or black. Ventral scale is more or less flat and light brown. Keel not very prominent. When boiled in KHO derm is light brown, with several brown spots and numerous round gland-orifices, which are larger near the margin. A few short spines near the margin. Antennæ very short and stout, indistinctly 6-jointed. Joint 3 longest, 4 and 5 subequal.

Larva (taken from body of female).—Color pink, twice as long as broad; after boiling in potash, colorless. Antennæ and legs yellow. Antennæ 6-jointed. Formula: 3 6 (2 5) (4 1). Caudal tubercles large, with very long setæ and three stout spines—one at base of tubercle, one on its inner margin, and one near setæ. On the margin of body each segment has a stout spine. Legs stout. Tarsus not twice as long as tibia. Femur nearly twice as long as tarsus plus tibia. Claw slender and curved.

On twigs of *Quercus oblongifolius*.

Many specimens of this species are found to be parasitized.

Kermes cockerelli Ehrh.

Female.—Scale 5 mm. long, 4.5 mm. broad, and 4 mm. high, deeply segmented, dorsum usually marked with black lines and spots along the sutures, some specimens not showing any. There is a broad, median, longitudinal groove, where the segmentation is obsolete; on each side of this the segments are strongly gibbous. Color light brown, without any conspicuous black specks; derm, by transmitted light, brown with numerous oval glands, several large postulæ on body. Antennæ very small, 6-jointed; joint 3 very large, longer than the three following together; the others short, very little longer than 5, 4 shortest.

Larva elongated oval, rather more than twice as long as broad, yellow, greatest breadth behind the middle of body. Eyes red, caudal tubercles quite large, each bearing one long bristle and three stout spines, one near bristle and one on the outer and inner margins of tubercle. On the anterior margin of the head are six bristles; the sides of the abdominal segments are armed with stout, but not very long bristles. Antennæ cylindrical, 6-jointed; formula: (3 6) (1 2) 4 5; last joint rounded at tip with several hairs, one very long; rostral loop extending halfway between base of third pair of legs and anal ring. Legs quite large, claw long and curved; tibia shorter than tarsus.

On twigs of *Quercus lobata*.

Very much parasitized by undetermined chalcid.

***Kermes galliformis* Riley.**

The following short description of this species is taken from Mr. King's article "The Genus *Kermes* in North America," and the description published in "Coccidæ of Ohio," by James G. Saunders:

"A large dirty-gray form, which turns to a nearly white color when exposed to a season on the twigs. Female scale 6 mm. long, 7 mm. broad, 6 mm. high, with black spots, and viewed with a hand lens the scale is seen to be covered with minute black specks. Newly hatched larva dirty gray."

On oak.

***Kermes nigropunctatus* Ehrh. and Ckll.**

Female.—Scale 4.5 mm. long, 5.5 mm. broad, nearly 4 mm. high, not very pale ochreous, speckled all over with black, the black specks so small as to be readily overlooked without the use of a lens; segmentation obscure, but discernible, the sutures slightly impressed and marked by more or less pallid transverse bands; an obscure median longitudinal depressed line; under side of scale, where it touches the bark, flattened and entirely dark brown; derm by transmitted light yellow, with numerous round glands. Antennæ small, 6-jointed; joint 3 very long, about as long as 4, 5 and 6 together; joints 2 and 4 subequal and smallest. Formula: 3 1 6 5 (2 4).

Larva oval, about one and a half times longer than broad; greatest breadth about the middle; pink; caudal tubercles large and distinct, each bearing a moderately long bristle and three stout spines, one on the outer and inner margins and one near bristle. The sides of the abdominal segments are armed with stout, short bristles. Antennæ cylindrical, 6-jointed, formula 3 6 1 (4 5) 2; last joint rounded at tip with several hairs; joint 5 with a hair; rostral loop extending beyond third pair of legs; anal ring with six hairs. Legs stout, claw long and curved; tibia much shorter than tarsus.

The larvæ were found in body of female. It is something like *K. galliformis*, but distinguished by the impressed sutures.

On twigs of *Quercus*.

The four species of *Kermes* above mentioned are of little importance, although occasionally a tree may be found which will contain quite a few specimens of the scale, but in most cases they are heavily para-



FIG. 4. *Kermes nigropunctatus*. Larvæ and adults on twig of oak.

sitized and are thus held in check and not allowed to increase to any extent.

Gossyparia spuria Modeer.

(Elm-tree Scale.)

Larva.—The newly hatched larva is of an elongated oval form, narrower behind, of a clear yellow color, each segment with a strong lateral spine, and the front border of the body with six spines. The genito-anal ring has six hairs, around which is later formed a secretion, which renders them invisible. There is a double row of spines down the middle of the back; the antennæ are 6-jointed, joints 2 and 3 longest,

4 and 5 shortest. There is an elongated protuberance each side of the antennæ. The legs are short and slender, with the tibia shorter than the tarsus. The genito-anal ring has eight hairs.

The full-grown male larva has 7-jointed antennæ, joint 7 longest, the rest equal. After impregnation the female becomes more round, fixes herself, the secretion becomes much more abundant on the sides, making at first lamellæ, which afterwards unite into a cushion. The back becomes smooth and the segmentation becomes plainly visible. The dorsum is plane transversely, but curved longitudinally. Particularly after the birth of the young, the female becomes well separated from the waxy cushion, and is easily removed from it (even jarring will accomplish the removal), leaving the noticeably empty white cup with its fringed edges.

Dr. L. O. Howard gives the following description:

Male.—"The antennæ of the male are 10-jointed, the joints well separated. The wings are represented by pads of varying length. The poisers appear rather thick and fleshy, but lack the terminal hook.



FIG. 5. *Gossyparia spuria*. On elm.

The abdomen is very stout, suboval, considerably broader than the thorax, and when seen from above covers coxæ, trochanters, and base of the femora. Its segments are not well marked. A few days after this form makes its appearance the cocoons begin to give out the perfect males, which issue with wings fully expanded. There seems to have been a molt between this pseudimago and the perfect males, for in no other way can we account for the difference in form. The antennæ possess the same number of joints (10), of about the same relative proportion, although joints 3 and 4 are longer, but the incisures are rather better marked. The poisers are lighter in color, and less fleshy in appearance, and the curved hook is plainly visible at tip. The abdomen is rather longer, much more slender, and tapers gradually from base to tip. Its segments are well incised and plainly separable from above. It does not cover the hind coxæ and trochanters. The tibiæ are longer in proportion to their tarsi. The anal segment gives off two waxy filaments as long as the entire body. These filaments were not noticeable in the pseudimago."

The cocoon of the male is rather close, though thin, flattened oval, and pure white, about 2 mm. long by 1 mm. wide, and is composed of rather coarse waxy fibers.

On elm trees.

We have but one generation of the scale a year in California. The young are brought forth alive during May, locate on the leaves and later settle on the branches.

In other states this species has proven a very destructive pest to the elms. In one locality in California it gained quite a foothold, but prompt remedial measures were applied and the scale has not been allowed to increase, although scattering specimens may be found on some of the trees originally infested.

***Eriococcus araucaria* Mask.**

The presence of the black fungus which accompanies many species



FIG. 6. *Eriococcus araucaria*. On *Araucaria bidwillii*.

of coccids, usually first denotes the presence of this scale. The full-grown insects are contained in white cocoon-like sacks, which are often massed toward the ends of the twigs. The larvæ are inconspicuous and are found in the angles formed by the bases of the leaves. Both sexes are similar in the larval form. They are greenish yellow in color; the posterior end of the body is furnished with two prominent lobes, each terminated by a long hair. Between these lobes there is a conical mass of white waxy matter projecting backward. The

margin of the body is fringed with a row of tubular spinnerets. The female when full grown measures 2.3 mm. in length. When the female is ready to lay her eggs, she excretes a cocoon-like covering to the body, composed of white waxy threads. This sac is dense, like felt, but easily torn, and appears to be open on the middle line of the ventral surface. It adheres to the tree quite firmly, remaining where excreted after the death of the insect.

On *Araucaria excelsa*, *A. bidwillii*.

***Eriococcus adenostomæ* Ehrh.**

Female.—Inclosed in an oval (at one end more or less pointed) sac about 3 mm. long and $1\frac{1}{2}$ mm. broad, woolly, snow-white, of uniform

texture. Oval, about half again as long as broad, dark purple, turning bright crimson when placed in KHO. Body about $1\frac{1}{2}$ mm. long. Antennæ light brown, 7-jointed; formula, approximately: (3 4 7) (1 2) 5 6; joint 3 equal to 5 and 6. Most of the joints with hairs; joint 7 with several comparatively long hairs. Legs light brown, large and stout; each joint with one or more bristles; femur quite swollen; tarsus a trifle longer than tibia. Claw stout and curved. Both tarsus and claw with long filiform digitules. Posterior tubercles short and rounded, with one very long, stout bristle and two shorter ones on their outer margin. Anal ring large, with eight long bristles. Derm colorless, with quantities of small spines and rounded glands distributed all over the dorsum.

Sac of male smaller and narrower than that of the female, color more creamy.

On *Adenostoma fasciculatum*.

Phenacoccus artemisiæ Ehrh.

Adult Female.—Elongate oval, about 3 mm. long and $1\frac{1}{2}$ mm. broad, of a sage-green color; measuring with egg sac $4\frac{1}{2}$ mm. Sac loosely woven without any grooves, eggs lemon-yellow. Legs and antennæ light brown. Body thinly covered with secretion, but not enough to hide color of body. Segmentation distinct. When placed in boiling KHO, body turns orange color, and leaves derm colorless after boiling. Antennæ 9-jointed; joint 2 always longest, joints 5, 6, 7, 8 subequal. Formula: 2 3 9 1 4 (5 6 7 8). Joints 1, 7, 8, and 9 with several stout hairs. Legs short and stout; femur about as long as tibia; tibia twice as long as tarsus. Claw stout and long, with tooth. Digitules fine knobbed hairs.

Adult Male.—Abdomen yellowish green, thorax and head dark green. Thorax marked with black longitudinal lines. Body slightly pruinose. Antennæ and legs light brown. Eyes dark red. Wings more or less pruinose, very delicate. Antennæ very hairy, 10-jointed; joint 3 longest, joint 1 shortest and stoutest, joints 7, 8, and 10 subequal, joints 2 and 9 subequal. Formula: 3 4 5 6 (7 8 10) (2 9) 1. Legs very hairy, long and slender; tibia much longer than femur; tarsus very short, less than one third of tibia. Claw long and very slender. Digitules fine hairs.

On *Artemisia californica*.

Phenacoccus stachyos Ehrh.

Adult Female.—About $2\frac{1}{2}$ mm. long and 1 mm. broad, convex, tapering posteriorly, viviparous, of a sage-green color. Slightly covered with white secretion, which, when seen through lens, appears as minute white

dots. Segmentation distinct. There are two longitudinal rows of light brown dots on the meson. The dorsum and margin are thickly set with long fine iridescent spines, which are deciduous. Legs and antennæ light brown, quite hairy. Caudal filaments short and stout. When placed in boiling KHO, body turns reddish brown. After boiling, derm becomes colorless, antennæ, mouth parts, and legs remaining light brown. Antennæ long and slender, each joint with a few long fine hairs. Joint 3 longest, next comes joint 2, joints 4 and 5 subequal, joints 1 and 6 subequal, joint 8 shortest. Formula, approximately: 3 2 (4 5) 9 (1 6) 7 8. Legs long and stout, quite hairy; trochanter with very long bristle; femur a trifle shorter than tibia; tarsus about one third of tibia. Claw long and slender, with tooth. Digitules fine knobbed hairs. Lobes well developed, with a long seta, and two long fine bristles. Anal ring with six stout hairs. On each segment of the ventral surface, thorax, and on the head, there are numerous very long fine hairs, and there are numerous short fine spines and numerous spinnerets with club-shaped tubes scattered over the body.

Newly hatched larvæ orange colored, elongate oval. Antennæ 6-jointed, quite stout. Formula: 6 3 (1 2) (4 5). Legs short and stout; tarsus as long as tibia. Rostral loop extending beyond last coxæ. Caudal lobes and setæ quite prominent.

On *Stachyos bullata*.

Ceroputo bahiæ Ehrh.

Adult Female.—About 4 mm. long and 3 mm. broad, covered with white cottony secretion, with a distinct ridge of cottony tufts running longitudinally on the meson and two smaller ridges parallel with it. Each ridge has a large tuft at the cephalic end. Margin fringed with short, broad cottony appendages, getting longer toward caudal end. Legs and antennæ dark brown. Color of body is greenish yellow, with a brown patch on the meson. When boiled in KHO turns crimson at first, then derm becomes colorless, except a row of dark brown patches on the body near and running parallel with the margin. These grow larger caudad. Body is densely covered with round glands and stout conical spines. Anal ring large, with six long stout hairs and numerous stout hairs scattered over area surrounding it. Antennæ remain brown. Antennæ 9-jointed, long and stout. Formula: 3 5 9 6 7 4 8 1 2. All joints quite hairy, and joint 9 quite pointed with numerous hairs. Legs long, stout, and thickly covered with very stout hairs; femur and tibia subequal; tarsus about one third of tibia. Claw very stout and curved, with tooth. Digitules very long fine hair.

Immature Male.—Much like female, smaller and lighter color, about $2\frac{1}{2}$ mm. long, $1\frac{1}{2}$ mm. broad. Legs not as stout. Antennæ 7-jointed. Formula: 3 7 2 (1 4 5 6).

Sac of male snow-white, more or less irregular in shape, no distinct carina, about 4 mm. long, 2 mm. broad.

Adult Male.—Measures, without setæ, about 3 mm. long and 1 mm. broad. Head and thorax dark brown, abdomen greenish yellow, slightly covered with white secretion. Antennæ 10-jointed. Formula: (3 4 5) 6 7 8 9 10 1 2. Legs long, stout and very hairy. Wings dusky, pubescent, each about $2\frac{1}{2}$ mm. long by 1 mm. broad. Halteres small, with two-stout, well-curved hooks. Style long, stout and conical, forming a blunt hook at caudal end. The last abdominal segment has two groups of round gland openings; on the cephalic margin of each, two very long, stout spines arise, which run parallel caudad. There are also numerous stout hairs surrounding the glands.

On *Bahia* sp.

***Pseudococcus aurilanatus* Mask.**

Adult Female.—Slightly elongated, nearly globulous, of a rich dark purple color, bearing on the dorsum a longitudinal band of bright golden-colored meal, with small patches of similar meal often visible on the edges. In alcohol or potash it produces a rich purple tint, and if crushed in the fingers stains them a dark red. The eggs, which are also purple, are laid in a mass behind the insect in a thin, white cottony web, the mass having thus a general dark gray appearance. Body obscurely segmented, length about $\frac{1}{11}$ inch. Antennæ usually of eight joints, often of seven; in the former case the fourth, in the latter the third, joint is the longest, the rest subequal, except the last, which is fusiform, and nearly equal to the longest; all the joints have a few hairs, the last bearing several.



FIG. 7. *Pseudococcus citri*.
(Common Mealy-bug.)

On *Araucaria bidwillii*.

This species is commonly known as the "golden mealy-bug," and is quite troublesome in the greenhouses on *Araucaria bidwillii*. I have also found it on the same host plant in the open.

***Pseudococcus citri* Risso.**

(Mealy-bug.)

Adult Female.—Length 3.5 to 4 mm., width 2 to 2.5 mm., white or yellow with brownish tinge, darker than *P. longispinus*, and with less powdery secretions covering body. The seventeen lateral appendages are short and blunt; posterior appendages not much longer than lateral ones. Antennæ 8-jointed, less pubescent than in *P. longispinus*. For-

mula: 8 3 2 (17) (5 6 4). The penultimate segment bears on either side a very long seta and two or three very short ones, and two conical projections; the surface of the segment is dotted with orifices. Six slender setæ, one half the length of the setæ on the penultimate, are borne by the anogenital ring, which is somewhat projected from the penultimate segment. Female oviparous; deposits eggs in cottony sac, which increases in size as the female grows.

On citrus, *Cycas revoluta*, coleus, ferns, and many plants in hothouses.

This is the common mealy-bug and can be found in almost any greenhouse or private conservatory. In a few instances it has been reported as occurring in citrus orchards. In these cases a colony of *Cryptolæmus montrouzieri* (Coccinellid), known as the ladybird enemy of the mealy-bug, soon cleans up the pest. In the greenhouses they do not work so well, as the mature beetle flies against the glass and tries to escape, but in the open they control this pest wherever liberated.

***Pseudococcus longispinus* Targ.**

(Mealy-bug.)

Female.—Length 2.5 to 3 mm., width 1.5 to 2 mm. White or tinged with yellow, with brown band on middle of back; each segment with a white waxy filament, which forms a border of appendages of varying lengths around the body; those near the posterior extremity longer, and four at caudal end very long, the inner the longer, sometimes longer than the body. Entire body appears as if dusted with flour, which is caused by the waxy secretion. Antennæ 8-jointed, each joint bearing seven hairs. Formula: 8 (2 3) (1 5) (4 6) 7. The legs are long, stouter than in *P. citri*, somewhat pubescent; tibia twice as long as tarsus. The penultimate segment presents on either side a rounded group of pores and two short, strong spines, also a seta somewhat longer than the

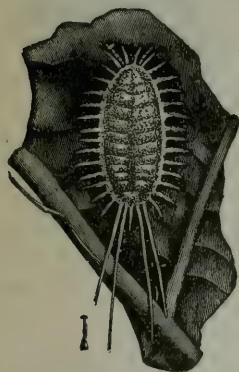


FIG. 8. *Pseudococcus longispinus*. (Mealy-bug.)

anal setæ, and several shorter setæ. Anal ring large, dotted with six long setæ.

Larvæ.—The male and female larvæ are similar to adult female in shape and color, but the male larva has 7-jointed and the female 6-jointed antennæ.

On fern, croton, coleus, citrus, *Cycas revoluta*, and many hothouse plants.

This species differs from *P. citri*, as it has long threads or spines extending from the end of the body. Its habits are the same as *P. citri* and it is usually to be found on the same host plants.

***Pseudococcus maritimus* Ehrh.**

Female.—Elongate oval, about 2 mm. long and 1 mm. broad, flattish, slightly covered with secretion. Color of body, reddish brown. Margin beset with stout, short, white filaments, which grow longer caudad. Caudal setæ about one-half length of body. Legs and antennæ same color as body.

Eggs orange-yellow. Egg sac well developed and has the appearance of *Pulvinaria camelicola*, but smaller—about 5 mm. long and 2 mm. broad.

Young larvæ light orange-yellow.

When boiled in KHO, female turns liquid purple and derm becomes colorless. Body thickly beset with long slender spines and many round glands. Each segment has a group of spinnerets on its margin, in the center of which are two short stout conical spines. Antennæ 8-jointed, quite hairy. Joint 8 always longest, and joint 4 generally shortest, although joint 6 sometimes is shorter than 4; again, joints 4 and 6 are sometimes equal. The following formulæ will assist in determining the species: 8 2 (1 3) (5 7) 6 4. 8 2 (1 3) 5 (4 7) 6. 8 3 2 1 (5 7) 6 4. 8 1 (2 3) 5 7 (4 6).

Legs quite hairy, well developed, long and slender. Trochanter with long stout spine (128μ). Femur about as long as tibia. Tarsus about a third as long as tibia. Claw short and stout. Digitules fine knobbed hairs. Caudal lobes prominent, with moderately long setæ and two very stout conical spines. Anal ring large, with six very long stout hairs.

On *Eriogonum latifolium*.

***Pseudococcus quercus* Ehrh.**

Female.—Slightly covered with white secretion, about $2\frac{1}{2}$ mm. long and $1\frac{1}{2}$ mm. broad, tapering at both ends. Color of body greenish brown, concealed more or less by secretion. Segmentation very distinct. Each segment bears a white filament on the margin. Caudal setæ about one third as long as body, white and very stout. Antennæ and legs dark brown. When placed in boiling KHO, body turns crimson; derm becomes colorless after boiling. Antennæ 8-jointed; joint 8 longest, joint 7 generally shortest. Formula, approximately: 8 3 2 (1 5) 6 4 7. Each joint has a ring of stout hairs. Joint 8 has numerous very long hairs. Legs long and stout, with numerous long fine hairs; femur about as long as tibia; tarsus about a third as long as tibia; claw

slender and well curved. Digitules long fine knobbed hairs. Anal ring small, with six fine hairs. Caudal lobes well developed, with very long setæ (280 μ). Groups of spinnerets, conical spines, and long slender hairs scattered over the dorsum.

On *Quercus chrysolepis*.

Pseudococcus ryani Coq.

This species is known as the cypress mealy-bug and is held in almost complete subjection by the Coccinellids (ladybirds), *Rhizobius ventralis* and *Exochomus marginipennis*. Of the sixteen species of *Pseudococcus* found in California, *P. citri*, *P. longispinus*, and *P. aurilanus* are the most troublesome, although where New Zealand flax is grown *P. calceolariae* is very abundant.

Erium eriogoni Ehrh.

Female.—Inclosed in a densely woven white felt sac about $2\frac{1}{2}$ mm. long and 1 mm. broad; also secreting considerable loose cottony matter. Color light yellow, slightly covered with white powder, about 2 mm. long and 1 mm. broad. Last segment of body with two short white filaments. Legs and antennæ light brown. Young larvæ and eggs light yellow. When boiled in KHO, turns brown. Numerous very fine slender spines on dorsum. Antennæ 7-jointed, quite bristly. Sequence of the joints of the antennæ is quite variable. Joint 7 longest, then comes 3, then 1 and 2, but these are sometimes longer than 3. Joint 4 is next, but sometimes joint 6 is longer. Joint 5 is generally shortest. Formula, approximately: 7 3 1 2 4 6 5. Legs small and rather slender; femur, tibia, and tarsus all bearing rather large stout bristles; femur twice as long as tarsus; claw slender. Tarsal digitules long, slender, slightly knobbed. Digitules of claw slightly longer than claw, slender, knobbed. Anal lobes not conspicuous, bearing a long, rather stout seta, several stout conical spines, hairs and spinnerets. Anal ring median, with the usual six hairs.

On roots of *Eriogonum* sp.

Ripersia villosa Ehrh.

Female.—In clusters and single in the crotches of twigs of oak. Sac loosely woven of long white wool, oval, about 2 mm. long and 1 mm. broad.

When removed from sac bright crimson, slightly covered with white powder, skin shiny; about 1.5 mm. long, 1 mm. broad, tapering anteriorly and quite convex dorsally. When boiled in KHO, derm colorless, densely covered with slender hairs. Antennæ light brown;

7-jointed, joint 7 longest; sometimes joint 1 is next longest, but joint 2 is often longer than joint 1, and in many cases they are subequal; joint 6 usually next, although joint 3 may be longer than 6; joint 4 next, often subequal with 5; sometimes 3 shortest, sometimes 5; 3 and 5 often subequal. In fact, the sequence of the joints is quite variable, as is shown in the following antennal formulæ: 7 2 1 (3 6) (4 5). 7 (1 2) 6 (4 5) 3. 7 1 2 6 4 (5 3). 7 (1 2) 6 4 (5 3). Joint 1 is stouter than any of the others. Each joint with hairs, joint 7 with several stout hairs. Legs light brown, large and stout; each joint furnished with one or more rather long bristles. Femur, $80 \times 50 \mu$; tibia, 70μ ; tarsus, 50μ ; claw, 20μ . Digitules of claw knobbed, moderately short and stout. Tarsal digitules long, fine, slightly knobbed hairs. Tubercles small and rounded, with long stout bristle. Anal ring with six stout hairs.

Larva, when newly hatched, color light red, rostral loop extending beyond body.

On *Quercus agrifolia*.

Subfamily COCCINÆ.

Pulvinaria innumerabilis Rathv.

This scale insect somewhat resembles the cottony-cushion scale (*Icerya purchasi*) and is often mistaken for it. It can be easily distinguished, however, being much smaller and the general appearance differing materially.

Female.—Oval in form; color dark brown. Near the posterior end are ridges, and the lines that separate them are darker than the other parts. The eggs are laid in the cottony sac; they are white when first laid, but change to a yellowish tinge before hatching. They are oval in form. The larva is yellowish white.

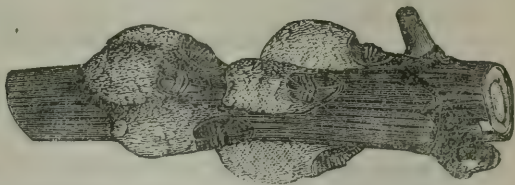


FIG. 9. *Pulvinaria innumerabilis* (Cottony Maple Scale).
On Grape.

At one time this species was very troublesome, but the internal parasites *Coccophagus lecani* and *Encyrtus flavus* work on this pest most effectively in the larval form, and the *Rhizobius ventralis* clean up the egg sacs of those that escape the attack of the parasites in the larval form and mature.

The other species of *Pulvinaria* found in California are of no economic importance.

Pulvinaria camelicola Sign.

The female of this species is not unlike *Coccus hesperidum*, but the formation of the white ovisac is a clearly distinguishing character. In late summer the female often drops off to the ground, leaving only the

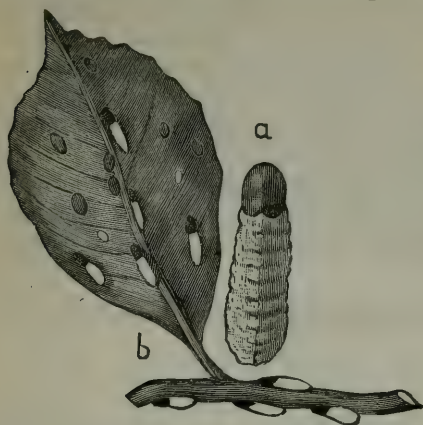


FIG. 10. *Pulvinaria camelicola*. a, female, greatly enlarged; b, natural size, showing position of scales on limb and leaf.

ovisac observable on the leaf. According to Maskell, the adult female is yellowish or reddish brown, naked, slightly convex, elongated; skin smooth, with puncta; length variable, from about $\frac{1}{7}$ of an inch to $\frac{1}{9}$ of an inch. Antennæ, according to Signoret, with sometimes 6, sometimes 7, joints. Abdominal clefts and lobes normal. The insect excretes a narrow, white, cylindrical, cottony ovisac, which is conspicuous on the leaf of the plant, and the brown body of the female can be seen at one end of it. The

eggs in the ovisac are numerous, perhaps some hundreds.

Larva in second stage of female flat, oval, yellowish brown.

On *Camellia japonica* in greenhouses.

Pulvinaria psidii Mask.

Adult Female.—Yellow or yellowish brown, sometimes with a greenish tinge; size variable, reaching $\frac{1}{12}$ of an inch before the ovisac is formed, but shriveling at gestation. The ovisacs cover the twig or leaf with masses of dirty-white cotton, usually accompanied by black fungus. Antennæ rather long and slender, of 8 joints, of which joint 3 is longest, joint 8 next, and the rest shorter and subequal. Feet also rather long; the trochanter is large, and bears a very long hair; tarsus curved, and about half as long as the tibia; upper digitules fine hairs, lower pair long and dilated at the end. Abdominal cleft moderate; anogenital ring with several hairs. The margin of the body bears a row of spiny hairs.

Female of the second stage yellow, flattish, elliptical; length about $\frac{1}{20}$ of an inch. Antennæ 6-jointed.

Larva yellow, flat, elliptical. Antennæ 6-jointed.

Male unknown.

On ferns, orange, coffee, pomegranates, and alligator pears at quarantine.

This species was very destructive to the coffee plantations of the Sandwich Islands, but since the introduction of the ladybird *Cryptolæmus montrouzieri* from California it has been cleaned out.

Pulvinaria rhois Ehrh.

Female.—Found on limbs and under side of leaves, single and in clusters. Length of female with ovisac, about 9 mm., width about 3.5 mm.; scale brown, largely covered with white secretion, ovisac snow-white, distinctly grooved longitudinally, sometimes curved, sometimes lifting scale off limb; scale shrunken, broadly oval, clay color. Female before forming ovisac something like *Coccus hesperidum*, but more convex, reddish brown; anal plates distinct; dorsum covered with white, waxy secretion in rows, the mesal row has the largest secretions, and they diminish in size as they approach the margin; edge of scale has short, simple hairs; in each anterior incision is a large spine, with a short one on each side. Anal plates yellowish brown, longer than broad, forming a diamond when closed; two very small spines at tip; anogenital ring with six long hairs; rostral loop reaching to middle pair of legs. Antennæ 8-jointed; formula: 3 (1 2 4) 5 8 6 7. Joint 3 much the longest, joints 2, 4, 5, and 6 each with long hair, joint 8 with several hairs. Legs ordinary, coxa and trochanter very stout, tarsus half as long as femur; tarsal digitules long fine hairs with knobs.

Larva.—Light yellow, flattish, elliptical, about 0.5 mm. long.

Male.—Small, oval, black, with numerous pale, wart-like prominences.

On *Rhus diversiloba*.

Ceroplastes cirripediformis Comst.

(Barnacle Scale.)

Adult Female.—Average length 5 mm., width 4 mm., height 4 mm. When naked the color is dark reddish brown; the shape sub-globular; with a strong spine-like projection at the anal end of the body. The waxy covering is dirty white, mottled with several shades of grayish or light brown, and even in the oldest specimens retains the division into plates, although the form is more rounded and the dividing line by no means as distinct as at an earlier age. There are visible a large convex dorsal plate, and apparently six lateral, each with a central nucleus; the anal plate, however, is larger, and shows two nuclei, and is evidently two plates joined together. Antennæ 6-jointed. Legs long; tibiæ nearly twice as long as tarsi; digitules of the claw very large. The other tarsal pair very long and slender, but with a very large button. The skin is seen in places to be furnished with many minute, round, transparent cellules, probably spinnerets, and along the border

are small groups of constricted arrow-shaped tubercles, but there are no bristle-shaped spinnerets.

On pepper-tree.

***Ceroplastes floridensis* Comst.**

(Florida Wax Scale.)

Adult Female.—Sub-globular in form, the point of attachment to the twig or leaf being concave. Length, from 2.5 mm. to 3 mm. Color, when naked, reddish brown; covered with an apparently homogeneous



FIG. 11. *Ceroplastes cirripediformis* (Barnacle Scale). Branch infested with scale. a, female, much enlarged.



FIG. 12. *Ceroplastes floridensis* (Florida Wax Scale). a, young female; b, adult female, much enlarged.

layer of waxy excretion, which is usually brownish on the dorsum and dirty white toward the edges; some specimens are irregularly mottled brownish and yellow-white. Antennæ 6-jointed, joint 3 nearly as long as all the others together. Legs normal in all respects. The margin of the body in the region of the stigmata is furnished with groups of minute arrow-shaped tubercles, constricted at the base, and between these groups are bristle-shaped spinnerets.

On citrus, mango. (At quarantine.)

Ceroplastes irregularis Ckll.

In certain sections this *Ceroplastes* can be found very abundant on sagebrush in the foothills, but has not attacked any other host plant as yet, and has been known in California for a great many years. One other species has attacked a pepper-tree in this State, but the tree was cut down and burned and its presence has not again been noticed. Owing to the fact that it was discovered in a section where the strictest inspection is maintained, it is safe to say that it will not gain a foothold.

Ceroplastes ceriferus Anderson.

(White Wax Scale.)

Female.—Test of adult female white or yellowish white, waxy, convex, thick; frequently agglomerated in large masses covering the twigs of the food-plant (as shown in Fig. 13). Separate individuals may range in size from $\frac{1}{8}$ to $\frac{1}{2}$ of an inch. Marginal tuberosities not distinguishable, though the margin is sometimes slightly flattened and irregular. The apex of the test is sometimes produced in a short pointed horn, not erect but bent over the test. The wax is rather soft and greasy. Test of the second stage slightly convex, elliptical; color grayish white. Median dorsal region usually smooth, separated by a narrow depression from the marginal region, which exhibits eight tuberosities, three on each side and two terminal. Average length of test about $\frac{1}{4}$ of an inch.



FIG. 13. *Ceroplastes ceriferus* (White Wax Scale).
Infesting camellia.

Adult female brown, very convex, elliptical, hollow beneath. Form lecanid, but the anal cleft and lobes are not easily made out, being contained in a conspicuous cylindrical "tail" or prolongation of the abdomen. Antennæ 6-jointed, joint 3 being much the longest. Feet rather thick, but not at all atrophied; tibia scarcely longer than the tarsus; upper or tarsal digitules slender knobbed hairs, lower pair on the claw rather long, thick, and expanded at the end. Rostrum rather large; mentum doubtfully dimerous. Near the spiracles, on each margin, is a group containing eight large conical spines and about twenty-four smaller ones. Epidermis bearing many circular spinneret orifices. When the "tail" is subjected to the action of potash and subsequent pressure it is seen to contain at its extremity the abdominal lobes and the anogenital ring, which has six rather strong hairs.

Female of the second stage brown, elliptical, slightly convex. Form lecanid, exhibiting the normal cleft and lobes; there is no "tail," but the region surrounding the lobes is thickened. Antennæ and feet as in

the adult, but the feet are more slender. The margin bears a row of very fine spiny hairs, and four spiracular groups of large conical spines. There are many small circular spinnerets on the epidermis.

Larva yellow, elliptical, flattish; length about $\frac{1}{76}$ of an inch. Form normally lecanid, the anal lobes bearing long setæ. Antennæ thick, with six rather confused joints.

Male unknown.

On camellia. (In greenhouse.)

I have often met with this scale on many plants from Japan at the quarantine station in San Francisco. Judging from the number found infested it must be plentiful in that country. The camellia on which I found it in California was in a Japanese nursery, and was promptly destroyed.

***Eucalymanatus perforatus* News.**

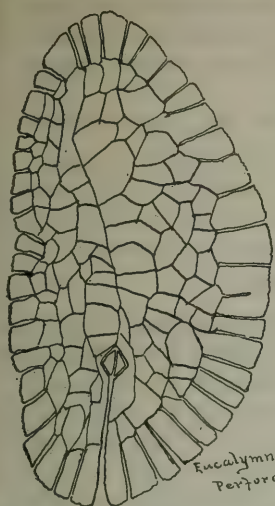
Adult Female.—Irregularly oval, bluntly acuminate in front, broadly rounded behind; sometimes almost dull colored; usually asymmetrical; flattish; median area very slightly convex, margins very thin. Under



FIG. 14. *Eucalymanatus perforatus*. Section of palm leaf infested with scale.

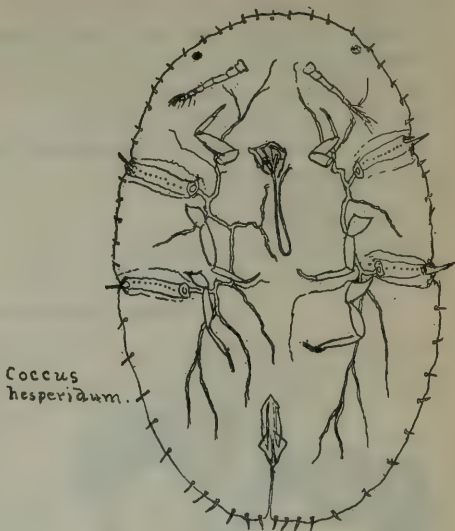
surface flat; a small hollow on each side of abdomen. Color dark castaneous, paling to fulvous or greenish yellow at margin. Dorsal area divided into numerous irregular plates, forming an intricate marqueterie pattern, more

conspicuous after treatment to potash. The pattern is roughly but not absolutely symmetrical on the two sides of a median line. The number of separate tesserae vary slightly in different individuals by the confluence of adjoining plate, but the main plan is constant, viz., four series on each side of the median line, indicated on the surface by a series of depressed, irregularly polygonal spaces, divided by slight carinae. Dermal cells numerous but ill-defined, irregularly oval, groups of them often forming irregular rosettes; but there is also near the margin of each plate, more particularly on those of the median series, a series of minute translucent pores, bearing a fanciful resemblance to rivet holes for the attachment of armor plates. Eyes minute, black, marginal. Marginal hairs small, simple. Submarginal tubercles five to seven on each side. Stigmatic clefts with three (rarely four) stout spines, the median one longest and projecting beyond the margin. Anal cleft rather more than one quarter the total length of the insect. Scales of anal operculum together forming a square, their extremities rather acutely pointed. Anal ring with six hairs; two or three stout



Eucalymnatus
perforatus.

FIG. 1. *Eucalymnatus perforatus*, dorsal aspect.



Coccus
hesperidum.

FIG. 2. *Coccus hesperidum*, ventral aspect.

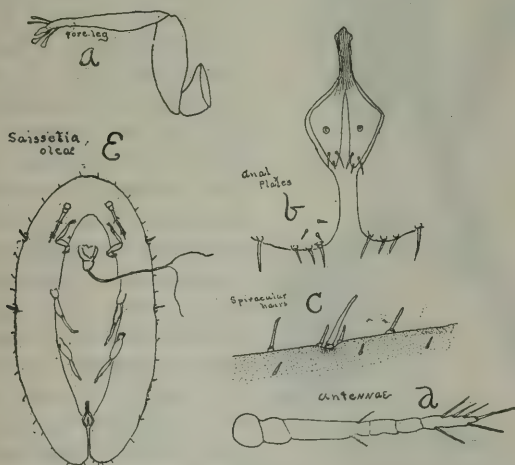


FIG. 3. *Saisssetia oleæ*. a, foreleg; b, anal plates; c, spiracular hairs; d, antennæ; e, *Saisssetia oleæ*, ventral aspect.

C. T. P., del.

hairs, each surmounting a small conical tubercle, on each side of ventral aperture. Antennæ with eight joints, the divisions between third and fourth often very indistinct, division between seventh and eighth diagonal; formula variable, joint 8 always considerably the longest, joints 6 and 7 shortest, joints 2 to 5 subequal. Legs rather small but well developed; tarsus shorter than tibia; digitules normal. Length, 3 to 4.75 mm.; breadth, 2 to 3 mm.

Young larvæ crowded beneath the body of the parent, which is apparently ovoviviparous.

Male unknown.

On palms. (In hothouses.)

***Coccus hesperidum* Linn.**

Adult Female.—Bright yellow or greenish yellow, minutely specked by red-brown, with specks sometimes agglomerated into transverse

bars, especially on the median abdominal regions; in other parts tending to form dotted lines radiating from center to margin. Dried specimens straw colored and much wrinkled. Form oblong-oval, often very irregular in outline; narrowest in front; more or less convex above, according to age. Eyes minute, black, marginal. Stigmatic clefts with three spines; the median one very long and pointed, projecting well beyond margin. Marginal hairs simple, pointed; rarely a few, more particularly at posterior extremity, divided or frayed at tip. Submarginal tubercles, four to five on each side. Scales of anal operculum with outer edge slightly longer than base; the latter slightly concave in outline. Derm cells scattered, small, circular, inconspicuous. Antennæ 7-jointed; formula:

(37) 4 2 1 6 5. Legs normal. Anal



FIG. 15. *Coccus hesperidum* (Soft Orange Scale).
An orange branch thickly infested.

ring with eight stout hairs. Length, 2.25 to 3.50 mm.; breadth, 1.25 to 2.50 mm.

The insect is ovoviviparous; living larvæ are usually found beneath the body of the parent.

On orange, lemon, grape-fruit, oleander, ivy, myrtle, and various other plants.

This scale at one time was considered quite a pest by the citrus-growers of this State, and is commonly known as the soft orange scale. It is completely held in check by internal parasites and is not considered a pest now.

Coccus ventralis Ehrh.

Scale of Female.—About $4\frac{1}{2}$ mm. long, 3 mm. broad, 1 mm. high. Oval when seen from above. Soft texture, very much like *C. hesperidum*; light brown, not very convex, and a dark brown border near margin. Dorsum pitted and margin moderately wrinkled, an indistinct mesial ridge.

Female.—Color greenish yellow, with a brown longitudinal line on the dorsum, also two brown lines forming a double cross with the dorsal line, more or less wrinkled and pitted. Ventral view shows the abdomen a dark purple brown with very distinct segmentations. Viviparous.

After boiling in soda, derm colorless. Margin with small curved spines. Lateral incisions with long, stout, curved spine and two shorter ones. Anal plates large, with blunt tips, bearing several hairs and notched on outer margin, together forming a square. Each plate has a distinct brown projection into the body. Anogenital ring with six hairs, which are very long, extending two thirds over the plates. Legs stout, coxa and femur each with a stout hair; femur one third longer than tibia. Tarsal digitules long, knobbed hairs, digitules of claw broad and thick. Claw stout and curved. Antennæ 7-jointed; formula: 3 4 7 2 1 (5 6). Joints 1 and 2 with two hairs each, 4, 5, 6, and 7 with several hairs; joint 3 very little longer than 4; 5 and 6 subequal.

Larva lemon-yellow, very flat, shiny, oval, about twice as long as broad.

On tuberous plants (in Japanese garden).

Parasites: *Encyrtus flavus* and *Coccophagus lecanii* were reared from this species.

Eulecanium armeniacum Craw.

(Apricot and Prune Scale.)

Adult Female.—Color light brown. In shape resembles *Coccus hesperidum*, but is much larger and more convex. In the center of the dorsum is a prominent shining circular protuberance, from which radiate a number of small ridges; these are more noticeable upon the posterior half of the scale. From the convex center to the anus is a low carina,

also noticeable in front. Length, from .20 to .27 of an inch; width from .12 to .15 of an inch; height, from .05 to .10 of an inch. Antennæ tapering to the point, 7-jointed; joints 1 and 3 subequal; joint 2 nearly three times as long as joint 1; joint 4 slightly longer than joints 5 and 6; joint 7 is nearly same as joint 3, and tapers to a point; a few bristles at the tip and upon each joint.

Eggs.—These are smaller and lighter colored than *Saissetia oleæ*.

Larvæ.—Are long, oval, light yellow, darker down the center, and can be distinguished from the larvæ of *oleæ* in not having the four reddish-brown marks upon the dorsum.

Like other species of *Eulecanium* that produce but one generation a year, their development is slow. They generally hatch in June and locate upon the leaves, where they go through their molt, and then move to the young wood. In the spring they grow rapidly and throw off great quantities of excrement, into which the spores of the black smut (*Fumago salicina*) adhere and grow, injuring the health of the tree and the market value of the fruit.

On apricot, prune, plum, cherry, peach, pear.

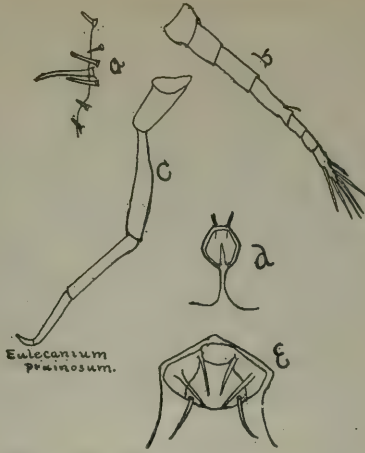


FIG. 16. *Eulecanium armeniacum* (Brown Apricot Scale). Showing scales on prune branch; about natural size.

This species is commonly known in this State as the brown apricot scale and is usually associated with *E. pruinorum*. The parasite *Comys fusca* has held this scale in subjection for many years, usually accomplishing the work the second year after a colony has been liberated.

***Eulecanium cerasorum* Ckll.**

This pest was first noticed in this State in 1904, a party having brought in a branch of English walnut which was quite thickly infested with the scale. Since then it has been found on pear trees. Dr. Howard kindly verified my identification of the specimen sent at that time as *Eulecanium cerasorum*. In tracing back the introduction of this pest I find it came from Japan on an ornamental plant, which was planted under the walnut tree above mentioned.



a, spiracular hairs; b, antennæ; c, hind leg; d, anal plate; e, anus.



C. T. P., del.

Eulecanium crawii Ehrh.

Female.—Scales not crowding each other; hemispherical, about 3 mm. long, 2 mm. broad, and $1\frac{1}{2}$ mm. high; oval, shiny, brown, getting darker with age. Margin generally lighter than dorsum.

Before gestation light brown, shiny. Derm, by transmitted light, brown, with numerous oval gland-orifices. Marginal hairs very short and slender. Lateral incisions each with three stout but not long spines. Antennæ 7-jointed; joint 3 longest, twice as long as 4; joints 5 and 6 very short, joints 1 and 2 about equal. Formula: 3 4 7 (1 2) 5 6. Anal plates broad, but not very large. Anogenital ring with six moderately slender hairs. Legs quite stout; coxa and femur with stout hair; femur very little longer than tibia; tibia and tarsus about equally long. Claw stout and curved. Tarsal digitules moderately stout, knobbed hairs. Digitules of claw not stout, a little longer than claw, more or less club-shaped.

Larva light yellow, with distinct ridge on dorsum, dividing scale lengthwise. Oval, about twice as long as broad. Rostral loop extending to third pair of legs.

On *Acer macrophyllum*.

Parasite: *Comys fusca* was reared from this species.

Eulecanium pruinorum Coq.

(Frosted Scale.)

Adult Female.—Pale brownish, thinly covered with a whitish powder, which does not conceal the ground color. Body oblong in out-



FIG. 17. *Eulecanium pruinorum* (Frosted Scale). On prune; about natural size.

line, very convex above, not distinctly carinate, the surface very uneven. Margins nearly perpendicular; dimensions as follows: Largest specimens, length, .28 of an inch; width, a trifle over .20 of an inch; height, .12 of an inch. Smallest full-grown specimen, length, .16 of an inch; width, .12 of an inch; height, .08 of an inch. Antennæ much thickest at the base, 7-jointed; joint 6 the shortest, then 5, then 1 and 2, which are subequal in length; joints 3, 4, and 7 are also subequal in length, each nearly twice as long as 6; joint 7 tapers to the tip, and is furnished with a style, being about three fourths as long as this joint; anal cleft

and lobes normal. The eggs are of the usual ovoid form of the *Eulecaniums*, and of a yellowish-white color, and are laid in May, June, and July.

Larvæ.—A few weeks after the eggs are deposited, the larvæ hatch out from under the old scale; they are of a pale color, having a distinct dorsal ridge extending the entire length of the body, and with many smaller ones (about twenty-four on each side) extending from it to the margin, some of them being divided into two branches.

The larvæ as soon as hatched locate upon the leaves; their development is slow until they take up their position upon the under side of the young shoots, where they remain throughout the winter, and, in fact, the balance of their lives. Upon the ascent of the sap in the spring they grow rapidly, and in April they assume the characteristic powdery or frosted appearance peculiar to this species.

On apricot, peach, prune, plum, pear, apple, rose, grapevine, hawthorn, and occasionally on orange.

This scale was first observed in California in 1887 on apricot. Several species of *Coccinellidæ* attack the young of this scale, also other predaceous insects, and have succeeded in keeping this species from becoming troublesome.

***Eulecanium pubescens* Ehrh.**

Female.—Scale about 4 mm. long, $2\frac{1}{2}$ mm. broad, and 2 mm. high, moderately soft, before gestation covered with very soft hair. Color blackish brown, more on the black, with a yellow longitudinal band on the dorsum. Dorsum pitted and margin slightly wrinkled. Some specimens show a lighter color. When removed from twig the insect leaves a small amount of white powder. Derm, by transmitted light, colorless, except margin, which is light brown, with numerous small round gland-pores. Margin with a double row of minute simple spines, lateral incisions with one moderately stout spine and two short ones. Anal plates large, outer corner forming a right angle, with several hairs at tip, and a long, stout hair on each plate. Anogenital ring with six long, stout hairs. Legs slender; tibia and tarsus about equal; femur a little longer than tibia; coxa, trochanter, and femur each with a hair. Claw curved, with slender knobbed digitules. Tarsal digitules with very fine, long, knobbed hairs. Antennæ 7-jointed; formula: 4 3 (1 2) 7 (5 6). Joint 4 very little longer than 3; joints 1, 2, 4, 6 each with a hair; joint 7 with several hairs.

Male.—Scale glassy white with median ridge, about $1\frac{1}{2}$ mm. long. Body dark red-brown; legs and antennæ light brown. Wings extend one third beyond body; color iridescent. Thorax with two elevated ridges much darker than body. Antennæ very hairy.

On *Quercus* sp.

***Eulecanium tulipiferae* Cook.**

This species is known as the "soft tulip scale," and is quite a serious pest in the East. It was first noticed in California in 1905, but had evidently been here for some time, as I found quite an extensive area infested. The species seems to confine its attack to cherry trees, usually on the under side of the larger lowest limbs.

This is a very large *Eulecanium* (?), dark brown in color, about $\frac{1}{4}$ of an inch high and of about the same width. The scale has a rather frosted appearance, in this respect somewhat resembling *E. pruinatum*, only much larger. There are two distinct irregular, black longitudinal lines on the dorsal surface of the scale. Steps were immediately taken to control its further spread and to eradicate the present infestation.

***Saissetia hemisphaerica* Targ.**

(Hemispherical Scale.)

Adult Female.—Shape approaching hemispherical, with the edges

flattened. Average length, 3.5 mm.; width, 3 mm.; height, 2 mm. The shape and proportion vary somewhat, according as the scale is formed upon a leaf or twig. Upon the rounded twig it loses something of its hemispherical form, becomes more elongate, and its flattened edges are bent downward, clasping the twig. The color varies from a very light brown when young to a dark brown, occasionally slightly tinged with reddish, when old. The oval cells of the skin vary in length from .01 mm. to .04 mm.; and each cell contains a large granular nucleus. The antennæ are 8-jointed, with joints 1 and 2 short and thick; joint 3 is the longest, and the succeeding joints decrease gradually in length to joint 8, which is longer than the preceding. The legs are long and rather slender. The bristle on the trochanter is long. The articulation of the tarsi is very well marked. The tarsal digitules are, as



FIG. 18. *Saissetia hemisphaerica* (Hemispherical Scale). On orange. a, female, greatly enlarged.

usual, two long and two short; those of the claws spreading widely at summit and very stout at the base. The anogenital ring is furnished with eight long hairs. The anal plates are triangular, with rounded

corners, and are furnished with two long hairs upon the disk and three much shorter ones at the tip.

On orange, lemon, grape-fruit, oleander, pepper, ferns, sago palms, etc.

The parasite *Scutellista cyanea* also attacks this species, and where it is found in the open holds it in subjection.

Saissetia oleæ Bern.

(Black Scale.)

Adult Female.—Densely chitinous; dark brown, almost black in color, surface roughened and minutely specked with small grayish waxy granules.

Form highly convex; length, 4 to 5 mm.; height, 3 mm. Dorsum with a median longitudinal carina, and two transverse carinæ, the latter dividing the body into three subequal portions; frequently the longitudinal ridge is more prominent between the transverse ridges than elsewhere, thus forming with them a raised surface of the form of a capital H. Eyes inconspicuous. Scales of anal operculum



FIG. 19. *Saissetia oleæ* (Black Scale). On olive branch, showing the larvæ of the ladybird *Rhizobius ventralis* at work destroying the scales.

pointed at extremities; outer edge rounded; base straight or slightly concaved; outer edge twice length of base. Marginal hairs rather long; extremity dilated and often deeply divided. Submarginal tubercles six on each side. No stigmatic cleft. Stigmatic spines three, prominent and sharply pointed, the median spine nearly four times the length of the others. Antennæ with eight joints, of which the third is always the longest. Legs rather slender; tarsus about three fourths length of tibia; digitules of claw rather long. Dermal cells large, irregular polygonal, with rounded angles; the margin of each cell distinctly

marked on the surface. On the denser marginal area the cavities of the cells are filled with a dark brown deposit, and (in very old scales) all the cells may be similarly darkened.

Early adult female and female of second stage dull pale brownish yellow.

Male Puparium (observed in California).—Grayish color, but almost colorless; length, 1 to 1.5 mm.; width, from .5 to .8 mm.; very glassy; oval. Dorsum with distinct longitudinal carina and two delicate transverse carinæ.

Winged Male.—Orange color, with lighter-colored wings; length of body, exclusive of style, 1.2 mm.; style, .4 mm.; anal plates, .5 mm. Antennæ 10-jointed; the first three joints are short, the second is swollen and pyriform, the fourth is longest and equal to the first three in length; balance of joints gradually diminish in size. Entire length of antennæ, .55 mm.; wings, 1.1 mm. Legs slender and about .8 mm. in length. Eyes six in number—two anterior compound, two ocelli at sides of head, and two compound eyes at posterior part of head. (B. W. Griffith.)

On orange, lemon, grape-fruit, olive, peach, prune, plum, apricot, apple, pear, pomegranate, oleander, rose, and many other plants.

In California the males begin to issue from the pupæ the latter part of November. I have male pupæ before me now that were collected the first of November last year.

This is the "black scale" of the olive and orange, although it has a great range of food plants and is one of the most widely distributed scales of California, being found practically in almost every section. An internal parasite, *Scutellista cyanea*, introduced a few years ago from South Africa, has in many cases completely controlled this pest and is swiftly robbing it of its terror. The ladybird enemy, *Rhizobius ventralis*, has for many years done excellent work against this pest and in certain favorable localities has held it in subjection.

***Aclerda californica* Ehrh.**

Female.—Covered with wax resting on a thin white secretion. Color orange-ferruginous, shiny, varying greatly in size and shape. The average specimens are about 3 mm. long, $1\frac{1}{2}$ mm. wide, and 1 mm. high; generally pyriform, but it is difficult to give any special form, as the insect adapts itself to the position on the plant. After boiling in KHO derm is colorless, mouth parts, glands, and caudal portion remaining brown. There are indications of antennæ, which are very small and very bristly, segmentation not visible. There are four large disk-like spiracles on the ventral surface; each disk contains numerous

glands. There is a row of thick, blunt spines on each margin, and one on the dorsum. These marginal spines are shaped like a spearhead set in a socket. With these there are several rows of round spinnerets. Rostrum attached to a prominence, which, however, varies with the position the insect adopts. End of abdomen strongly chitinized, with the margin strongly crenate and plicate, and deeply cleft in the middle as in *Eulecanium*. Numerous round glands scattered near its margin, and several strong spines on margin at intervals. Anal ring with numerous (eight?) stout hairs. On the ventral surface opposite the anal ring there is a round projection with four stout spines. This is inserted in the cleft of the anal lobes.

On roots of bunch-grass.

***Physokermes insignicola* Craw.**

This is a large, almost spherical dark brownish-black scale which infests the Monterey pines (*Pinus insignis*). When a tree becomes infested it presents a sickly, stunted appearance, with scant foliage, and is covered with honey-dew and black fungus. The scales cluster very thickly around the small shoots and usually at the tip of the branches. They are oviparous, with but one generation a year. The young are elongated, dark brown in color, with a short fringe along the edges and a deep abdominal cleft. As soon as they hatch they attack the tender pine shoots, afterwards removing to the harder wood, where they locate permanently.

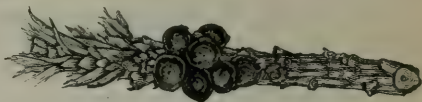


FIG. 20. *Physokermes insignicola*, a large, almost black, spherical scale, infesting the Monterey pines.

The *Rhizobius ventralis* (Coccinellid) and an internal parasite do good work toward controlling the ravages of this pest. In isolated cases, however, where the insect enemies of this scale have not made their appearance, I have found many trees that have been killed by the scale.

Subfamily **DIASPINÆ.**

***Chionaspis ortholobis* Comst.**

(Willow Scale.)

Scale of Female.—Moderately elongated, broadest near the middle of the scale; dirty white. Exuviae .8 mm. long, brown.

Female.—Median lobes straight and parallel, having the appearance of being set closely together; rounded on their extremities, sometimes obscurely serrate on the sides. Second and third pairs, with the inner lobule larger than the outer, a little oblique; entire or obscurely serrate.

The gland-spines are arranged as follows: 1, 1-2, 1-2, 2, 4-5. The first one is small and blunt. Second row of dorsal gland-orifices represented

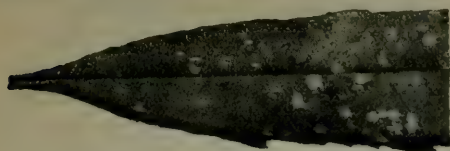


FIG. 21. *Chionaspis ortholobis*. On section of willow leaf.

by the anterior group consisting of 4-7 orifices. Third row with 7-9 orifices in anterior and 5-8 in the posterior group. Fourth row with 10-11 orifices in the anterior and 5-9 in the posterior group. Median

group of circumgenital gland-orifices, 10-25; anterior laterals, 18-35; posterior laterals, 16-24.

Scale of Male.—Length, .6 to .8 mm. Oval, without carinæ; exuviae pale brown or almost colorless.

Eggs.—Dark purple in color.

On willow.

Chionaspis pinifoliae Fitch.

(The Pine-leaf Scale.)

Scale of Female.—Snow-white; with bright orange or brown exuviae, shape depending upon width of leaf or host, but usually broadened posteriorly and very convex. Length, 3 to 4 mm.; length of exuvia about 1 mm.

Scale of Male.—Length, 1 to 1.5 mm. The pale yellow exuvia occupies about one third the length of the tricarinate, posteriorly broadened scale.

Female.—Three pairs of well-developed, thin, striate lobes; the median almost circular in outline, entire, separated by about one third their width, slightly diverging at the apex and joined anteriorly by an arched chitinous process. Inner lobule of second and third lobes the larger and subtruncate. The gland-spines are arranged as follows: 1, 1, 1, 1, 1-3, becoming shorter toward median lobes. The spines on the ventral surface are short and inconspicuous, situated over mesad of the base of the first, second, third, and fourth gland-spines respectively. Those on the dorsal surface are longer and situated mesad of the corresponding ventral spine. Second row of dorsal pores represented by anterior group of 2-4; third row by 3-5 in anterior and 4-6 in posterior group. Median lobes of circumgenital gland-orifices, 7-13; anterior laterals, 12-20; posterior laterals, 14-18.

The *eggs* are purplish, ellipsoidal; length, .25 mm.

On pine and other coniferous trees.

This species is held in check by an internal chalcid parasite.

Chionaspis quereus Comst.

(Oak Scale.)

Scale of Female.—Long, narrow at anterior end, much widened posteriorly, quite convex. Exuviae brownish yellow, remainder of scale white, though often appearing gray from dust and hairs from the stem to which the scale is attached.

Body of Female.—The last segment with the anterior group of spinnerets consisting of about 10, the anterior laterals of from 17–20, and the posterior laterals of from 10–18.

This species is peculiarly characterized by having an undivided lobe on the meson; this lobe is large and rounded distally. The second and third lobes of each side are very small and are laterad of small incisions in the margin of the segment. In each case there is a reniform thickening of the body wall bounding each incision anteriorly. There is also a similar incision with a rudimentary lobe and reniform thickening of the body wall about midway between third lobe and the penultimate segment. The plates are inconspicuous and spine-like; there are usually one or two laterad of second ventral spine, two or three between third and fourth lobes, and usually five between fourth lobe and penultimate segment. The penultimate and antepenultimate segments bear six each; those on the latter are much expanded at the base.

The spines are long and conspicuous; those on the dorsal surface are situated as follows: One on each side at the base of the lateral margin of median lobe, one laterad of each of the second and third lobes, and a fourth one near the center of the anterior group of plates. Those on the ventral surface are as follows: A short one nearly ventrad of the first dorsal spine, a large one laterad of each of the second and third dorsal spines, and a fourth one a little cephalad of the fourth dorsal spine.

Scale of Male.—The scale of the male is snow-white, with the larval skin very light yellow. The texture of the scale is quite loose and the carinae prominent. Length, 1.25 mm.

The adult male is as yet unknown. Pupae mounted in balsam are bright yellow in color, with eyes purplish black. Fully grown male larvae in balsam are yellowish brown.

On white oak (*Quercus lobata*). The females occur on the bark of small limbs; the males on the leaves.

Chionaspis wistariæ Cooley.

Scale of Female.—Length, 1.8 to 2.3 mm. Plainly broadened posteriorly, rather thin in texture, dirty white in color. Exuviae .8 mm. long, brown.

Female.—Median lobes larger and more conspicuous in proportion to the other lobes than is usual in this genus; usually parallel in general direction, though sometimes slightly divergent; rounded or indistinctly pointed at the extremities, firmly united at their bases, the chitinous thickened process which unites them extending anteriorly for a distance about equal to the length of the lobes. Second pair distinct and entire, but much smaller than the median pair; outer lobule smaller than the inner. Third pair usually obsolete, but sometimes represented by low serrate prominences. The gland-spines are arranged as follows: 1, 1, 1, 1, 1-2, 2-4. The first one is short and blunt, scarcely surpassing the median lobes. Second row of dorsal gland-orifices represented by the anterior group of 2-3 orifices. Third row with 3-4 orifices in the anterior and 4-5 in the posterior group. Fourth row with 3-4 orifices in the anterior and 4-6 in the posterior group. Median group of circumgenital gland-orifices, 8-15; anterior laterals, 19-31; posterior laterals, 13-23.

Scale of Male.—Length, about 1 mm. Sides nearly parallel, distinctly tricarinate. Exuviae yellowish brown, occupying about one third of the length of the scale.

On wistaria from Japan. (In quarantine.)

Of the seven species of *Chionaspis* found in California no single species is considered a real pest. *C. ortholobis* may be found the most plentiful, but the host plant is not of much commercial importance. As to the others, they are, in a majority of cases, held in check by parasites. At times *C. pinifoliae* gets a good start on the pines, but is soon overtaken by the parasite.

Howardia biclavus Comst.

(Mining Scale.)

Scale of Female.—Very nearly circular; the exuviae are marginal, and project beyond the edge of the scale.

Female.—The characters presented by the last segment of the female are as unusual as those presented by the scale. The pores on the dorsal surface of the segment are very small. Scattered over the ventral surface are numerous minute spines. The groups of spinnerets are wanting. The mesal lobes are large, oblique, nearly twice as broad as long; approximate at the base; the mesal margins diverge slightly, distal margin serrate; meso-distal angle rounded and produced into a lobule. The second lobe is very small, being simply an angular projection of the body wall. The third lobe is about three times as wide as the second lobe; but it projects only a little beyond the margin of the segment. The plates are simple and spine-like. There are two minute ones between lobes; two between first and second lobes; two or

three between second and third lobes; a group of three or four larger ones laterad of third lobe; and another group of four or five still larger ones about midway between this group and the penultimate segment. Each of the three segments preceding the last bears on each lateral margin about seven plates. Two spines accompany each group of plates, one on the dorsal surface and one on the ventral. The first and second spines of each side are very small; the third, which is between the second and third lobes, is the largest; the fourth and fifth are successively smaller. There are two conspicuous club-shaped organs which appear like thickenings of the body wall, but which are really within the body cephalad of the mesal lobes. These organs are about three times the length of the mesal lobes; they converge caudad, and the cephalic end of each is suddenly enlarged. This species may be distinguished from any other known American coccid by the presence of these organs.



FIG. 22. *Howardia biclavis*.
(Mining Scale.)

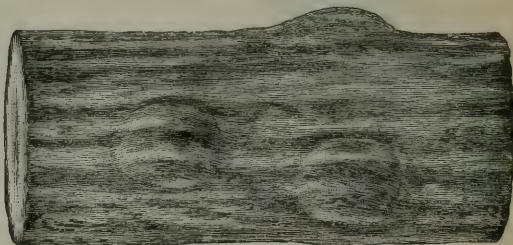


FIG. 23. Section of branch showing the mining habits of the scale. Greatly enlarged.

This scale is not to be found in California. Occasionally it is met with at quarantine, but is never permitted to pass, as the plant upon which it is found is immediately burned. At one time 325,000 orange trees infested with this and other scales were burned at quarantine at the port of San Pedro, and probably it was owing to this fact that it has been accredited as "Habitat: California."

***Diaspis bromeliæ* Kern.**

(Pineapple Scale.)

Scale of Female.—Circular, with the exuviae nearly marginal. The scale is white; the exuviae are very light yellow. The first larval skin is usually naked; the second covered with a delicate film. Diameter of scale, 2 to 2.4 mm.

Female.—The body of the female is broadly ovate in outline; it is variable in color; it is usually a pale dirty yellow, with a faint tinge of purple; some are whitish yellow, with irregular pale-purplish markings;

and others are of a reddish-yellow tint. The last segment presents the following characters: The mesal group of spinnerets consists of from 9-15, usually 10 or 11; the cephalo-laterals, of from 20-27, usually 23; the caudo-laterals, 15-23, usually 16 or 17. The mesal lobes are small, separated at their base by at least the width of one of them, and divergent. The second and third lobes of each side are deeply bifurcated, with the lobes divergent; in each case the lateral lobule is more rounded than the mesal one. The fourth lobe is present, but much less developed than the other lobes; the lateral margin of this lobe is serrate.

The plates are simple and pointed. There are four or five plates, subequally distant from each other, between the fourth plate and the penultimate segment.

The spines on each side of the ventral surface are situated as follows: First mesad of the first lobe; second, third, and fourth laterad of the second, third, and fourth lobes, respectively; and the fifth between the seventh and eighth plates. All the ventral spines are very minute except the first pair, which are very conspicuous.

Of the dorsal spines the first is very delicate and is situated laterad of the first lobe; the second is large and is on the second lobe near its lateral margin; the third and fourth are laterad of the third and fourth lobes, respectively; and the fifth is about midway between the sixth and seventh plates.

Between the fifth and sixth plates there is a triangular prolongation of the body which bears an elongated pore. The penultimate and antepenultimate segments bear plate-like spinnerets.

Eggs.—The eggs are yellow; those recently deposited are paler than those ready to hatch.

Larva.—The recently hatched larvæ are orange yellow, with the eyes dark purplish.

Scale of Male.—The scale of the male is strongly tricarinated; the exuviae are yellow.

On pineapple. (In greenhouses.)

This species has been reported from quarantine, on pineapples (fruit) from the Hawaiian Islands. It was also observed on growing plants in greenhouse.

***Diaspis carueli* Targ.**

Scale of Female.—Circular, snowy white, with the exuviae central, naked and yellow. Diameter of scale, 1 to 1.5 mm.

Female.—Body yellow, circular, slightly elongated posteriorly. The last segment of the body presents the following characters: The anterior group of spinnerets consists of about 8, the anterior laterals of

from 10 to 16, and the posterior laterals of about 8. There are four lobes, which are nearly in a straight line, the end of the body being truncate. These lobes are quite small, rounded posteriorly and equally distant from each other. The second lobe of each side is deeply incised, but the lateral lobule is very small, and in many cases concealed by the margin of the segment. Each lateral margin of the segment is divided into three subequal, more or less distinct lobes; each lobe ends posteriorly in one or more lobules, each of which bears an elongated pore on its dorsal surface. The plates are short, and in some cases subtruncate at extremities; they are situated as follows: Two between median lobes; two inconspicuous ones laterad of first lobe of each side; two laterad of second lobe; usually one on the anterior part of the first lobe of the lateral margin; one or two near the middle of the second lobe of the lateral margin, and two or three on the third or anterior lobe of the lateral margin. Dorsal spines: One on first lobe near lateral margin; one on lateral lobule of second lobe; and one a short distance mesad of the mesal plate of each of the three lobes of lateral margin. The ventral spines accompanying the first and second lobes of each side are obsolete. There is one at the base of the plate of the first lobe of the lateral margin; one between plates of second lobe, and one near the middle of the third or anterior lobe of the lateral margin.

Scale of Male.—The male scale is white, and very small, being only 1 mm. in length; it is elongated, with a prominent median ridge; the larval skin is naked and light yellow in color.

Male.—Color of body light orange yellow, thoracic band yellow. The terminal joints of the antennæ are enlarged.

On juniper (*Cupressus* sp.).

In several sections this scale may be found very abundant upon juniper, but seems to confine its attack to this host plant and *Cupressus* sp. It is not considered as troublesome.



FIG. 24. *Diaspis carueli* (Juniper Scale). 2, adult females and larvæ on branches; 2a, female, greatly enlarged.

***Aulacaspis rosæ* Bouche.**

(Rose Scale.)

Scale of Female.—Circular or irregular, snowy white, sometimes with yellowish tinge; 2.3 mm. in diameter; exuviae sublateral; first larval skin naked, showing the segmentation; second covered.

Scale of Male.—1.25 to 1.5 mm. in length; white and tricarinated.

Female.—Body elongated; the antepenultimate segment prominently lobed and bearing 8 to 10 gland-spines. Median lobes large, approximated at base, serrulate, diverging, attached to body for entire length.



FIG. 25. *Aulacaspis rosæ* (Rose Scale). Branch showing scales on rose. *a*, male scale; *b*, female; both greatly enlarged.

Inner lobules of second, third, and fourth lobes rounder and larger than the other lobule. Fourth lobe nearly obsolete. There is a gland-spine laterad of each of the four lobes, and 2 to 4 near penultimate segment, enlarging as they are farther removed from the meson. On the dorsal surface the spines are situated as follows: one very small one on the median lobe, and one slightly larger on the outer lobe of the second, third and fourth lobes respectively, and one about three fourths of distance to penultimate segment. The spines on the ventral surface are slightly mesad of the corresponding dorsal ones. Dorsal spines in three rows; second row represented by anterior group of 2-3; third row,

anterior group 4-5, posterior group 5-6; fourth row, anterior group 4-6, posterior group 6-8. Mesad of second and third lobes respectively is an elongated pore, appearing like a lobe. Anterior group of circumgenital gland-orifices distinct, rounded, 18-22; anterior laterals, 25-32; posterior laterals, 26-34. Lateral groups indistinctly separated, sometimes almost continuous.

On rose, blackberry, and raspberry, infesting the canes.

This is a very common species in this State, and may be found on old rose bushes, and on the canes of blackberry and raspberry. In many cases it entirely coats the cane for some distance, giving it the appearance of having been whitewashed. When remedial measures are applied and all visible scale removed the horticulturist is somewhat surprised to again see the plant infested in a short time, owing to the fact that this species breed at or near the root of the host plant. When remedial measures are applied, the ground should be removed from around the base of the plant so that the wash will reach all the scale.

Hemichionaspis aspidistræ Sign.

Eggs.—Reddish fulvous. *Larva*.—Pale yellow (newly hatched).

Scale of Female.—Length, 1.8 to 2.6 mm. Distinctly broadened posteriorly and usually broadly rounded at the extremity, but occasionally bluntly pointed. Very thin and delicate in tissue or moderately thick and strong. Pale yellowish brown to brown. Exuviae .7 to .9 mm. long, of the same color as the secreted portion of the scale, but slightly brighter.

Female.—The first four segments anterior to the pygidium very pronounced, being often produced at each side into a conspicuous protuberance. The first and second pairs of lobes well developed, third very rudimentary or wanting. Each median lobe with three distinct notches on the outer curved edge. Lobules of the second lobe long and narrow, spatulate in form; edges thickened at the base. The gland-spines are arranged as follows: 1, 1, 1, 1, 2-5. As a rule the fifth group contains 2-3 spines, although 5 have been observed. The marginal gland-orifices between the first and second lobes, if situated on a large, conspicuous prominence. Second row of gland-orifices wholly absent. Third and fourth rows with 2-5 orifices in their posterior groups. Anterior groups absent. Median group of circumgenital gland-orifices, 5-15; anterior laterals, 15-22; posterior laterals, 17-23.

Scale of Male.—Length, 1 to 1.3 mm. Exuviae bright yellow.

On *Aspidistræ lurida* (in greenhouses).

Epidiaspis piricola Del Guer.

This species has become quite troublesome to pear-growers in the Santa Clara Valley, and is often mistaken for the San José scale. It is easily distinguished from that species by the male scale, which in this species is of an elongated oval form and much flattened. A feeble carina extends along the middle, but the sides are not carinated. The color is white; the larval skin is light yellow and usually is about one third the length of the scale, while in the San José scale the male scale is nearly black and resembles the female scale in shape.

The female scale is circular, dark ash-gray in color, with the margin lighter, varying in color to nearly white. The exuviae are nearly central, dark brown, naked and glossy.

This species is subject to the attack of several species of Coccinellids (ladybirds), which serve as a partial check to its increase. In some sections the lime, sulphur, and salt spray is used against this species, with good results.

A plate showing the characters of the last abdominal segment, made from specimens collected at San José, Cal., will be found on opposite page.

Aspidiotus æsculi Johns.

Scale of Female.—Circular, rather convex; diameter 1.5 to 3 mm.; color, dirty gray, conforming to color of bark; exuviae a little to one side of center, and covered with excretion. In rubbed specimens the protuberance indicating the position of the exuviae is orange-red and surrounded by a band a little darker in color than the rest of the scale; ventral scale delicate white, adheres to the bark.

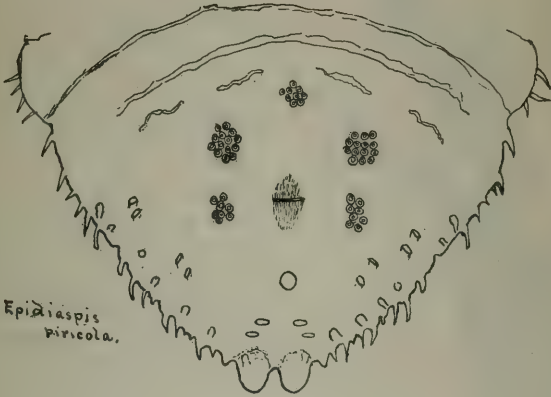
Scale of Male.—Elongate oval; 1 to 2 mm. long and half as wide; darker than the female. Larval scale marked by a nipple-like prominence between the center and the anterior margin; this is usually covered with a slight excretion, but when rubbed it is orange-red. Ventral scale white, slightly thicker than that of female.

Mature Male.—Yellowish; eyes and antennæ prominent; body stout; legs long, lighter yellow than rest of body; wings large; thoracic shield with band distinct and with margins indistinct in some specimens. Length, .60 mm.; style, .39 mm.

Mature Female.—Ovate, rather plump; yellow, last segment a little darker yellow. Four groups of spinnerets, number in each group extremely variable; anterior laterals, 5–17, average 10; posterior laterals, 4–11, average 7; number variable on opposite sides of same individual; one pair of lobes, nearly as broad as long, notched on lateral margin near the tip. Plates simple and inconspicuous, one usually just laterad of the lobe and two between the second and third spines. Spines prom-



*Fiorinia
fioriniæ*



*Epidiaspis
piricola.*



*aspidiotus
asculi.*

C. T. P., del.

inent, usually one pair to each segment, a rather deep incision just laterad of the lobe; anal opening about twice as distant from the base of the lobes as the lobes are long; spinnerets grouped about curious club-shaped organs.

On *Æsculus californica*.

Aspidiotus hederæ Vall.

(Oleander and Lemon Scale.)

Scale of Female.—Flat, lightish or light gray in color, and with exuviae central or nearly so; exuviae dull orange-yellow; the first skin usually showing the segmentation distinctly, the second skin more or less covered with secretion, often appearing only as an orange-colored circle surrounding the first skin. Ventral scale a mere film applied to bark of plants. Diameter of fully formed scale, 2 mm.

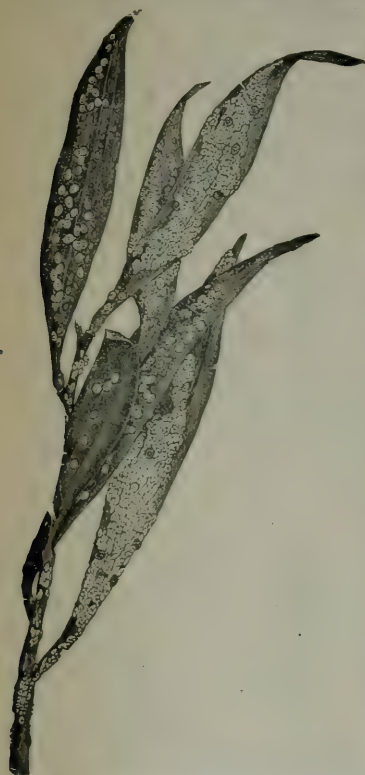
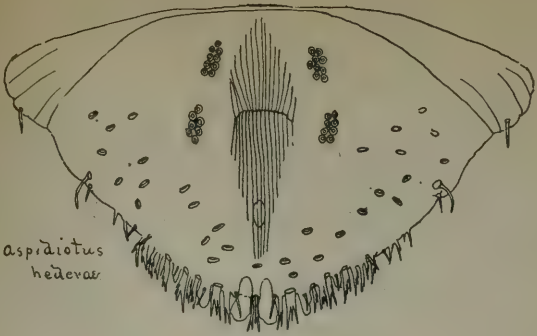


FIG. 26. *Aspidiotus hederæ* (Oleander Scale).
On branch of oleander, showing leaves
thickly infested.

Female.—Body of adult nearly circular, with abdominal segments forming a pointed projection; light yellow in color, mottled with darker yellow; the last segment presents the following characters: The anterior lateral group of spinnerets consists of about 9, and the posterior laterals of about 7. There are three pairs of lobes; the first and second are well developed, the third quite small. The plates are well developed; they are long and usually fringed; there are two small ones between the median lobes; those of each side are as follows: Two between the first and second lobes; three between second and third lobes; and usually seven laterad of the third lobe, of which usually four are fringed and three simple.

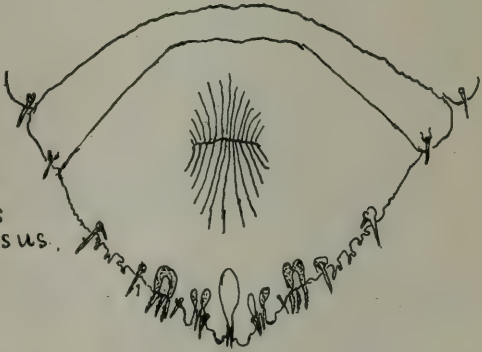
The number of the last-named group varies from four to nine. There is on each surface of the segment a spine accompanying each lobe; one between the fourth and fifth plates laterad of third lobe, and one at



aspidiotus
hederæ



aspidiotus
juglans-regiæ



aspidiotus
perniciosus

C. T. P., del.

about one third the distance from this spine to the penultimate segments. In each case the spine on the ventral surface is a little laterad of the one on the dorsal surface.

Eggs.—Very light yellow in color.

Scale of Male.—The scale of the male is slightly elongated, with the larval skin nearly central; it is snowy white, with the larval skin light yellow. Longest diameter, 1 mm.

Male.—Yellow, mottled with reddish brown; central part of thoracic band reddish.

On oleander, magnolia, ivy, palms, etc.; also on lemons.

This is another of the common species of the State, having quite a range of host plants. It does not confine its attack to plants in the greenhouses, but is met with in many places in the open. It also attacks the lemon, usually infesting the fruit only; in such cases all the fruit on the tree is removed, either fumigated or destroyed, and the pest usually controlled.

***Aspidiotus juglans-regiæ* Comst.**

(English Walnut Scale.)

Scale of Female.—Circular, flat, with the exuviae laterad of the center; it is of a pale grayish brown color; the exuviae are covered with secretion; the position of the first skin is indicated by a prominence which is pink or reddish brown. The ventral scale is a mere film which adheres to the bark. Diameter of scale, 3 mm.

Female.—The color of the female when fully grown is pale yellow, with irregular orange-colored spots; oral setae and last segment dark yellow. This segment presents the following characters: There are either four or five groups of spinnerets; the anterior group is wanting or consists of from 1 to 4 spinnerets; the anterior laterals consist of from 7 to 16, and the posterior laterals of from 4 to 8.

There are two or three pairs of lobes. The median lobes are well developed, but vary in outline; the second lobe of each side is less than one half as large as the median lobes, elongated, and with one or two notches on the lateral margin; the third lobe is still smaller and pointed, or is obsolete.

There are two pairs of incisions of the margin, one between the first and second lobes of each side, and one between the second and third lobes. They are small, but are rendered conspicuous by the thickenings of the body wall bounding them.

The plates are simple, inconspicuous, and resemble the spines in form. The larger ones are situated one caudad of each incision.

The spines are prominent, especially those laterad of the second and third lobes; the fourth spines are a little nearer the first lobes than the penultimate segment; and the fifth are near the penultimate segment; there is also a spine at or near the union of the last two segments.

Scale of Male.—The scale of the male resembles that of the female in color; it is elongated, with the larval skin near the anterior end; this skin is covered by excretion, but its position is marked by a rose-colored prominence, as in the scale of the female; the anterior part of the scale is much more convex than the posterior prolongation, which is flattened. There is a rudimentary ventral scale in the form of two narrow longitudinal plates, one on each side of the lower surface of the scale. Length, 1.25 mm.

On English walnut, infesting the larger limbs, usually on the under side.

***Aspidiotus perniciosus* Comst.**

(San José Scale.)

Scale of Female.—Circular, slightly convex, 1 to 2 mm. in diameter; gray or dark gray, except the prominent, covered, pale or reddish yellow exuviae. The exuviae are nipple-like, with a shallow, depressed ring about them, which is quite characteristic of this species.

Scale of Male.—Black in color, rather convex, with the nipple-like prominence and depressed ring still more noticeable than in the female.

Female.—Two pairs of lobes well developed. Median lobes prominent, rounded at the apex, notched on the outer margin near the middle, though somewhat variable and converging. The thickened inner margins of the median lobes extend anteriorly, encircling the anal orifice in a characteristic manner. The second lobes are smaller and narrower, though distinct, quite close to the median, notched on the outer margin, pointed and converging. Between the median lobes and bounding each incision of the segment are club-shaped, chitinous processes; the inner usually the larger. There are two conspicuous plates between the median lobes, two caudad of the first incision, and three small, laterally serrate ones caudad of the second incision. Often laterad of second incision are wide, furcated extensions of the margin of the segment. The spines of the ventral surface are situated laterad of the corresponding dorsal spines at the bases of the first and second lobes; the third pair laterad of second



FIG. 27. *Aspidiotus perniciosus* (San José Scale).

incision; the fourth pair at one half the distance to penultimate segment. Groups of circumgenital gland-orifices are absent. Rows of dorsal spines are not prominent, though variable.

On apple, pear, peach, quince, apricot, plum, hawthorn, rose, currant, raspberry, etc.

This scale is known the world over as the San José scale, yet it is a fact that it is very scarce at San José or in the district surrounding that city. At one time this species was extremely troublesome in California, but the internal parasite *Aphelinus fuscipennis* has done such excellent work that it is not a pest in California any more. We also have several species of Coccinellids (ladybirds) that prey upon it and have materially assisted in the work of controlling this once serious pest.

Aspidiotus rapax Comst.

(Greedy Scale.)

Scale of Female.—Very convex, gray, almost white, translucent, appearing yellow because of insect beneath; the sub-central exuviae marked by a brown or black dot and a concentric ring. Ventral scale snow-white and usually entire.



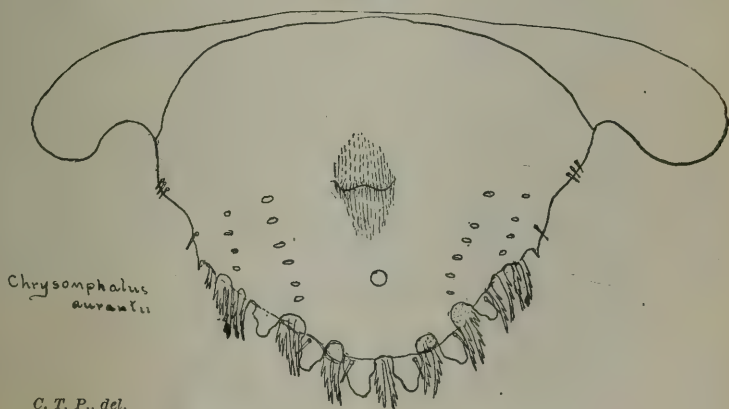
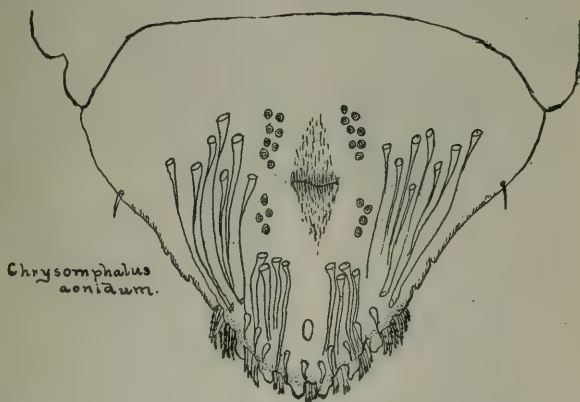
FIG. 28. *Aspidiotus rapax*.
(Greedy Scale.)

Scale of Male.—Similar to scale of female; scarcely so convex, with exuviae sublateral.

Female.—Only median lobes well developed and prominent, sharply notched on either side, the mesal notch near the apex. Second and third lobes are represented by small, pointed projections on the margin. A deep incision laterad of the median and second lobes, bounded by subequal chitinous processes. Two irregular toothed or branched plates caudad of each incision, with a simple one between them and two or three simple or furcated ones laterad of the third lobe. On each surface, spines are located at the lateral basis of each lobe; the fourth spine at about two thirds of the distance to the penultimate segment. The ventral fourth spine is slightly laterad of the corresponding dorsal spine. Groups of circumgenital gland-orifices absent. Dorsal pores in two or three irregular rows; the second of about six; the third of about four. The anal orifice is very large.

On willow, holly, ivy, acacia, orange, pittosporum, camellia, palms, etc.

This species is commonly known as the greedy scale, and it is well named, as it certainly seems to have no choice as to host plant, but thrives on almost any one of our shrubs. An internal parasite is par-



C. T. P., del.

tially effective against it in this State, but does not do good enough work to be of much use. This species is distributed all over the State, and while it is troublesome to individuals, yet it has not attacked any of our commercial trees or plants extensively enough to be really considered of much economic importance.

Pseudaonidia duplex Ckll.

Scale of Female.—The female scale is about $2\frac{2}{3}$ mm. in diameter, subcircular, moderately convex, dark blackish brown, with the large round exuviae nearly to one side, and orange in color. When upon the stems and larger twigs of the camellia the scale has the same brown color of the bark and is easily overlooked. When removed the scale leaves a white patch on the branch.

Female.—Pale orange, broadly oval or subcircular, with the large cephalic portion separated from the rest by a deep suture. Mouth parts large; skin on dorsum very strongly, transversely grooved, the grooves linear, often anastomosing. Four groups of ventral glands in the usual situation; caudo-laterals of 28 to 30, cephalo-laterals of 42; median group represented by two orifices, not very close to each other. Besides these groups there is a group of 17 to 22 orifices, quite similar in character, on each side of the mouth parts; these groups are oval in outline. The anus is about on a level with the anterior ends of the caudo-lateral groups. There are four (two on each side) long tubes or ducts originating about the region between the caudo-lateral groups and the anus, and passing hindward, practically parallel, to the end of the body. On the dorsal surfaces the segments are marked by rows of oval pores. The pygidium shows on the dorsal surface a very distinct lattice-work, as in *A. theæ* and *Ischnaspis filiformis*. Median lobes very large, brown, rounded at the ends, but notched on each side so as to be trilobed; the lateral lobes very small and passing into the straight parallel sides. The median lobes are very close together, but distinctly separated, not touching, not diverging. There are three other pairs of lobes, small, narrow, rounded at ends, very inconspicuous and easily overlooked among the scale-like plates. Plates not extending beyond lobes, scale-like, not separately distinguishable, but forming a continuous fringe, which rapidly narrows beyond the fourth lobe, and ceases before the deep notch which indicates another segment. Margin cephalad of fourth lobe distinctly serrate, serrations coarse.

On *Camellia japonica* (in greenhouses).

Chrysomphalus aonidum Linn.

(Florida Red Scale.)

Scale of Female.—Circular, moderately convex, smooth; dark olivaceous brown or reddish brown, paler at margin. Pellicles reddish yellow, always partially obscured by a layer of secretion, which is reddish brown above the first, and pale olivaceous above the second pellicle. In the center of circular raised disk is usually exposed, the secretionary covering being here worn off. In young specimens the center is covered by a raised patch of opaque white secretion. The first pellicle convex above; the second often slightly concave; the form



FIG. 29. *Chrysomphalus aonidum* (Florida Red Scale). On orange twig.
a, female, greatly enlarged.

may best be observed from the inside of the scale, where the exuviae are more fully exposed. Ventral scale obsolete. Diameter, 1 to 2 mm.

The *male puparium* is dark brown, with pale gray margins. Pellicle reddish fulvous. Length, .8 mm.

Adult Female.—Yellow, or white mottled with yellow. Body broadly rounded in front, tapering suddenly to a point behind. On the margin of the mesal thorax is a small thickened patch bearing a stout thorn-like spine. Pygidium with six prominent lobes subequal in size, each notched on the lateral edge. At a short distance beyond the lobes the lateral margin is thickened and projecting, with minute serrations and two deep indentations. Plates deeply fringed; two in the mesal and first spaces, three in the second space, and three beyond the third lobe, these last being bifurcate and fringed on their lateral edges. Circum-
enital glands in four groups; lower laterals with 2 to 4, upper laterals

with 6 to 8 orifices. A large number of conspicuous tubular spinnerets, varying from the filiform to the trumpet-shaped type, some opening by inconspicuous dorsal pores in two series on each side, others opening on to the margin near the extremities. Anal aperture small, close to extremity; genital aperture between the upper and lower groups of glands. Length, .8 to 1 mm.

Adult Male.—Orange yellow in color, with dark brown conspicuous transverse band crossing the thorax in front of the scutellum.

Eggs and young larvæ yellow.

On palms (in greenhouses).

Chrysomphalus aurantii Mask.

(Red Scale of California.)

Female.—The female is light yellow in color in the adolescent stages, becoming brownish as it reaches maturity. When fully developed the thorax extends backward in a large rounded lobe on each side, projecting beyond the extremity of the abdomen, and giving the body a reniform shape. The last abdominal segment presents the following characters: Three pairs of well-developed lobes, the first pair abruptly narrowed at about half their length; the notch on the mesal margin is often nearer the distal end of the lobe than that of the lateral margin. The lobes of the second and third pair are abruptly narrowed at half their length on the lateral margin, and often bear a notch on the median margin near the distal end. Laterad of the most lateral plate is a triangular lobe on the margin of the segment, which is separate.

The plates are deeply fringed; those between the first pair of lobes on their distal margins, the others on their lateral margins. They are all well developed, exceeding the lobes in length, and are situated as follows: Two between the first pair of lobes, two between the first and second lobes of each side, two between the second and third lobes, and three between the third lobe and the lobe on the margin of the body. The first plate laterad of the second lobe and the three plates laterad of the third lobe are each deeply bifurcated, and each bifurcation is fringed on the lateral margin.

On the ventral surface there is a spine near the base of the lateral margin of each of the four lobes except the first; there are also about three small slender spines on the margin of the body near the penultimate segment. On the dorsal surface there is a spine with each lobe. The first spine is very slender and inconspicuous, but as long as the lobe; it is situated at the base of the lateral margin of the lobe in such

a manner that it can be moved either above or below the lobe. Each of the other spines is situated near the middle of the base of the lobe it accompanies. Female viviparous.

Scale of Male.—The scale of the male resembles that of the female, excepting that it is only one fourth as large; the posterior side is pro-



FIG. 30. *Chrysomphalus aurantii* (Red Scale). a, male; b, female scale, greatly enlarged; c, male scale, greatly enlarged.

longed into a flap, which is quite thin; and the part which covers the larval skin is often lighter than the remainder of the scale.

Male.—The male is light yellow, winged, with the thoracic band brown, and the eyes purplish black.

On orange, lemon, grape-fruit, sago palms, rose and various palms.

While this species is called the "Red Scale of California," it is an introduced species. It is also a very serious pest in other countries, having been reported from Australia, China, Japan, New Zealand, Samoa, Fiji, Hawaiian Islands, West Indies, and many other countries, as well as several states in our own country. In California it is mostly confined to the southern part of the State, where it is well known to our citrus-growers. By strict quarantine, fumigation, and the use of various sprays it has been practically held in subjection in some of the counties, while in others it has been allowed to gain quite a foothold.

While Australia has been credited as the home of this pest, later investigations seem to show China to be the real home.

***Chrysomphalus aurantii citrinus* Coq.**

(Yellow Scale of the Orange.)

This species differs but slightly from *C. aurantii*, but in its habits and color there is a very marked difference. The female scale is circular, with the exuviae slightly to one side; the scale is not as convex; the

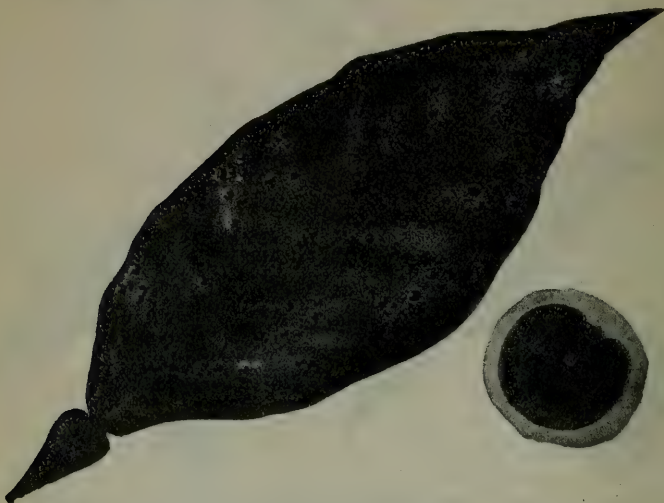


FIG. 31. *Chrysomphalus aurantii citrinus* (Yellow Scale). On orange leaf. Female, greatly enlarged.

margins are wider and a light gray. The body is a pale yellow; the ventral scale is light colored and remains attached to the upper one, making it difficult to remove the insect from the scale.

A curious fact about this insect is that it seldom attacks the wood, even when the foliage and fruit are covered with them. On this account the fruit-grower can readily determine between it and *aurantii*, as the latter infests the young shoots and even the large branches.

On orange and lemon.

This scale was introduced into this State in 1872 and for a number of years proved to be very destructive. It is now held in almost complete subjection by its natural enemy, *Aspidiotophagus citrinus* Craw, a minute chalcid fly introduced from Japan.

Lepidosaphes beckii Newm.

(Purple Scale.)

Scale of Female.—The scale of the female is long, more or less curved, and widened posteriorly. It is brown, with the exuviae of the same color and with a delicate margin. The ventral scale is well developed; it is white, and consists of a single piece which is slightly attached at



FIG. 32. *Lepidosaphes beckii* (Purple Scale). On orange branch.

its sides to the lower edge of the scale, and is more or less incomplete posteriorly. Length of scale, 3 mm.

Female.—The female is yellowish white. The characters of the last segment are as follows: The anterior group of spinnerets consists of about 6; the anterior laterals of about 18, and the posterior laterals of about 9.

The median lobes are well developed, with the margins crenate; the second lobe deeply incised, with the margins of the lobules either entire

or crenate; the third lobe is quite inconspicuous, projecting but little beyond the body wall, the margin crenate and one large notch in the center of the lobe.

The plates are long, simple, and tapering. There are two of them in each of the following places: between median lobes; between first and second lobes; between second and third lobes; laterad of third lobe; and about midway between this lobe and the penultimate segment.

There is an elongated pore between first and second lobes; two laterad of each of the third and fourth pairs of plates; and one laterad of the fifth pair of plates. The penultimate segment bears at least four plates upon each lateral margin.

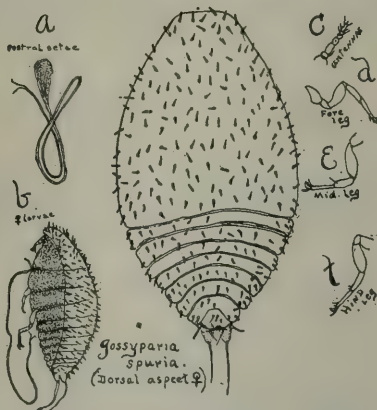
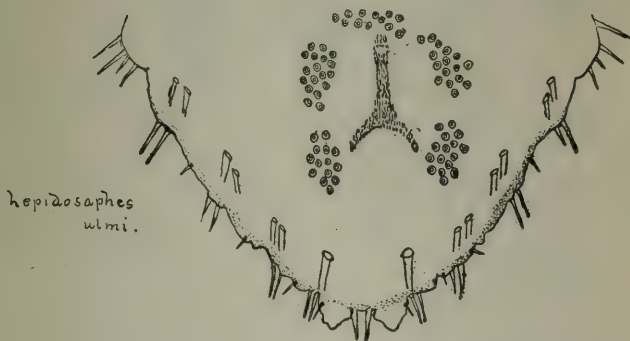
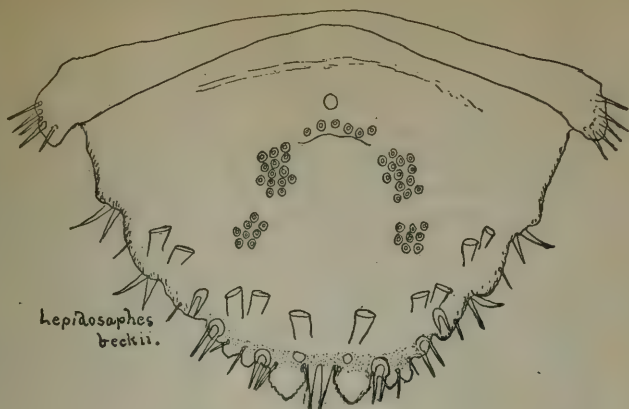
The spines upon the dorsal surface are long, and are situated as follows: one at the base of each margin of the first lobe; one dorsad of incision of second lobe; one dorsad of the notch of third lobe; and one about midway between the fourth and fifth pairs of plates. Those of the ventral surface are as follows: cephalad of the bases of the first pair of plates are two small spots which resemble the bases of spines, and are doubtless the homologues of the first pair; the second spine of each side is near the base of the lateral half of the first lobe; third spine laterad of lateral lobule of second lobe, and fourth and fifth spines between the members of the fourth and fifth pairs of plates respectively.

Eggs—The eggs are white, and are arranged irregularly under the scale.

Scale of Male.—The scale of the male is usually straight, or nearly so; the same color as that of the female, or in some specimens varying to a very dark brown, almost black, the larval skin light yellow. At about one fourth of length of the scale from the posterior extremity, the scale is thin, forming a hinge, which allows the posterior part of it to be lifted by the male as he emerges. Length, 1.5 mm.

On orange, lemon, grape-fruit, sago palms.

This species is well known to many of our citrus-growers, and is commonly known as the purple scale. It was introduced from Florida on orange stock, and is to-day one of the most serious pests we have in the State. By strict quarantine it has been practically confined to certain districts, and with the use of insecticides and fumigation its spread has been checked. At the Insectary we are now working on material from which we hope to get its natural insect enemy, and if successful, our past experience in this line gives us the hope that at last we may be able to successfully control this pest.



a, rostral setæ; *b*, female larvæ; *c*, antennæ;
d, fore leg; *e*, middle leg; *f*, hind leg.

C. T. P., del.

Lepidosaphes crawii Ckll.

Scale of Female.—The female scale is narrow, measures $2\frac{1}{2}$ mm. long and $\frac{1}{2}$ mm. wide; pale orange yellow; exuviae concolorous.

Adult Female.—Yellow; four groups of ventral glands, caudo-laterals of 3, cephalo-laterals of 4 in a row. Median lobes very large, roundish at the ends, their edges finely serrate. They are closely adjacent at a point at the base, being separated, however, by a pair of small spine-like plates; thence they diverge at nearly a right angle to their rounded ends; thence rapidly sloping, the outward slope longer than the inner, and diverging from it at an angle of about 80 degrees. Next to the outer side of each median lobe is a small spine-like plate, then a sac-like incision, then the small second lobe, shaped much like the last joint of a finger, and in bulk hardly one tenth of a median lobe. Following this is a small sac-like incision, then a pointed projection, then two succular incisions, then after a short interval a spine-like plate, then another sac-like incision, then a long interval of smooth margin, then another sac, then another interval, in the middle of which is a small spine. Below the sac-like incisions are transversely elongate pores.

The scale is extremely inconspicuous, as it lives beneath the epidermis, on the under side of the leaf, along the mid-rib. By this habit, and the large median lobes, it will be readily distinguished from *M. grandilobus* Maskell, which has the large median lobes; it is known, too, by the entirely different color of the scale, etc. Several of the specimens were parasitized.

On the under side of the leaf beneath the epidermis of *Quercus cuspidatus*.

This species represents one of the smallest members of this destructive family. Its mining habits and size make it extremely difficult to detect.

Lepidosaphes ulmi Linn.

(Oyster-shell Scale.)

Scale of the Female.—Mussel shaped, more or less curved, of a purplish-brown color, with the exuviae yellowish. Length, one sixteenth of an inch.

Adult Female.—The body is light yellow. The last segment presents the following characteristics: The anterior group of spinnerets consists of from 11 to 17; the anterior laterals and posterior laterals each of 16 to 21. The median lobes are large and wide, with the sides parallel; they are only about three fourths as long as broad. Each lobe is narrowed on each side near the distal extremity by one or two notches, and then rounded. The second lobe of each side is about as wide as

the first, and is deeply incised; mesal lobule with mesal margin as long as lateral margin of the first lobe, and rounded posteriorly; lateral lobule about half the length and width of mesal lobule, and similar in shape. Third lobule obsolete. The plates are long, simple, and tapering.

Eggs.—These are white, and are arranged irregularly under the scale.

Scale of Male.—The scale of the male of this species is usually straight and of the same color as that of the female. At about one quarter of the length of the scale from the posterior extremity, the scale is thin, forming a hinge which allows the posterior part of it to be lifted by the male as he emerges. Length, .06 of an inch.

The male is translucent, corneous gray, with a dorsal transverse

band on each joint, and the portions of the mesothorax and metathorax darker, or purplish gray, with the members somewhat lighter.

According to climate and locality the young scale hatch from the middle of March to June. Color, yellow. They begin to form the cottony excretion after twenty-four hours, and in from two to four days the insect is completely covered with a dense excretion, which increases as the larva grows.

On apple, pear, plum, hawthorn.

In several of the older apple orchards of the State this species can be found in limited numbers, also in the grounds of private residences where the trees are neglected. An internal parasite and predaceous insects prey on this species, causing a partial check to its increase.

Parlatoria pergandii Comst.

(Chaff Scale.)

Scale of Female.—Circular to elongated, irregular, dirty gray, 1.6 mm. in length; exuviae marginal, brown, the first naked and the second covered by a thin skin of secretion, occupying nearly one third of length of scale.

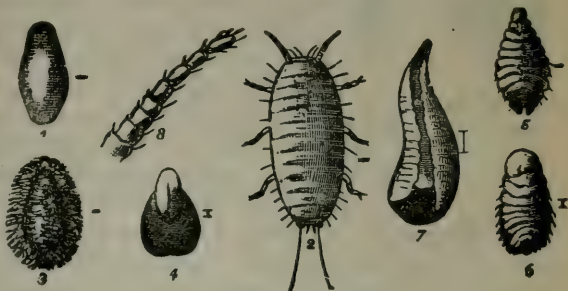


FIG. 33. *Lepidosaphes ulmi* (Oyster-shell Scale). 1, egg; 2, young insect (larva); 3, appearance of secretion as it hardens and forms shell over insect; 4, immature scale; 5 and 6, appearance of insect after casting skin, limbs, and other appendages; 7, dorsal view of insect at maturity; 8, antennae. (All greatly enlarged.)

Scale of Male.—Long and narrow, lateral margins prominent, not carinated, light gray with terminal exuviæ darker.

Female.—Three pairs of well-developed lobes, nearly equal in size, broadest near the middle, tapering anteriorly, notched deeply on each side of the apex. A rudimentary fourth lobe, produced into a papilla, halfway between third and penultimate segment. A crescent-shaped



a



b

FIG. 34. *Parlatoria pergandii* (Chaff Scale).
a, female, much enlarged; b, male, also enlarged.

thickening of the body wall appears between the median lobes, between median and second, second and third, and two thickenings between third and fourth lobes and penultimate segment. The plates are as long as the lobes, and fringed on the distal margins; two between median lobes, two between median and second, three between second and third, three between third and fourth, and three palmar plates cephalad of fourth lobe. On the three segments preceding the last are five or six plates,

each produced into a papilla. A spine on the dorsal surface of each lobe near the margin; on the ventral surface the spines are situated laterad of the second, third, and fourth lobes respectively. Four groups of circumgenital gland-orifices, each of about 7, but varying from 5 to 10.

On orange. (On palms in greenhouse.)

This is a very difficult scale to detect on the orange, being so near the same color as the bark. In California this scale has not gained a foothold, being known in the open in only two districts. The author once found in a new section thirteen trees that were badly infested, and the entire infestation was on the trunk and lower branches up to the main fork of the tree. This scale seems to prefer the lower branches and trunk and requires close inspection to detect its presence.

INSECTS OF THE YEAR.

By E. M. EHRHORN.

The season of 1906 was notable for an abundance of rain, coupled with a rather mild spring, and these conditions were very favorable to the production of an abundance of insect food. Climatic conditions have a great bearing on all pests, and abundance of food, produced by favorable weather conditions, generally acts as a stimulus for an increase of the more common species.

For many years the State departments have urged upon farmers and fruit-growers the necessity of reporting the appearance of insects and diseases as soon as noticed, so that timely advice and early applications might be made on the various pests. I am sorry to say that such recommendations in most cases have gone unheeded, for in few instances have the growers responded, and these no doubt realize that the State furnishes such advice free, through the agencies of the Horticultural Commission and the Experiment Station. Let us hope that in the future the farmers and fruit-growers will become more interested in the necessity for timely reports and in the indispensable coöperation of applied science which the State institutions are carrying on for the agricultural industry in all its various branches.

Of all the injurious insects, the ones which seem to be constantly, and with good cause, on the mind of the grower, are the scale insects, for inquiry regarding these pests are continually being received.

Brown Apricot Scale (*Eulecanium armeniacum*).—This species was reported more plentiful in several districts, and samples of badly infested twigs have been received, but it was gratifying to observe that *Comys fusca*, its parasite, was always present. It is absolutely necessary for the growers to send samples of all scale insects to the office of the Horticultural Commissioner, room 11, Ferry Building, San Francisco, for the reason that in many cases promiscuous spraying would endanger the good work of reduction, which is steadily going on by the delicate parasites and other natural enemies.

Black Scale (*Saissetia oleæ*).—Not very extensive inquiry regarding this species has been received, but very gratifying reports of the work of *Scutellista cyanea*, *Tomocera californica*, and the Rhizobiids have been received. In the more interior sections of the State the conditions

need further study, as there the scale develops an even growth, *i. e.*, all individual insects produce eggs at the same period. This seems to prevent the chance for future generations of the parasites, as such conditions are not promising for a big yield of parasites. We are now looking into the problem, and no doubt we shall be able to remedy this peculiar condition in the near future, either by introducing a parasite to attack the scale at a different stage or by encouraging a later brood of scale on certain varieties of evergreen plants.

Red Scale (*Chrysomphalus aurantii*) and **Purple Scale** (*Lepidosaphes beckii*).—It may be said that the conditions of these two species are about normal. Vigorous spraying and fumigation in the various sections where they exist have made this possible. Every feasible proposition has been looked into by the State Commissioner in the furtherance of parasites for these species, and much material is now in the hands of the entomologist in charge of the Sacramento insectary.

San Jose Scale (*Aspidiotus perniciosus*).—There has been a little more complaint of the appearance of this species this season, not from the older sections, but from new localities and the mountain regions. It is possible that rain and cold weather during the spring months somewhat check the work of the parasites. As a rule we do not fear the work of this scale any longer, but we must not disregard its presence and become careless, for under favorable conditions it would not take much for the scale to increase and do considerable damage.

Pear Diaspis (*Epidiaspis piricola*).—Very little inquiry concerning this scale has come to hand. The thorough work against this hiding species, by the removal of moss and lichens, under which it secretes itself, and by spraying with caustic soda, has materially helped to check it. The twice-stabbed ladybird (*Chilocorus bivulnerus*) can be found in great numbers wherever this scale exists, and is better able to attack it after the moss is removed.

Cottony-Cushion Scale (*Icerya purchasi*).—The usual demand for *Norius* (*Vedalia*) *cardinalis* would indicate that this scale was in its normal state of existence, and it is gratifying to know that nearly every inquiry accompanied by specimens was found to harbor the ladybird in one of its stages. I sincerely believe, from past observations, that the *Vedalia* is with us to stay, and that the *Icerya* will not again be a serious pest.

Codling-Moth (*Carpocapsa pomonella*).—From reports received from the apple and pear sections of the State, it is apparent that this pest was not as abundant as was expected this season, and that the fruit is comparatively free from worms and of good quality. Much spraying

with arsenites has been done in the larger sections, and this, coupled with other methods, has no doubt done much to reduce the pest. Remarkable as it may seem, we find that the pest was as scarce in outlying sections, where spraying was not carried on, as in the thoroughly sprayed orchards. The causes for all this are many. Very good reports have reached the office of the presence of *Caliephialtes messer*, the imported parasite, in goodly numbers. Many of our native parasites have also been observed quietly destroying the larvæ under loose bark and in burlap bands. The thorough destruction of the worms in the packing-houses, the picking up of fallen fruit, and the gathering of worms found under burlap bands in the orchards, without question have had a great bearing on the scarcity of this destructive pest.

Peach-Root Borer (*Sanninoidea opalescens*).—This pest was reported but a few times, and that from neglected places. Past experience has demonstrated that with eternal vigilance, clean systematic worming of trees, followed by a thorough application of good barriers, this pest can be kept down to a minimum.

Cankerworms (*Alsophila pometaria* and *Paleacrita vernata*).—The thorough application of barriers in the fall of the year has caused a great reduction of this pest. Ever since it has been demonstrated that the wingless female moth, when ready to deposit eggs, could be captured during her ascent of the tree with various substances or traps, diligent experiments have been made to find the most persistent material for the capture. Within the last three years most excellent results have been obtained by the use of tree tanglefoot, a very sticky substance which keeps its adhesive qualities for two or three months. It is advisable to apply this substance on paper bands instead of directly on the bark, and it is very important that the application be made early in the fall before the moth appears.

Peach-Moth (*Anarsia lineatella*).—This pernicious enemy of the peach should really not give any trouble, since it has been demonstrated that the winter larvæ—those hibernating in the soft bark of the crotches and larger limbs—can be completely eradicated by timely spraying with lime, sulphur, and salt, or a good kerosene emulsion, applied as late as possible in the winter—just before the buds open. Any great damage done by this pest shows the result of pure and simple neglect of the growers to avail themselves of practical demonstrations and experiments. In the past season many inquiries were received stating that this pest was doing considerable damage, especially to young trees.

Cherry-Slug (*Eriocampoides limacina*).—These dark-colored, slimy larvæ, with the head end much enlarged, somewhat resembling small slugs, which rest on the surface of the leaves and feed on the outer layer, gradually skeletonizing them, have been reported quite abundant. The pest is an easy one to control, if taken in time. As soon as the first slugs are noticed on young leaves, any of the arsenical mixtures, applied either wet or dry, will check them. Dusting young trees of moderate height with road dust, air-slaked lime, or hydrated lime, will effectually stop the ravages.

Flat-Headed Borer (*Chrysobothris femorata*).—The larvæ of this species, which are whitish grubs, with an enlarged, flattened head, found boring beneath the bark of a great variety of young trees, have been rather more plentiful this season. This species can be checked by preventing sunburn by the use of tree protectors or by whitewashing the trunks. A good remedy when the young borers are first noticed is to apply to the bark a mixture of lime and whale-oil soap at the rate of 25 pounds of unslaked lime to 6 pounds of soap.

Tussock-Moth (*Hemerocampa vetusta*).—This species has caused a lot of loss and trouble this season, not only in the fruit sections, but also in private parks and groves. The control in the orchards is only a matter of persistent effort on the grower's part to gather the egg masses in the fall at pruning time. These are so conspicuous as not to require much hunting. The collecting of the cocoons in summer, whenever practicable, is advisable, if done before the moth escapes. It is a greater task to practice these methods where evergreen shrubbery grows, but on large tree-trunks and near-by fences, where caterpillars generally web, many egg clusters and cocoons can be destroyed. Spraying with arsenites, unless done when the caterpillars are very young, has very little effect.

Tent-Caterpillars (*Malacosoma distria* and *M. californica*).—These two species aroused considerable anxiety by appearing in numbers during the early season, the pest being so numerous as to defoliate great numbers of trees. Especially was this true of *M. distria*, the more common species of the two. The burning of the tent and the destroying of congregated caterpillars on the trunks of trees at the start will stop the pest and save the loss of foliage and the injury to fruit.

Red Hump (*Schizura concinna*), **Nuttall's Sheep-Moth** (*Pseudohazis eglanterina nuttalli*), and **Brown Bear** (*Estigmene acrea*).—All these species have been reported from different localities with complaint of damage. The brown bear especially has been very abundant, doing much damage to garden plants. The red hump is reported as doing

considerable damage to plum trees in two upper counties, and Nuttall's sheep-moth as defoliating prune trees in several localities. Early spraying with arsenites and later gathering the caterpillars and cocoons is about the only way to cope with these pests.

Tomato-Worm (*Protoparce sexta*) and **Vine Sphinx** (*Celerio lineata*). Both these species have been reported as appearing in numbers in various places. Owing to the habits and food plants of these large caterpillars it is very difficult at times to use arsenites, and the quickest and best method to get rid of them is to destroy them by cutting in two with a pair of scissors. Although this method might seem slow, it has been successfully performed on a large scale.

Cornworm (*Heliothis armiger*).—This species is always present, and reports received from all over the State show that there was not any great increase of its usual numbers. Owing to its life, the larva being inclosed with the ear in the husk, this insect is a very difficult one to fight, but can be checked to a certain limit by rotation of crops, or by planting catch crops.

Cabbage-Butterfly (*Pieris rapæ*).—The cabbage-worm, the larva of the cabbage-butterfly, has caused considerable damage to the cabbage crop and other crucifera. Its abundance this season was very marked, due probably to more favorable conditions. Examination of the late-brood chrysalids indicates that there will be a great reduction in the winter-brood holdovers, as fully seventy-five per cent show the attack of the parasite (*Pteromalus puparum*).

Cutworms (*Peridroma saucia*, *Agrotis ypsilon*, and others).—From reports and observations, 1906 was a banner year for these destructive pests. The early crop of weeds caused by the mild spring and abundant rains was a great inducement for a large brood of cutworms.

Oak-Tree Caterpillar (*Phryganidia californica*).—Several localities were visited by this pest, and it aroused much anxiety, for it was so numerous as to defoliate great numbers of trees. Owing to the good work of parasites, this species generally only lasts one season, and the trees have a chance to recuperate before another visitation occurs. Very little can be done when the pest does appear in numbers, as the host plants are generally too large to spray with arsenites.

Green Apple-Louse (*Aphis pomi*).—The past season has been a very favorable one for plant lice, and this species in particular was very abundant, so much so that considerable loss resulted to the crop in some sections. Of all the species attacking fruit trees this one is most difficult to handle, owing to its work of curling the leaves, thus

preventing a thorough contact with spray materials; therefore, an early spraying, just as the first lice appear and before they cause the curling of the leaves, is absolutely necessary.

Woolly-Aphis (*Schizoneura lanigera*).—This pest is always to be found to a greater or less extent. During the past season much alarm was felt, as it seemed to be present in greater numbers. A great deal of this trouble could be averted if the fruit-growers would pay closer attention to the root-form. If during the fall, after harvest, a thorough campaign were instigated and every grower would undertake to treat the larger roots with gaslime, tobacco, or wood ashes, this pest could be greatly reduced. Spraying for the summer, aerial or branch form, as it is called, is not sufficient to check it, as the root-form, as soon as the growth starts, furnishes abundant material to restock the tree during the growing season.

Black Peach-Aphis (*Aphis persica niger*).—Not much complaint regarding this species came to hand. It is possible that timely warning has caused many to fight the pest, which fortunately has as yet only gained a foothold in a very small area.

Cabbage-Louse (*Aphis brassica*).—This species was exceptionally abundant, not alone on cabbages, but on other plants of this family, and caused much loss to young plants. It does not take much for this species to increase, especially when conditions are right and new vigorous plants are at hand. It is true that a great many ladybirds and syrphus-flies can be found when the pest is at its height, but these are not present in sufficient numbers in the spring to obviate the rapid increase at that time. By clean culture, the destruction of all worthless plants in the fall, and diminishing in this way the winter hibernating form, much aid is given the various enemies of this pest.

Melon-Aphis (*Aphis gossypii*).—This pest is becoming more alarming each year, despite the fact that late in the season enormous quantities of parasites, ladybirds and syrphus-flies can be found. This is probably due to the fact that when the plants begin to cover the ground it is next to impossible to use sprays of any kind. More attention should be devoted to the aphid while the plants are very small, and when the first lice are noticed spraying should be resorted to. If reduced at this period we can expect to get better help from the many enemies which attack it.

Many of our shade trees, the poplar, elm and willow, were attacked by the usual species generally found on these trees, which for some time made a very disagreeable sight of sidewalks and dooryards.

Grasshoppers.—Wherever we find arid lands in our several counties, lands which are generally used as stock pasture in the spring of the year, we must always be prepared to hear of grasshopper damage. This season was, so to speak, an off year for grasshoppers. These insects continue to make periodical invasions, and these have proven that grasshoppers are capable of doing enormous damage, and also that if this pest is not taken in hand before its wings develop, all the efforts available will not give much relief. Grasshoppers lay their eggs in the ground in the fall of the year, and if the ground remains undisturbed the eggs hatch in the spring, when favorable weather prevails. We seldom find the young hopper in swarms in our valleys, owing to the fact that the eggs of the migratory insects, those which came to us from the arid uplands or pastures, have generally been destroyed by plowing or cultivating. We know that to have grasshoppers we must have a mild winter, and we must expect the pest to migrate from undisturbed lands to our cultivated areas when their natural food pastures dry up. We often note the decrease in numbers in the breeding grounds, and we are told that this is caused by climatic and soil conditions, but too few observations have been made in California to substantiate this claim. There is no doubt that the grasshopper plague can be easily controlled, for the breeding areas are comparatively small. It is necessary for the grower to closely observe the first appearance of young hoppers, and the fight will be of short duration. Most complaint of damage comes when the grasshopper is on the wing, generally in the months of June and July, and it is at this time that very little help can be given. Poison baits and hopper-dozers are not necessary if the breeding grounds are closely watched in early May. The hauling of hay to the barns from the fields to which hoppers have migrated brings them to the orchard and garden, and frequently much damage is done. This should be avoided if possible.

Vine-Hoppers(*Erythroneura comes*).—No perfectly satisfactory method has as yet been devised to keep this hopper in check. In some seasons not much damage is done, owing to the limited numbers found. This was the case in the season of 1905, but 1906 found an abundance of hoppers doing considerable damage to the vines. The gathering of all rubbish and dead weeds, in which this species hibernates, and removing these from the vineyard, will do much to reduce the pest. *Tettigonia circellata*, which at times does considerable damage, was only found in small numbers.

Pear-Thrips (*Euthrips pyri*).—This species, although present in the several areas reported from in 1904 and 1905, was not near as abundant during the past season. From reports at hand, we find that probably climatic conditions are partly the cause of this reduction, but the

fungus which is found attacking this species no doubt does its share. It will be necessary to continue observations and experiments on this species, as no thorough method of control has as yet been found.

Red Spiders and Mites.—Of the members of this family it may be said that the pear-leaf blister-mite (*Phytoptus pyri*) was very abundant, while the yellow mite (*Bryobia* sp.) was not quite as prevalent as last season. Of the other species very little complaint reached this office, and from general reports these have not caused any material damage.

Ants.—A great amount of inquiry regarding the appearance of ants in houses has been received this season. It will be remembered that two years ago considerable trouble was experienced from this source. There are a number of species which often invade houses and are attracted to the pantry, cellar, and outhouses, where provisions are kept, especially sweet substances such as preserves, syrups, or sugar. Whenever the nests of ants can be located it is an easy matter to kill the colony by pouring a small quantity of carbon bisulphide into the exit of the nest, or, if necessary, a hole should be made with a stick, closing the hole promptly with soil after pouring in the liquid. When the nests can not be found, or when the nests are in such places that carbon bisulphide can not be used, other methods must be employed. Ants can be enticed to small sponges moistened with sweetened water, and when these sponges become covered with ants they can be dipped into boiling water, which quickly kills the pest. A solution of corrosive sublimate, applied to the shelves and runs of ants, will often drive them away, but care must be taken with this solution, as it is poison. One of the most important steps toward preventing ants from invading houses is cleanliness—keeping sweets well covered and avoiding the spilling of syrups and the like on shelves and floors.

THE CODLING-MOTH PARASITE.

Caliephialtes messer Grav.

Owing to the ravages of the codling-moth in California, which have very largely reduced the profits of apple-growing, and, in some cases, made it almost impracticable, the State Horticultural Commission has endeavored to seek out and introduce some effective check upon this pest.

To this end, the *Caliephialtes messer* Grav., a member of the Ichneumonidæ, a parasitic family of the Hymenoptera, was introduced from Europe some two years since. In its native home it was found to be a very effective check upon the codling-moth, and it was hoped that by introducing and caring for it in California it would prove at least as effective as it had been in sections of Europe. Special attention has been paid to this parasite during the past two years; it has been introduced into a great many sections of the State, and gratifying reports have been received in this office regarding its work where it has been established.

We wish to guard our readers and the fruit-growers of the State generally against expecting too much from any parasite, or from any remedy that can be applied. In the first place, every one should understand fully that an injurious insect, once firmly established, can never be thoroughly eradicated. All that we can hope is to so far check its ravages as to leave a large percentage in favor of the agriculturist. It is too much the case with people that they depend upon beneficial insects to do all their work, and having once introduced them expect the pests to disappear entirely. With a thorough understanding that a parasite will simply serve as a check upon injurious insects, we may state that the *Caliephialtes messer*, the parasite introduced for the codling-moth, has been successful. We may also state that it is, so far, in its experimental stage, and that it is likely to prove of increasing value with each passing year, as its numbers increase and it becomes more widely disseminated over the State.

We have received a very extensive correspondence in this office from different sections of the State where the parasite has been established, and most of the writers speak of it in very favorable terms.

The insect is a very swift-flying one, hiding in the thick foliage of the trees, and is very difficult to find, even by experts, so that it may exist

in large numbers in an orchard and yet pass unnoticed, unless one understands where to look for it and to recognize it when it is seen.

We publish herewith a colored illustration of the *Caliephialtes messer*, which, while the figures are very much enlarged, will give our readers a very excellent idea of the general appearance of the insect. The plate represents the female, showing the under and upper surfaces; also the male insect, and the female in the act of laying an egg upon the codling-moth larva. It also shows the larval or grub form of the fly, and the insect in process of transformation.

The *Caliephialtes messer* was first described by Gravenhorst in his "Ichneumonologia Europæ," from which the following description is taken:

"*General Characteristics.*—The feet are reddish yellow, the posterior tibia slightly curved; the ovipositor the length of the body.

"*Specific Description.*—Form well proportioned and having breathing pores in the segments. Length about seven lines. Head with yellow antennæ. Thorax punctate, slightly testaceous at base of wings. Wings testaceous-hyaline. Stigma and radius fulvous, base and membrane brittle. Feet rufous (reddish yellow), with posterior tarsi fuscous. Tibia arcuate, and fuscous above. Abdomen three times as long as thorax and slightly narrower, cylindrical, all tubercles on lateral prominences. Ovipositor as long as body."

An examination of the colored plate will show that the most peculiar feature of the female is the ovipositor, or egg-laying tube, which is as long as the rest of the body. This is composed of five parts, the two outer and larger of which compose the sheath, and the inner ones the ovipositor proper. Two of the inner parts are very slender and furnished at the tip with transverse ridges like the teeth of a saw, and are slightly concave on the inner side, fitting against a groove in the large piece, which is blade-like. This groove forms the oviduct, down which the egg passes into the body of the worm.

When about to lay her eggs the female walks slowly over the rough bark of the tree, carefully examining every nook and crack in which a worm may be hidden. This critical examination is made with her antennæ, which she inserts into each crevice. When a cocoon is located, a condition of excitement is evident in the rapid vibration of the wings and the swift, yet careful, movements of the antennæ, covering every part of the cocoon, evidently in search of the most vulnerable point of attack. Here the female displays a most remarkable instinct, for through her antennæ she is able to determine whether the inclosed larva has been previously parasitized. A careful examination of several hundred parasitized worms showed that in no case have two eggs or larvæ been found in a single cocoon.

When the female is satisfied that the cocoon contains a healthy worm, she elevates her abdomen until it forms almost a right angle with the rest of her body, and the entire ovipositor is then bent downward between the second and third pairs of legs and against the thorax until the tip rests on the cocoon. The sheath of the ovipositor then springs quickly upward, resting at a point that would be slightly above an imaginary line running parallel with the thorax. The next process is sawing through the tough substance of the codling-moth cocoon. The female brings into play the muscles in the tip of the abdomen, which force the ovipositor down and inward, the ovipositor resting against the abdomen, which prevents it from bending outward. At the same time she firmly grasps the bark with her feet, bracing herself for the operation. In this position, with her abdomen elevated, she uses her entire body as a derrick, and slowly, but surely, saws a hole in the cocoon. The tip of the ovipositor is slightly enlarged and, as soon as the tip is forced through the opening, she has the worm at her mercy, and after reaching the body of the imprisoned larva she gives it several sharp jabs in quick succession. Her ovipositor is then thrust in to its full extent. The insect remains perfectly quiet in this position for several minutes, seemingly oblivious to her surroundings. During this time there is a slight quivering motion of the ovipositor while the egg is being forced down. After depositing her egg, she moves in a circle with the ovipositor still thrust into the cocoon, and probably to make certain that no mistake has been made she gives the worm a couple more quick jabs, when she passes on to the next worm, where the operation is repeated.

The egg is long, narrow, almost transparent, wider at one end than the other, grayish white in color, and shiny in appearance. It is usually deposited on the outside of the worm, at or very near the wound made by the ovipositor. The egg hatches in a few hours into a minute grayish-white grub or maggot, which begins at once to devour the host worm. It grows very rapidly and, in warm weather, is full grown in about seven days. It continues to feed for about eight days more, when the food supply is generally exhausted and nothing is left of the worm but the empty skin and head. At the end of fifteen days from the time the eggs are hatched, the larva begins to spin a cocoon of its own, usually within the cocoon of the codling-moth larva. The cocoon spun by the parasite is darker in color, more parchment-like, and of stronger material than that of the codling-moth. In another seven or eight days this cocoon is finished and the larva commences to assume the pupa form; but there is no perceptible shedding of a skin, only a gradual change comes over the larva, which slowly changes to a pupa. When climatic conditions are favorable, the pupa stage has a duration of about sixteen days. The fly fully matures inside the

cocoon, and in making its escape cuts a little round hole in the parchment-like cover of the cocoon, through which it works its way to freedom. The males of this species, as in others of the Ichneumonidæ, emerge first and impatiently await the coming of the females. The sexes mate soon after the females emerge, and after feeding for a day or so, the latter are ready to deposit eggs. The life of the adults is greatly governed, among the females, by the number of available worms. Where a female can readily find sufficient worms to deposit all her eggs, her life is short, but females in test cases have lived over thirty days. The males, in confinement, die in from twelve to fifteen days. However, in some cases, the life of the male is also extended. Just how many eggs the female lays has not been fully determined, but nearly two hundred adults have been reared from a single female. The life cycle thus appears to be from thirty to forty days, according to conditions of temperature.

During the past year this insect has been bred out in large numbers at the insectary; it has been distributed as widely as possible, and the experiment has been watched by this department with much anxiety. A large number of letters have been received from parties in whose orchards the parasites were planted, and these are generally of such a tone as to very greatly encourage the work, and give assurance that if an exterminating enemy for the plague has not been obtained, we shall at least have succeeded in securing one which will materially check its ravages. The following extracts are taken from letters which have been received in regard to the work of this new parasite:

"The parasite of the codling-moth I received two years ago is now spread over twenty acres of pear orchard, and this year those pears were free from codling-moth. I don't mean by this that a percentage was free, but the entire crop where the parasite was is clean and free from worms. Other orchards where the parasite has not reached are badly infested with codling-moth."—*J. R. Banks, Laughlin.*

"In regard to a colony of the codling-moth parasite which I received some eighteen months ago, I would say that I received the colony and put the insects in the orchard, according to directions. Since that time I have never been able to detect the insect in the orchard; but from the fact that my apples and pears this year were fairly free from worms in that orchard, I judged that the parasite is still active. I did not spray for the codling-moth at all in the orchard where I had placed the parasite, and yet the fruit was cleaner than where I had sprayed."—*Clyde M. Frisbie, Manager Shade Farm, Anderson.*

"The parasites were placed on an apple tree which the year previous showed over fifty per cent of the fruit damaged by the codling-moth. The flies were put on the trees at the close of the blossoming period.

In the subsequent crop of fruit the infection was reduced to about twenty-five per cent."—*L. R. Curtiss, Riverside.*

"The parasites were liberated in one orchard, as directed. My apples this year in this orchard were as free from worms as I could wish, only one per cent having worms. In another orchard twenty per cent were infested. Both orchards received the same spraying."—*Paul H. Cordes, Gilroy.*

"The Board received one colony, which was liberated in an orchard below Anderson, and, I understand, with good results."—*George A. Lamiman, Olinda.*

"I am picking my apples at the present time and will not have as many wormy apples this year as last, and in the orchard where I liberated them I have not two boxes to the hundred of wormy apples, while last year I had at least twenty. In my other two orchards, about 300 yards distant, the wormy apples will be about five boxes to the hundred. I think this parasite has solved the codling-moth problem in a far better way than spraying, as I spent both time and money spraying, yet the codling-moth kept right on increasing in numbers."—*C. C. Tichenor, Bellevalle, San Mateo County.*

"I wish to say that I am very much interested in these parasites, having spent considerable time in an orchard in the Dry Creek Valley, where a colony was liberated two years ago, and also in an apple orchard near Geyserville. I discovered the parasite in both orchards, though they are hard to find if one does not know just where or how to look for them. They have done good work in both of these orchards, as the apples for the past two seasons have been almost entirely free from worms. The owners as well as myself feel certain that it is the parasite that has brought about these excellent results."—*G. W. Miller, Healdsburg.*

"Mr. Desnoyer, of Chino, says that he has often seen the parasites flying about in the orchards, and to verify this statement I caught some and found them to be identical with those liberated. In 1905 he lost fifty per cent of his crop, and this year his loss was reduced to twenty-five per cent."—*John Wasson, Pomona Times.*

THE GYPSY AND BROWN-TAIL MOTHS.

Considerable correspondence has been carried on between the Horticultural Commissioner of this State and prominent parties interested in checking the ravages of the gypsy and brown-tail moths in Massachusetts, and it is due to the fruit-growers of California that some information in regard to this matter should be given them.

The terrible ravages of the gypsy-moth are generally well known to our fruit-growers, and its history from its first introduction up to the present time is not unfamiliar. The outbreak of this fearful pest was due to the escape of one female moth which had been introduced into Malden, Massachusetts, by an enthusiastic but careless entomologist, who little realized the extent of the damage that could be done by one insect. Its increase was noted after several years, although little attention was paid to it until it became a really serious pest, when public attention was directed thereto and an effort made to get rid of it. Exterminative work was commenced in Massachusetts in 1890, and continued for ten years, during which period over \$1,000,000 was expended in fighting this pest alone; but all that was accomplished by artificial means was to curtail the area of infestation to some extent and to prevent its spread to new sections. The continual cost of fighting this pest and the small results accomplished by the means employed led to considerable dissatisfaction among the taxpayers of Massachusetts, and, as a result, the Legislature ceased to make appropriations for the work and it was abandoned. With the abandonment of the work the moth began to increase with alarming rapidity, and the Legislature was again compelled to take the matter in hand and in 1905 made an appropriation of \$300,000 for the purpose of seeking remedies or means of extermination, the work being placed under the superintendency of Mr. A. H. Kirkland.

This pest is now found throughout the whole of the eastern portion of Massachusetts, southeastern New Hampshire, and a region in and about Providence, Rhode Island. It has been reported several times from Connecticut, and is gradually spreading in all directions.

As a result of the inefficiency of artificial methods in checking the pest, interested parties in Massachusetts applied to the Commission of Horticulture of California to ascertain the possibility of securing and introducing parasites which will work upon it. This Commission has never doubted that effective parasites could be found and secured. The

moth has been known in Europe from time immemorial. It has been observed in England on several occasions, and while on the Continent it sometimes appears in large numbers, it as invariably disappears and can not be counted a serious pest even where it is the most prevalent. In England it has never obtained a foothold in spite of numerous introductions. The moth is also known in other parts of the world, where it has never been considered a pest and is unquestionably kept below the danger limit by some natural enemy.

A second pest, closely allied to the gypsy-moth, and commonly known as the brown-tail moth, was also introduced into Massachusetts some years ago, and while not so well known to our readers as the gypsy-moth, it has spread with greater rapidity and threatens to be an even greater pest in the sections infested by it than has been the gypsy-moth. This insect was first introduced into Somerville, Massachusetts, early in the past decade, and was supposed to be a native species, but the rapidity of its increase, and the fact that there was apparently no natural check upon it, led to an investigation and it was discovered that it is a European species probably introduced into the new world by accident. The knowledge of the devastation wrought by the gypsy-moth led to a special appropriation being made for the fighting of the brown-tail moth also, which was placed in the hands of the Gypsy-Moth Commission, which availed itself of all known artificial means—spraying, burning, fumigating, hand-picking, and every other method—to check the spread of both pests, but in neither case were they successful, and in 1900 the appropriation for fighting the brown-tail moth was discontinued with that of the gypsy-moth. Since then, this insect has spread rapidly through southeastern New Hampshire, Maine, New Brunswick, and elsewhere in the New England states, and has become even more an object of dread among the horticulturists than the gypsy-moth itself. This, as stated before, is a European species, and in Europe has been known from time immemorial, but has never been reported as a very serious plague, nor has it ever increased with the alarming rapidity, or in such vast numbers, as it has in its New England home—evidence sufficient to indicate that there is some natural check working upon it.

In the fighting of this pest, as with the gypsy-moth, the advice and assistance of the California Commission of Horticulture were sought, and a voluminous correspondence was carried on between parties in Massachusetts and this office relative thereto, until finally an offer was made to search for, secure and introduce an effective parasite for both of these pests for a specified amount, sufficient to cover the cost of the labor performed. This was done on the theory that it is far better to check a pest while it is still in a limited area and can be handled with comparative ease and effectiveness, but which is threatening to spread

until it might possibly reach our own State, than to wait until it has gained a foothold here and caused a vast amount of damage.

While two such pests as those under consideration are ravaging a large area in New England, although the trouble seems to be very remote to California, there is still danger that specimens may be brought into our own State and we be called upon to fight the enemy in our own home at a vastly greater outlay of money, to say nothing of the destructive work that would be done by them if once introduced.

Recalling the experience which California has had in the introduction of parasites, and knowing the good work that is being done by them, Massachusetts in its distress naturally turned toward us. Nothing came of the proposition, however, as the entomologists of Massachusetts in conjunction with the Bureau of Entomology at Washington combined together to work along the same lines; and Dr. L. O. Howard spent a large part of the summer of 1905 in Europe and made arrangements with entomologists in different parts of that continent to send every known parasite of these pests to Massachusetts. We have learned from Dr. Howard that he succeeded in obtaining a large number of species of parasitic insects which prey upon both the gypsy and brown-tail moths. These have been secured from different parts of Europe and from different altitudes, and among them all he is in hopes that an effective check can be secured. Experiments are now being carried on with these parasites in Massachusetts, and California most sincerely hopes that an effective check may be soon obtained and the possibility of the danger from this source be removed from our State.

We present herewith a colored plate showing both the gypsy and brown-tail moths in their various forms, for the benefit of the fruit-growers of the State, and advise them to become thoroughly familiar with both pests, so that if, by any accidental means, any should be observed, they may be reported to this department at once, and never be allowed to obtain a foothold with us.

THE PEACH BLIGHT.

(*Coryneum beyerinkii*.)

By CHARLES T. PAINE.

During the past three or four seasons the damage occasioned in the peach orchards throughout the State by peach blight has assumed such large proportions as to make a study of the disease imperative. The total loss of crops for several successive seasons, reported by many large growers, shows that either the ravages of the disease must be checked, or the peach industry will rapidly decline. The writer has, therefore, endeavored to gather all the information possible concerning the disease, and to present to peach-growers the methods of control which study and experimentation have proven successful in combating it.

The blight of the peach has long been known both in Europe and in this country. Few writers have treated the subject, and until this past year no one has given us a remedy for the disease which has proven successful. In Bulletin No. 20, Division of Vegetable Pathology and Physiology, U. S. Department of Agriculture, 1900, by Prof. Newton B. Pierce, the disease is aptly called "winter blight," for it is in the winter that the disease works its mischief.

Peach blight is caused by a parasitic fungus, just as are pear scab, curl leaf, and all our rots and mildews. The botanical name of the fungus is *Coryneum beyerinkii*, and it is a true parasite, living only in the tissues of the living host plant. Oudemans first published a description of this form in "Hedwigia for 1883," page 115. The following description is taken from Saccardo's "Sylloge Fungorum":

"A very minute parasitic form growing in spots, which are black, with conidia, and having lightish-brown, cushion-like mycelium. Stipe oblong-obovate, pale olive-green, commonly triseptate, with the septate dividing it into equal parts, the ultimate segment being perhaps slightly smaller than the others. The basidia are cylindrical or perhaps slightly wider at the basal ends, hyaline, without color, and about equal in length to the conidia."

Habitat: In the trunk and branches of the peach in the Netherlands. Producing a flowing gum.

The life history of *Coryneum beyerinkii* has never been thoroughly worked out. It is in the conidial, or asexual spore-producing, stage of the fungus that the damage is done and infection takes place, and we know it best in this stage. Later appearing sexual spore forms are

known by different names, but their identity with *Coryneum beyerinkii* has never, so far as the writer knows, been proven. The life cycle may then be described as follows:

The spores which have wintered over in the buds and at the bases of the twigs germinate as soon as the heavy winter rains set in. This is usually about the latter part of December or the first of January. Whether this is the regular time of germination is not yet known, but for several seasons it has been concurrent with the heavy rains and at the time named. These spores are elongate-oval in shape, and septate into 2-6 cells. Upon germination each cell sends out a tiny tube or thread between the cells of the epidermis of bud and twig down into their tissues. Only the growing parts of the twigs are attacked and penetrated by these threads or hyphæ of the fungus. These hyphæ are vegetative in character, and their aggregate is called the mycelium. They are finely microscopic in size, much branched, septate only rarely, and light brown in color. At frequent intervals on the mycelium threads, as they push their way between the cells of the plant tissue, minute lateral projections are formed that pierce the adjacent cell-walls. These projections are "suckers," and their function is to absorb the nourishing sap. These suckers are known as haustoria, and are the organs by which very many of the parasitic fungi absorb their food. They are spherical in shape and strongly contracted at their bases, where they are connected with the mycelium. The penetrated cells quickly turn brown, and finally those changes are produced which are seen as the outward manifestations of the disease.

Where each spore has developed and the mycelium ramified throughout the cambium a reddish circular or oval spot appears on the surface of the bark. When a bud, leaf, or young fruit is attacked, it turns brown and quickly dies. Within a few days after the red spots appear on the bark, short, straight tri-septate tubes or stipes are developed on the mycelium and thrust out through the epidermis. On the ends of these stipes, "mother cells," or basidia, are developed, and by the division of the basidia, "daughter cells," or conidia, are formed. These conidia are the seeds or spores. They are black at first, but soon turn brown, thus changing the color of the spots from red to black and to brown. The spores are rapidly disseminated through agencies of wind, rain, birds, and insects, and a new infection takes place to start another life cycle. The blossom and leaf buds are attacked first, and it is usually from these points that the twigs and small branches are infected.

As the growth of the fungus in the twigs and small branches progresses, they become very much spotted, gum pockets form at badly affected points, and gum exudes from them. This exudation of gum is particularly noticeable on damp days, and it may be seen hanging in drops on the under side of the branches. Often the grower's attention

is first called to the disease by this very noticeable stage. When these gum pockets form, the wood itself is injured and decays to the central pith of the branch and mycelium is found ramifying throughout the brownish, jelly-like substance. Oftentimes the branches will be attacked to such a degree that they will die back several feet from their tips.

The under sides of the trees are most subject to infection by the fungus. Often the top will be left unharmed, a mere tuft, while the lower part is withered and dead. This is most unfortunate, as the lower branches are the most desirable to preserve for fruiting; but this is the case from the very nature of fungous growth. The lower part of the tree is shaded and holds the moisture, and so presents the most favorable environment for the germination of the spores and the development of the fungus. Once the mycelium has penetrated the cambium, or is within the bud, it is thoroughly protected from drought and from the sun's rays, and draws all its water and nourishment so necessary for its growth from the sap, the very life of the tree itself.

Several successive years of blight in an orchard will so injure the trees as to make them worthless for anything but the wood pile or the brush heap, and, in some cases, they have died from the severe attack. Trees affected with blight one season lose their crop not only that year, but to a large extent the following year also, for the fruit buds put forth that season are infected and injured.

When the growing months are over infection practically ceases. Green branches, with the characteristic red spots on them, last through the fall, and sections placed under the microscope show that living mycelium is present as late as October. The gum pockets are still active to a certain degree also. Thus it seems probable that the peach blight fungus goes over from one active season to another in a dormant state of the mycelium. An allied species, *Podisoma juniperi*, winters in a dormant state of the mycelium in the branches of the juniper, and many other parasitic forms do the same, so it would not be strange to find our blight doing likewise. Later examinations will prove or disprove this.

In many respects peach blight resembles the brown rot (*Monilia fructigena*) of the peach, and in some cases might be easily confused with it. The brown rot has indeed been called peach blight in a treatise by Erwin F. Smith. The wilting and killing of blossom, fruit, and twig are characteristic of both diseases, and flowing gum pockets are formed as a result of the attack of each. Brown rot does not cause spotting, however, and attacks old and mature fruit, while the blight does not.

On July 30 of this year, the State Commissioner of Horticulture sent a circular letter to each of the County Horticultural Commis-

sioners asking for information relative to the peach blight. The main questions were, when first observed; how long prevalent; area infested; percentage of damage done, and methods of control used. Nearly all of the commissioners responded, but only the reports from counties where the disease is prevalent can be taken up in this discussion.

It was found that all the peach-producing counties of the State are affected by the blight, Tulare, Merced, Kings, Madera, Sacramento, Sonoma, Solano, Mendocino, Humboldt, and Shasta counties having received the greatest damage.

Commissioner Schell, of Fresno, reported that the blight made its first appearance in that county five years ago, but that there was no increase in its spread, nor particular damage done until two years ago. The southern part of the county was affected first, and thence it spread northward. This past season thirty per cent of the crop was lost on account of the blight.

Commissioner James A. Hill, of Kings County, reported that the blight was very prevalent there and in adjacent counties, and had been so for several years.

Commissioner J. L. McClelland, of Merced County, stated that although the blight had been noted there for the first time this year, twenty per cent of the peach crop had been lost. Dos Palos and Los Banos colonies were most seriously affected.

Commissioner George W. Harney, of Yuba City, reported that all the peach trees in the Marysville district were badly affected in twig, leaf, and newly formed fruit. Not an orchard was free from the disease.

Commissioner G. W. Whitaker, of Sonoma County, found the disease prevalent only in the eastern and northern ends of the county. Five per cent of the crop had been lost there during the past season.

Commissioner Chris. N. Tharsing, of Shasta County, reported that the blight made its appearance about Anderson in 1903 and had gradually spread since then. Commissioner Lamiman said, however, that it had not yet reached the Olinda district.

Commissioner George H. Cutter, of Sacramento County, stated that he had lost ninety per cent of his crop for the past two years. In company with him, the writer visited several orchards and found that his is only a fair example of what has taken place.

In none of the foregoing counties had an effective remedy for the blight been found and applied. Growers and horticultural commissioners of Tulare, Fresno, and Kings counties, however, had invited Prof. Newton B. Pierce, then U. S. Plant Pathologist and Director of the Government Experiment Station at Santa Ana, to visit and inspect their orchards. Professor Pierce was not unacquainted with the disease, having observed it in the Feather River bottom in 1894-95.

Solano County has suffered severely from blight. Commissioner

Name.	Address.	1905.			1906.			Varieties Affected.
		Blight.	Spray.	Date Applied.	Blight.	Spray.	Date Applied.	
C. S. Riley	Visalia	Some	L. S. S.	Late	Bad	L. S. S., Bord.	January	All varieties.
G. Geraldson	Newcastle	Some	L. S. S.	Late	Very bad	L. S. S.	Late	Crawford.
W. E. Rippey	Penryn	Some	L. S. S.	Late	Worse	L. S. S.	Late	Susquehanna, Foster, [Clings.
S. C. Day	Loomis	Very little	L. S. S., Bord.	Late	25 per cent	L. S. S., Bord.	Late	Crawford.
L. D. Greene	Vorden	Some	None		Worse	None		All varieties.
Isaac Phillippi	Acampo	Very little	L. S. S., Bord.	Late	Worse	L. S. S., Bord.	Late	
H. G. Boyce	Winters	Some on unsprayed trees.	L. S. S., Bord.	Early	Worse	L. S. S.	Late	St. John.
G. W. Harney	Marysville	Some	L. S. S., Bord.	Late	Bad	L. S. S., Bord.	Late	Phillips' Cling.
A. C. Sullivan	Winters	Very little	L. S. S.	Late	Some	L. S. S.	Late	Muir.
T. B. McKevitt	Vacaville	Very little	L. S. S.	Early	Very little	L. S. S.	Early	Muir, Crawford.
Wm. Brink	Winters	None	L. S. S.	Early	On unsprayed trees.	L. S. S., Bord.	Early	
F. de Gomez	Auburn	None seen	L. S. S., Bord.	Late	Bad	L. S. S.	Late	Yellow Clings.
S. M. Tool	Napa	Slight	Bord.	Late	Some	Bord.	Late	Crawford, Salway.
W. H. Barry	Courtland	Very bad	L. S. S.	Late	Very bad	L. S. S.	Late	Alexander, Hale's, Crawford.
P. D. Fowler	Tulare	Bad	L. S. S., Bord.	Late	50 per cent	L. S. S., Bord.	Late	Foster, Clings, Early Crawford.
Cutter Bros.	Sacramento	Bad	L. S. S.	Late	Very bad	L. S. S.	Late	Early varieties.
Mrs. S. Runyon	Vorden	Bad	L. S. S.	Late	Slightly less	L. S. S.	Late	All varieties.
Runyon & Dorsey	Courtland	Bad	L. S. S.	Late	Crop failure	None		
J. R. Chadbourne	Suisun	Bad	Bord.	Late	None	Bord.	Before Dec. 15.	All varieties.
J. S. Brown	Suisun	Bad	Bord.	Late	None	Bord.	Before Dec. 15	All varieties.
Wm. Pierce	Suisun	Bad	Bord.	Late	None	Bord.	Before Dec. 15	All varieties.
C. N. Tharsing	Anderson	Some	L. S. S., Bord.	Late	Worse	L. S. S., Bord.	Late	Clings.
J. R. Banks	Laughlin	Bad	None		Very bad	None		All varieties.
G. N. Whitaker	Santa Rosa	Some	None		Worse	None		Muir, McClish Cling.
F. Giannini	Tulare	Bad	L. S. S., Bord.	Late	None on sprayed trees.	L. S. S., Bord.	Early	

J. R. Chadbourne first found blighted trees in his orchard in 1899, and for the past four years it has been general in distribution. In 1905 the loss was particularly great, sixty per cent being a fair average of the loss sustained. It is from experiments carried on in the Suisun Valley during the winter of 1905-06 that we gain our first positive knowledge as to how the disease can be controlled and practically stamped out. These experiments will be taken up when we come to the subject of methods of control.

The commissioners of San Diego, Orange, Los Angeles, Riverside, San Bernardino, Ventura, Santa Barbara, Alameda, El Dorado, and Lassen counties reported that the disease had not yet reached them; but in these counties peaches are not grown extensively.

In May of this year, Mr. George H. Cutter, having become alarmed at the increasing prevalence of the blight, and being able to secure but little information on the subject, addressed a letter of inquiry to his fellow commissioners throughout the State and to many growers of peaches. Questions were asked as to how prevalent the blight was, what remedies were used, and the date of application, for both the years 1905 and 1906. These replies he has kindly turned over to the writer and they are given on page 243 in tabular form. Presented in this form the eye and mind can readily take in the conclusions to be deduced from them.

Peach blight has gained a strong hold in California. Wherever blight existed in 1905 it is worse in 1906, and places which were free from it in the past experienced its inroads last season. Clings, Crawford, Muir, and early varieties of peaches seem to have suffered most severely. All varieties are affected in most cases, however, and no positive assertion as to the susceptibility of certain varieties to blight can be made at present. The most striking conclusion to be drawn is that in regard to spraying. Sprays, both with the Bordeaux mixture and with lime, sulphur, and salt, have been used by all but three growers in their efforts to control the disease. In all cases but five the spraying was done late, that is, in the latter part of January and in February. Failure was the uniform result for those who sprayed late, and success for those who applied the remedy early in the season. Recent letters from Runyon & Dorsey, and from P. J. Huth, for Mrs. S. Runyon, state that although their spraying was done late and their crops were a failure, their trees made a thrifty growth during the summer, and for that reason they assert that there was some improvement over the preceding season. At Vacaville, where the spraying is usually done early, on account of the earliness of the season, the blight has done little damage and has not increased as it has in other places.

The reason for the total failure to prevent blight by late spraying is easily seen when the nature of the fungus is considered. The fungus

spores resting in the buds and crevices in the bark had germinated and entered the tissues of the tree before the spray was applied. Once beneath the epidermis of bud and twig, the mycelium is fully protected. It is a waste of good material to spray for it in this stage, for the fungus can not be destroyed without destroying its host as well. If the mycelium of the fungus remained dormant in the branches during the early part of the winter, as seems probable, it had renewed its activities and borne a new crop of spores to be disseminated through the orchard before the spray was applied, and a multitude of new infections had taken place. But where the spraying was done early, that is to say, finished by the first of January, the wintered-over spores were destroyed and any fresh lot borne by dormant mycelium were killed by contact with poisons on the surface of the branches.

In February, 1905, Prof. M. B. Waite, of the U. S. Department of Agriculture, at the request of Messrs. Chadbourne, Pierce, and Brown, visited the peach orchards in the Suisun Valley. The damage for that season had already been done, but for the following season he advised spraying with Bordeaux mixture early in December.

Accordingly Mr. Brown commenced spraying December 6, 1905. He continued spraying at intervals until February, 1906, covering different blocks of orchard at each application. Messrs. Pierce and Chadbourne followed the same plan, so that different blocks of trees, well separated from each other, and sprayed at different times, were made to act as a check one upon the other.

The results were uniform throughout. The blocks of trees sprayed before December 15 were entirely free from blight. Those sprayed from December 15 to January 1, 1906, were only slightly affected. From January 1 to 15 a certain amount of benefit resulted from the spraying, but there was still considerable blight. Trees sprayed after January 15 were blighted just as badly as those which were not sprayed at all. Several other growers made the same experiment and the result was the same in each case.

The Bordeaux mixture used in these experiments was stronger than is customary, the formula being 16 pounds of copper sulphate and 35 pounds of quicklime to 100 gallons of water. Mr. Chadbourne writes concerning it as follows: "I think after the first year this wash can be used a great deal weaker, and possibly the first year; but that is the way we used it on an orchard that had not produced a crop for the past three years, and this year three fourths of the crop was thinned off by hand, trees tied and propped, and still the trees are breaking down from the overload of fruit."

The Bordeaux mixture can undoubtedly be used in a weaker solution and still produce good results. It is the time of application rather than the proportion of ingredients that is most important. The spores

of the fungus must be destroyed before they germinate, and it is useless to apply remedies after germination has taken place. Experience has shown that this must be done early in the winter and before the rains set in. Weather conditions must govern, to some degree, the spraying operations, but by starting to spray as soon as the pruning is over in the fall, or as soon as the leaves have fallen, it can all be finished by December 15. The ground to be covered will be the guide for each grower to govern his time of commencing operations.

Pruning out all dead and diseased limbs and plowing under or burning all leaves and weeds will remove great sources of infection. If the dead, gummed, or spotted branches are removed, the infection from wintered-over mycelium is certainly removed.

The lime-sulphur-salt formula has been used and found effective in destroying the spores of the peach-blight fungus. Where an insecticide as well as a fungicide is needed, the lime-sulphur-salt spray will do double duty. Bordeaux is, however, our best fungicide, and its use is recommended wherever the blight is prevalent to a high degree.

Since the peach-blight fungus (*Coryneum beyerinkii*) has been known to exist in California for at least ten years, it seems probable that the climatic conditions of the past three or four years have been the cause of its becoming a pest. The peach industry of the State was very great ten years ago, and yet the trees were not affected by blight, so that the increase in acreage and consequent opportunities for spreading the disease can not have been the cause. Fungi are, to a very high degree, dependent upon moisture. If a spore which has germinated is subjected to a dry atmosphere for a short time even, it dies. A long-continued rainy season is, then, very conducive to the rapid growth and multiplication of fungi. The comparatively heavy rainfall throughout California for the past three or four years has afforded, then, the very conditions which are most conducive to the growth of the peach-blight fungus. Instead of but one or two generations of spores, very many have been able to germinate and start new colonies of the parasite to growing throughout our peach orchards. Should dry years again prevail, the fungus might cease to be a pest; but those are conditions which few of us desire or hope for.

Remedies.—The following sprays will be found effective:

Bordeaux Mixture.

Copper Sulphate (bluestone)	15 pounds
Quicklime	25 pounds
Water	100 gallons

Dissolve the copper sulphate in a barrel or wooden vessel containing 25 gallons of cold water. Slake the lime in a small amount of water and add water to make 25 gallons. Pour the lime water slowly through a fine screen into the copper sulphate solution, stirring the while, and add 50 gallons of water. Apply the spray while fresh, using a pump that will maintain 150 pounds pressure. This will insure every part of the tree being reached, and a spray that is a mist will cover thoroughly every bud and twig. Cloudy days when there is no wind are best to work in.

The use of a larger proportion of lime than is usual in the Bordeaux mixture gives the wash greater lasting qualities, as it is not so easily washed off by rains. Where it seems best to use the lime, sulphur, and salt wash, the following formula will be found effective:

Lime, Sulphur, and Salt Wash.

Quicklime	40 pounds
Sulphur	20 pounds
Salt	15 pounds
Water	60 gallons

Make the sulphur into a thin paste with hot water; place the unslaked lime in a tight barrel, and add the sulphur paste and from 10 to 15 gallons of boiling water. Cover the barrel with sacks and a wooden cover and let it stand until the violent boiling has ceased. Then stir the mixture until the boiling ceases entirely, add the salt and enough hot water to enable the mixture to be strained into the spraying tanks, and add the required quantity of boiling water. Apply while hot.

Summary.—1. Peach blight is a disease which has but recently reached importance in California, although it has been known to exist here for more than ten years.

2. All the large growing peach sections of the State are affected by the blight, the loss varying from five to ninety-five per cent of the crop. Thirty per cent would perhaps be a fair estimate of the damage done.

3. The blight is caused by a parasitic fungus, *Coryneum beyerinkii*, and its action is to destroy the buds, twigs, and young branches during their semi-dormant condition in winter. Infection takes place by the first of January, and the damage is done before the usual time of spraying in February.

4. Late spraying has in all cases failed to check the blight, while spraying done before December 15 has proven successful in completely controlling the disease.

5. Spraying with Bordeaux mixture before the middle of December, combined with clean culture and cutting out of all dead and diseased branches, will prevent blight.

MISCELLANEOUS.

Reclamation of Alkali Land Near Fresno.

An Experiment in Silk-Raising.

RECLAMATION OF ALKALI LAND NEAR FRESNO.

By CLARENCE W. DORSEY,

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An experiment has just been completed by the U. S. Bureau of Soils which should prove of considerable interest to the fruit-growers of California. This is the successful reclamation of a 20-acre tract of alkali land south of Fresno, in Central Colony. The history of the alkali question in the Fresno district is doubtless familiar to many of the readers of this publication. All who have followed the development of this flourishing raisin and fruit center know how from a few insignificant patches alkali has greatly spread, in recent years causing in extreme cases complete abandonment of some of the choicest vineyards and orchards. This is especially the case south of Fresno, for, as is well known, little if any alkali exists in the red hardpan soils north and east of Fresno. Various remedies have been suggested from time to time, yet there is no recorded instance of a single field having been permanently reclaimed after having once been ruined by excessive quantities of black alkali. Slowly the area of alkali land has encroached upon the fertile vineyards and fields, which have rapidly depreciated in value, while the apparently helpless farmer has made little or no effort to check the damage.

With the gravity of the situation in mind, then, it is especially gratifying to report that in one of the most badly affected sections a tract of land has been so freed from alkali that the owner of the larger part of the tract is now contemplating planting again the sensitive vines. The work, moreover, is practical in application, and the cost is such as to commend it to owners of alkali land or to those seeking investment for unemployed capital.

The tract of land where the experiment was undertaken is situated $4\frac{1}{2}$ miles south of Fresno, at the junction of Fig and Central avenues. The soil is a fine sandy loam, locally known as white ash land, derived largely from volcanic detritus. Throughout the Great Valley of California this class of soil frequently contains appreciable quantities of alkali. It is underlain at irregular depths by white calcareous hardpan, varying in thickness from a few inches to several feet. The land

was first cultivated many years ago, at which time the ground water was quite deep. Traces of alkali were generally present, and occasional alkali patches of limited extent were frequently noticed by early settlers. Those areas, underlain at slight depths by continuous thick beds of hardpan, were of little value for fruits or farm crops, but the greater part of the tract was considered choice land. In fact, part of the tract yielded handsome crops of fruit and at one time was valued at \$350 an acre.

With the continued practice of irrigation on this and adjoining lands the ground water, originally very deep, gradually rose. With this rise in ground water alkali began to make its appearance on the surface. Conditions grew worse until about 1899, when almost all of the tract was abandoned for useful crops. The alkali-resistant Bermuda-grass occupied most of the soil, yielding a slight return as pasture land. Occasional trees and vines remained that made feeble growth, but were no longer of commercial value. This brief statement of the abandonment of this tract on account of alkali is the history of many farms in the neighborhood formerly of high value.

During 1900 a systematic classification and study of the soils was made by agents of the Bureau of Soils. The alkali question received careful consideration at the time, and explicit instructions were given in regard to the treatment of the various classes of alkali soils found in the district. Suggestions were made to prevent the rise of alkali in productive soils, as well as certain rules to be followed to reclaim soils containing excessive quantities of alkali. In 1901 concerted effort on the part of Fresno merchants and farmers south of Fresno resulted in the undertaking of an experiment to free certain lands from alkali. A tract of land was chosen $4\frac{1}{2}$ miles south of Fresno. The plan of the experiment was to lay tile at a depth of 9 feet for a distance of nearly one-half mile along the east side of Fig avenue. Since no gravity outlet was available, the drainage system was to discharge into a deep sump hole at the intersection of Fig and Central avenues. It was believed that lands from one eighth to one fourth of a mile on each side of the line of tile would be greatly benefited. While a considerable sum of money was subscribed, principally by the farmers in the vicinity, and the work of digging the trenches begun, unforeseen difficulties finally resulted in the abandonment of the project.

Early in 1902 the Bureau sent representatives to select a suitable site for a demonstration experiment in alkali land reclamation. Although there were many objections to the tract already selected, after due deliberation the Bureau decided to accept this as a location for such an experiment, inasmuch as a waterwheel had been installed to remove the drainage water, and several hundred dollars' worth of lumber and drain tile had been delivered. On account of the height of the ground

water at this time (April, 1902), no further work was done until November of the same year. In November a drainage system was installed, consisting of drain tiles ranging in diameter from 3 to 6 inches. The system consisted of a main drain about 2,000 feet in length, with short laterals discharging into it at irregular intervals. The main drain discharged into a sump hole located at the intersection of Fig and Central avenues. The drainage water was removed by means of a Chinese pump operated by a waterwheel that had been installed when the first experiment was undertaken. The main drain was not located along Fig avenue, as originally contemplated, but some little distance east, in order that the fields heavily charged with black alkali might be more greatly benefited by the drainage. The drainage system embraced approximately 20 acres, and was installed at a depth of from $2\frac{1}{2}$ to 5 feet from the surface.

Copious flooding early in 1903 greatly diminished the alkali content in the upper layers of the soil. In view of the fact, however, that the water-table still remained close to the surface, the reclamation of the upper layers of soil was not permanent, so that in certain portions of the tract a concentration of alkali again took place in the top soil. During this year, also, considerable difficulty was experienced in keeping the tiles free from silt. The fine micaceous silt entered the tiles almost as readily as water, and restricted the efficiency of the drainage system. In some few places it was even deemed advisable to relay certain portions of the system.

During 1904 flooding was again continued and the greater part of the tract freed from alkali to a depth of 2 or 3 feet. Remunerative crops of wheat and barley were grown on much of the tract that had not produced profitable crops for years. Alfalfa sown on portions of the tract in the late fall made good growth. This crop yielded several heavy cuttings during 1905, while other parts of the tract again produced good crops of barley and wheat. The returns from the crops of 1905 alone were sufficient to pay the cost of the drainage system.

While the removal of the alkali from the upper layers of soil had been satisfactory and profitable crops could be grown, the successful lowering of the water-table demanded further consideration. This was realized to be a difficult problem, since the ground water rises to within a very short distance from the surface on the tract as well as on surrounding lands. With the ground water standing at a depth of even 3 feet from the surface during at least a portion of the year, the chances are quite favorable for a second accumulation of alkali in the upper layers of soil. Considerable damage may result from a water-table that fluctuates from a depth of 8 feet in the winter months to 3 feet during the growing season of the summer. Fluctuation of the water-table, aside from its bearing on the alkali question, inflicts the maximum

injury by drowning the new root growth of vines, fruit trees, and other deep-rooted crops. Any permanent lowering of the water-table, then, would appear very desirable. In any such question, however, there is the governing factor of the cost in installing drainage systems below certain depths.

Believing that much permanent benefit would result in lowering the water-table even a few feet, a new drainage system was installed in November of 1905. The system was enlarged somewhat and all drains placed from 1 to 3 feet deeper than the original system. The last few hundred feet of the main drain averaged more than 7 feet in depth, while most of the laterals were slightly more than 4 feet deep. The sump hole for receiving the drainage water was also enlarged and excavated to a depth of 10 feet. To keep the drains open and effective at all times a small galvanized wire cable was laid in all lines of tile. To this cable steel wire brushes may be attached and drawn through the tiles as often as necessary to keep them free from silt and roots. A centrifugal pump was connected with the waterwheel, to remove the drainage water from the sump hole.

With the opening of the irrigation season in January, 1906, the ground water rapidly rose from $8\frac{1}{2}$ feet to the lower portions of the main drain. The centrifugal pump at once proved capable of easily removing the drainage water, together with the varying quantities of sand and silt discharged into the sump. While the removal of the alkali by flooding had proceeded satisfactorily in previous years, the results were especially gratifying after the installation of the new drainage system. The greatest change was due to the lowering of the ground water. It was soon found that the ground water was kept several feet below the surface not only on the tract, but also in lands situated some little distance away. Certain cellars fully three fourths of a mile distant were reported to be perfectly dry for the first time in years, while ponds likewise some distance from the pump stood at a much lower level than formerly. As the season advanced the area affected by the drainage system grew in extent, until perhaps two hundred acres were more or less directly benefited.

The quantity and position of the alkali in the tract were also materially affected by the new drainage system. While formerly it had been possible to leach the alkali downward some distance in the soil, the exact depth was limited by the height at which the ground water stood. With the first drainage system this was admittedly too shallow. With the water-table not more than 3 feet from the surface, conditions are very favorable for a return of the alkali to the surface, unless the utmost precautions are taken. With a deeper and more efficient drainage system, however, this danger seems to have been eliminated, and when once the alkali is leached to a depth of 4 or 5 feet there is little

chance of its being returned to the surface, even by the excessive evaporation of the long, hot summer. This refers to that portion of alkali remaining in the soil and not carried away by the drains. After repeated flooding for some time, it will be found that the alkali content of the soil is so greatly reduced that the portion remaining need not be considered at all.

This, briefly, is a short description of the experiment at Fresno. To ascertain the bearing this experiment may have upon the question of horticulture and related subjects in California and adjoining states we must give some consideration to alkali and its relation to arid soils. Alkali, as is well known, is an accumulation of water-soluble mineral salts. These salts are principally the chlorids, sulphates, and carbonates of sodium, magnesium, calcium, and potassium. In countries of little rainfall all soils have an abundance of mineral salts. The rains are not sufficient to leach away all the salts set free during the formation of soils from rocks; hence, soils of arid regions contain more soluble mineral matter than the soils of regions of abundant rainfall. In moderate quantities these salts are beneficial, but when accumulated in quantity they prevent the growth of valuable crops. These salts can only move within the soil when dissolved and held in solution by water. Under natural conditions they may remain practically unchanged for years, or heavy rains or floods from the mountains may dissolve them and carry them to lower basin-like depressions. Before the advent of irrigation the soluble salt may move up and down in the upper few feet of soil, depending on the depth to which the rains penetrate the soil. The rains dissolve the salts and soak into the soil, carrying along the salts held in solution. Some of the rain water evaporates within the soil, but the greater part returns to the surface by capillary attraction—that force which causes the oil to rise in the wick of a lamp to replenish that utilized by the flame.

When canals are built in an arid district and irrigation practiced for the first time, the position of the soluble salts is no longer allowed to remain unchanged. The use of large and often excessive quantities of water dissolves the salts held in the soil, and there soon commences a definite movement of the salts from the higher lands to the lower levels. These lower areas gradually accumulate sufficient alkali to cause a material reduction in the crop yields, with the final ruin and abandonment of the land. Gradually these areas of alkali lands increase, unless prompt measures are taken at the very time irrigation is begun.

This is the history of nearly every irrigated district. There is practically not a single irrigated district in the United States that does not contain some land so strongly impregnated with alkali that useful crops can not be grown. The area of alkali land may be less than one per cent in certain districts, while in other districts it may exceed thirty

per cent. Conservative estimates, based on careful surveys of many of the most important irrigated districts, show that ten per cent of all the areas examined contain too much alkali for profitable cultivation. Of this ten per cent much can be profitably reclaimed, but for some of it it is doubtful if reclamation from alkali will be profitable for many years, if at all.

While the area of ruined alkali lands is large, it is important to note that it is rapidly increasing in many sections. It should be noted that in nearly all irrigated districts there are certain soils which, on account of their naturally well-drained condition or certain other desirable characteristics, are free from alkali, and probably will always remain so. Fortunate, indeed, is the farmer who has chosen land of such a nature. Other lands, on the contrary, soon develop alkali, unless the greatest precautions are taken. Yet even in the worst alkali districts small tracts of land are frequently seen that remain productive when all around them is an alkali waste. These oases, as they may very properly be termed, usually prove that certain practices have maintained the fields in good condition, while other methods of irrigation, cultivation, and cropping have hastened the abandonment of the surrounding land. The object of the farmer situated in a district where there are already indications of alkali or where there are evidences that conditions are favorable for alkali accumulation is to handle his land in such manner that it will remain productive for an indefinite time. It is much cheaper to prevent alkali from accumulating in fertile soils than to reclaim them after they have accumulated excessive quantities of alkali.

The principal point to remember is that the salts comprising alkali only move within the soil when dissolved in the soil moisture. If water is applied to a carefully leveled field, the salts on the surface are dissolved and penetrate the soil as deep as the water. If only sufficient water is applied to soak a few inches into the soil, the salts are carried to a corresponding depth. If sufficient water is added to a porous, well-drained soil not only to saturate the soil but also to flow away into the country drainage, the soil is then freed from as much salts as the water was able to dissolve. Repeated heavy applications of water will eventually leach away practically all of the soluble salts from a well-drained soil. It has even been proved that water carrying large quantities of salts may be used without fear of injury on well-drained soils. This shows the advantage of keeping the soils in a well-drained condition. Rarely, however, except on the higher lands, are the soils maintained in such a condition after irrigation has been practiced for years. The too often excessive use of water raises the water-table, especially in the low places, and there is constant capillary connection between the surface and the saturated subsoil. Soils in such condition are constantly accumulating alkali. It may require years to accumulate an amount

sufficient to cause the abandonment of the land, but it will eventually take place, the time depending on the salt content of the water evaporated at the surface. There are vineyards in the Fresno district which have not been irrigated for years and are steadily accumulating alkali, greatly to the surprise of the owners. Little do they realize that while depending upon subirrigation they are slowly ruining their vineyards. It is because there is some evaporation at the surface in spite of repeated surface cultivation, and every part of water making its way to the surface carries a certain quantity of salt. Even deep furrow irrigation, frequently the most economical manner of applying water, tends gradually to accumulate at the surface whatever alkali is contained in the soil so moistened. Often an occasional smoothing of the surface and a few heavy surface irrigations will leach the alkali accumulated at or near the surface to such depth that it may require years for it to reascend. There are few irrigation districts that do not have at least every few years an abundance of water for such flooding purposes. Even when the ground water fluctuates greatly during the year, generous floodings at the beginning of the irrigating period when the water-table is still low will be found to benefit undrained land greatly. The irrigator should prevent indefinitely, if possible, the rise of the ground water, for with the ground water permanently maintained several feet below the surface there is little chance of large accumulations of alkali taking place in the upper few inches of soil.

Cultivation in localities where there are indications of alkali should be with a view of restricting evaporation at the surface as far as possible. With surface evaporation entirely eliminated, but little if any alkali would accumulate on the surface, but it would remain more evenly distributed in the lower depth of soil. Unfortunately, we can not entirely eliminate surface evaporation, though by frequent cultivation we can greatly restrict it, even where crops are grown that leave much of the soil unoccupied. As a matter of fact, crops that entirely cover the soil with a dense shade are undoubtedly to be recommended for soils containing appreciable quantities of alkali. The dense shade checks evaporation quite effectively, while much of the soil moisture is thrown off by the growing plant. By maintaining a well-drained condition of the soil to a depth of several feet, by occasional smoothing and surface irrigation, and by growing crops that shade the surface, or by frequent cultivation, the farmer may keep his farm in a high state of cultivation in the midst of lands being ruined by alkali.

Since it is possible to protect fertile lands from alkali, what can be said about reclaiming them after once they can no longer be profitably cultivated? We have already described the successful experiment south of Fresno. It is possible to reclaim the greater part of the alkali lands in California and other arid states, but the question of cost must alone

decide as to whether the farmer desires to undertake such work or not. First, he must determine their value in their present condition, their value when reclaimed, and the cost necessary to reclaim them. There are lands in the Fresno district which at one time earned handsome returns on a valuation of \$250 an acre. Those same lands now sell for \$30 and less an acre as Bermuda-grass pastures. By a reasonable expenditure of time and money these lands can again be made to return handsome profits. The first essential step is thorough drainage, in case the ground water is within a few feet of the surface. With the ground water several feet deep artificial drainage may not be necessary, but it will greatly hasten the final reclamation of the land. The depth necessary to drain, the distance apart for the drains, as well as the kind of drainage, whether open or closed drains are needed, all depend on several factors which must be carefully considered before a decision is reached. Porous, sandy soils require fewer drains than tenacious clay soils, while a few deep drains may be far more effective and more economical than many shallow ones. No drainage system should be installed without the advice of a thoroughly competent authority on the subject. Such advice frequently is the means of saving considerable sums of money, as well as vexatious delays in the final outcome of the work. The cost of drainage will vary according to local prices for the necessary labor, for ditching, for drain tile or lumber, in case closed drains are needed, as well as with the presence or absence of hardpan, the depth of quicksand, if such exists, and finally with the texture of the soil. The cost may be as low as \$10 an acre, and should rarely if ever exceed \$50 an acre. A conservative price in California would be from \$15 to \$25 an acre, not including the cost of pumping plant, in case no gravity outlet is available.

In passing, it may be well to emphasize that well-drained soils are warmer and earlier in the spring, require less water to make them productive, and conserve their moisture supply longer. From this statement of the advantages to be gained by drainage it must appear that it is well worth the expense to drain even alkali-free soils, since it is in the nature of a permanent improvement and an insurance against alkali, the cost of which will soon be returned in the increased yields from the more highly improved soil. After having supplied an efficient drainage system, the leaching away of the alkali depends upon the rapidity with which water moves through the soil and upon the character of the alkali. White alkali is more readily leached from soils than black alkali. The greater part of the black alkali is leached readily enough from the soil, but small quantities frequently remain in the soil in spite of repeated leaching. Layers of hardpan necessarily retard the reclamation of alkali soils, and in case there are continuous beds of hardpan of considerable thickness lying a short distance below the sur-

face, it is to be doubted if reclamation will prove a paying investment. Soils underlain by such formidable beds of hardpan have not a high value even when free from alkali, so their reclamation is not to be advised as long as more easily reclaimed lands are to be had at low prices. The experience of the Bureau of Soils has been that with a deep efficient drainage system, basin irrigation will leach away large quantities of alkali in a few months. With the water-table 4 or 5 feet below the surface there is but little chance of a further accumulation. Even if a second accumulation should take place after several years, it is an easy matter to practice surface flooding for a short time and again leach away the slight accumulation. It is true that repeated flooding may have a somewhat bad effect on certain soils, especially those heavy in character, and yet there is no way to remove large quantities of alkali from soils except by supplying sufficient water to dissolve and leach away the noxious salts. Deep cultivation will aid in destroying the bad physical effect caused by flooding and at the same time will render subsequent flooding more effective by allowing the water more readily to penetrate the soil. In some few cases it may even be advisable to plow-under liberal applications of well-rotted manure on soils easily damaged by flooding.

As soon as circumstances will permit it will be found an excellent plan to plant some shallow-rooted crops before occupying the soil with alfalfa or permanent fruit crops. Such crops serve as a practical test as to the progress of the reclamation. When once the land is reclaimed to such an extent that sensitive crops can be grown, no fears need be entertained that alkali will again destroy the crops, provided the drainage system be kept in working order. When the drainage system, through neglect, no longer is able to keep the ground water at a safe level, a second accumulation of alkali will undoubtedly take place. None but the most careless farmer, deserving of no sympathy whatever, will allow his land to become ruined a second time after having once gone to the trouble of reclaiming it.

With the rapid development and extension of irrigation there is a widespread demand for more lands than can be brought under cultivation. In their haste individuals and companies have frequently gone far from railroad and market centers and have expended great sums of money to reclaim small tracts of barren desert. Oftentimes the same expenditure of time and money would restore to their former productiveness abandoned alkali lands situated in well-established communities, with ready markets near at hand for all classes of farm produce. Quite frequently these alkali lands have at one time had considerable sums of money spent upon them to put them in perfect condition for irrigation. The necessary ditches were all built long ago and the fields carefully leveled. Such improvements, frequently costing many dollars

an acre, should not be overlooked by the prospective settler or capitalist seeking to derive the largest returns from irrigated lands with the least expenditure of money.

Alkali should no longer be allowed to ruin fields worth upwards of \$200 an acre, when an outlay of rarely more than \$30 an acre will prevent it. The expenditure of this relatively small sum will in many cases actually increase the former productiveness of many farms. The time will come when every flourishing irrigated center will, as a matter of pride, see that not even small tracts of alkali land are allowed to lie waste.

Alkali has long been considered one of the serious drawbacks to irrigation, justly so perhaps, but it should be considered so no longer. Alkali lands can be reclaimed too cheaply to allow even a small percentage of a highly developed irrigation district to cast doubt upon the future outcome of the entire district. The problem can be definitely solved, and for all time, but persistent, concerted effort on the part of all those interested in the question will be necessary to accomplish this.

AN EXPERIMENT IN SILK-RAISING.

Numerous attempts have been made to raise silk in California, and very much interest has been evinced in this industry at different times, but, so far, it has not assumed commercial importance. There is, however, no question but that California has all the requirements, in climatic and other conditions, to make this industry a success. Silk-raising in the countries where it is carried on is largely a domestic industry; one in which the different members of a family engage, and which is carried on at home, the cocoons, when gathered, being sold to a central filature. Californians have not yet learned the art of rearing silkworms, nor is there as yet any sale for cocoons, if they were grown; so that, aside from gratifying a laudable curiosity, there is as yet no incentive to this industry. Yet there is no question that it might become a very important one with us if once established and properly managed. The United States imports annually, in raw and manufactured silk, from \$50,000,000 to \$60,000,000, a great part of which could be produced in California. With the interest being taken in this industry, and the experiments being carried on, there is no doubt that some day it will be taken hold of here, and the production of silk cocoons will give many of our people a means of earning a considerable addition to their income, and employ their leisure time with pleasure and profit.

During the past season we have watched with a great deal of interest the work of a Japanese resident of Sacramento, who, knowing something of this work, carried on experiments in silk-growing. At our request he kept a record of his labors, and the results have been tabulated by him and a report made, which is reproduced here for the benefit of those of our people who are interested in this industry. The observations have been accurately recorded, and we leave the experimenter, Mr. Kurosawa, to give the history of his experiments in his own language.

REPORT ON AN EXPERIMENT IN REARING SILKWORMS.

By KIGORAW.KUROSAWA.

A few years ago I thought of making a trial of rearing silkworms in California. In October, 1905, I came to Sacramento and chanced to see a number of cocoons in a spinning-brush displayed in a show window on Fourth street. This was a good stimulus for me, and I managed last spring to make this experiment, but with many difficulties.

Although I was born in a part of Japan where the principal industry of the inhabitants is rearing silkworms, and had gained some knowledge of this industry, I was never fortunate enough to study it scientifically. In Japan they are at present making wonderful progress in this industry, and are applying scientific knowledge to improve it.

I am thinking of going back to Japan in the near future in order that I may get the practical as well as the scientific knowledge of the industry, and after having thus equipped myself, of coming back here and starting the industry on a larger scale; for I have full confidence in being successful in carrying on this industry in this country.

I am far from being satisfied with the cocoons which the worms I rear spin; but they are, though small in size, far better in quality than those yellow cocoons which I saw last year in a show window in this city. Thus I see what the quality of the cocoons depend on—the way of rearing the worms—and at the same time I see that the general climate of California will suit the silkworms.

As I got some profit out of the cocoons which I considered poor, I believe that the industry is very hopeful in this State and worthy of serious consideration of the people.

The tables following show how I handled the worms in all ages.

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One foot square is taken as the unit of the space given to the silk-worms. The temperature is taken three times a day, *i. e.* at 6 A. M., at 2 P. M., and at 10 P. M. The number of silk-worms was about 5,000 at first when they were laid down on the bed.

FIRST AGE.

Ordinal Day.	Date.	Weather.	Temperature.		How often food was given.	Quantity of leaves a day.	Quantity fed each time.	Nursing.	Space, Feet.
			Inside.	Outside.					
1st ---	Mar. 6	Morning--Fair Noon----Fair Night----Fair	64° 70 50	42° 67 50	3	5½ drs.	1½ drs.	At 5 P. M. worms laid down on the bed.	1 ½
2d ---	Mar. 7	Morning--Fair Noon----Fair Night----Fair	63 72 52	43 68 52	6	15 drs.	2½ drs.	At 8 A. M. bed changed, space enlarged.	3 ½
3d ---	Mar. 8	Morning--Fair Noon----Fair Night----Fair	64 70 67	44 69 52	7	1 oz. 7½ drs.	3½ drs.	At 9 A. M. bed changed, space enlarged.	3 ½
4th --	Mar. 9	Morning--Fair Noon----Fair Night----Fair	67 73 73	48 74 64	7	1 oz. 15½ drs.	4½ drs.	At 10 A. M. bed changed, space enlarged.	4 ½
5th --	Mar. 10	Morning--Fair Noon----Cloudy Night----Cloudy	59 66 71	48 64 59	6	1 oz. 14 drs.	5 drs.	At 9 A. M. blue-grass seed sprinkled.	4 ½
6th --	Mar. 11	Morning--Cloudy Noon----Rain Night----Rain	62 69 70	52 60 54	7	3 ozs. 1 dr.	7 drs.	At 11 A. M. bed changed, space enlarged. At 10 P. M. molt began, bed changed.	1
7th --	Mar. 12	Morning--Rain Noon----Cloudy Night----Fair	64 70 71	52 59 45	1	6 drs.	6 drs.	At 6 A. M. feeding stopped.	1

Total.

Temperature.		Average of the Temperature.		Feeding Hours.	Molting Hours.	Times food given.	Weight of the leaves given.	Weight of a hundred molting worms.
Inside.	Outside.	Inside.	Outside.					
Morning--449° Noon-----490 Night-----499	329° 466 371	Morning 63° .3 Noon ----70 .0 Night----71 .3	49° .0 66 .5 53 .0	133 (5 days and 13 hours.)	33½ (1 day, 9 hours, and 15 minutes.)	37	10 ounces ½ dram	½ dram

SECOND AGE.

Ordi- nal Day.	Date.	Weather.	Temperature.		How often food was given.	Quantity of leaves a day.	Quantity fed each time.	Nursing.	Space, feet.
			Inside.	Outside.					
8th	Mar. 13	Morning--Rain Noon-----Rain Night-----Cloudy	60° 72 75	43° 50 50	3	1 oz. 15½ drs.	10½ drs.	At 3:15 P. M. began to feed.	1
9th	Mar. 14	Morning--Rain Noon-----Rain Night-----Rain	64 72 73	41 52 50	5	2 ozs. 15½ drs.	9½ drs.	At 6 P. M. bed changed, space enlarged.	1½
10th	Mar. 15	Morning--Cloudy Noon-----Fair Night-----Fair	59 68 69	40 50 44	6	4 ozs. 12½ drs.	12½ drs.	At 10 A. M. bed changed, space enlarged.	1½
11th	Mar. 16	Morning--Fair Noon-----Fair Night-----Cloudy	69 70 67	36 60 49	6	1 oz. 14 drs.	5 drs.	At 6:30 A. M. put 1,000 worms aside and burned all the rest.	1
12th	Mar. 17	Morning--Cloudy Noon-----Fair Night-----Fair	65 70 64	44 57 42	6	2 oz. ½ dr.	5½ drs.	At 2 P. M. molt began, bed changed. At 10 P. M. feeding stopped.	1
13th	Mar. 18	Morning--Fair Noon-----Fair Night-----Fair	60 72 72	39 62 43	0	Molting.			1
Total.									
Temperature.			Average of the Temperature.		Feeding Hours.	Molting Hours.	Times food given.	Weight of the leaves given.	Weight of a hundred molting worms.
Inside.	Outside.	Inside.	Outside.						
Morning--37° Noon-----424 Night-----420	243° 331 278	Morning--62° .8 Noon-----70 .7 Night-----70 .0	40° .5 55 .2 46 .3	102½ (4 days, 6 hours, and 45 minutes.)	36 (1½ days.)	26	13 ounces, 10 drams	2 drams	

THIRD AGE.

Ordinal Day.	Date.	Weather.	Temperature.		How often food was given.	Quantity of leaves a day.	Quantity fed each time.	Nursing.	Space Feet.
			Inside.	Outside.					
14th	Mar. 19	Morning--Fair Noon-----Fair Night-----Cloudy	57° 74 70	35° 65 52	4	1 oz. 12 drs.	7 drs.	At 10 A. M. began to feed.	1
15th	Mar. 20	Morning--Rain Noon-----Rain Night-----Rain	62 71 70	50 50 56	5	5 ozs.	8 drs.	At 7 A. M. bed changed, space enlarged.	2
16th	Mar. 21	Morning--Cloudy Noon-----Cloudy Night-----Cloudy	66 72 67	53 62 56	5	5 ozs. 10 drs.	9 drs.	At 9 A. M. bed changed.	2
17th	Mar. 22	Morning--Cloudy Noon-----Cloudy Night-----Fair	64 70 70	53 72 53	5	9 ozs. 6 drs.	7½ drs.	At 8 A. M. bed changed, space enlarged.	4
18th	Mar. 23	Morning--Cloudy Noon-----Rain Night-----Cloudy	60 71 68	52 59 54	6	14 ozs. 8 drs.	9½ drs.	At 8 A. M. bed changed.	4
19th	Mar. 24	Morning--Fair Noon-----Cloudy Night-----Cloudy	62 72 70	49 70 59	3	6 ozs. 8 drs.	9½ drs.	At 2 P. M. molt began, bed changed. At 7 P. M. feeding stopped.	4
20th	Mar. 25	Morning--Fair Noon-----Cloudy Night-----Rain	60 71 70	53 72 58	0	-----	-----	Molting.	4

Total.

Temperature.		Average of the Temperature.		Feeding Hours.	Molting Hours.	Times food given.	Weight of the leaves given.	Weight of a hundred molting worms.
Inside.	Outside.	Inside.	Outside.					
Morning--431° Noon-----507 Night-----485	345° 450 388	Morning 61° .5 Noon-----71 .5 Night-----69 .3	49° .3 64 .3 55 .4	125 (5 days and 5 hours.)	46 (1 day and 22 hours.)	28	2 lbs. 10 ozs. 12 drs.	10½ drams

FOURTH AGE.

Ordinal Day.	Date.	Weather.	Temperature.		How often food was given.	Quantity of leaves a day.	Quantity of leaves at a time on one space.	Nursing.	Space, Feet.
			Inside.	Outside.					
21st..	Mar. 26	Morning--Cloudy Noon-----Fair Night-----Fair	60° 70 69	52° 65 50	2	6 ozs.	12 drs.	At 5 P. M. began to feed.	4
22d ..	Mar. 27	Morning--Fair Noon-----Fair Night-----Fair	62 72 64	44 68 49	5	1 lb. 2 ozs. 12 drs.	10 drs.	At 3 P. M. bed changed, space enlarged.	6
23d ..	Mar. 28	Morning--Fair Noon-----Fair Night-----Cloudy	65 67 70	47 72 59	5	1 lb. 6 ozs. ½ dr.	11½ drs.	At 9 A. M. bed changed.	6
24th ..	Mar. 29	Morning--Cloudy Noon-----Cloudy Night-----Cloudy	64 70 69	56 70 58	6	1 lb. 14 ozs. 6 drs.	13½ drs.	At 8 A. M. bed changed.	6
25th ..	Mar. 30	Morning--Rain Noon-----Cloudy Night-----Rain	63 70 68	58 62 57	5	2 lbs. 8 drs.	12½ drs.	At 10 A. M. bed changed, space enlarged.	8
26th ..	Mar. 31	Morning--Cloudy Noon-----Cloudy Night-----Fair	58 64 69	53 64 46	5	2 lbs. 2 ozs. 6 drs.	13½ drs.	At 9 A. M. bed changed.	8
27th ..	April 1	Morning--Fair Noon-----Fair Night-----Fair	55 68 70	45 56 52	5	2 lbs. 2 ozs. 6 drs.	13½ drs.	At 9 A. M. bed changed. At 10 P. M. molt began; bed changed.	8
28th ..	April 2	Morning--Fair Noon-----Fair Night-----Fair	63 70 72	46 56 52	3	7 lbs. 1 oz. 4 drs.	11½ drs.	At 11 A. M. feeding stopped.	8
29th ..	April 3	Morning--Fair Noon-----Fair Night-----Fair	70 71 72	47 57 52	0	-----	-----	Molting.	8

FOURTH AGE—Continued.
Total.

Temperature.		Average of the Temperature.		Feeding Hours.	Molting Hours.	Times food given.	Weight of the leaves given.	Weight of a hundred molting worms.
Inside.	Outside.	Inside.	Outside.					
Morning...560°	448°	Morning...62° .2	49° .8	162	54	36	11 lbs. 3 ozs. 12½ drs.	3 ozs. 3¼ drs.
Noon.....622	570	Noon.....69 .1	63 .3	(6 days and 18 hours.)	(2 days and 6 hours.)			
Night.....623	475	Night.....69 .2	52 .8					

FIFTH AGE.

Ordinal Day.	Date.	Weather.	Temperature.		How often food was given.	Quantity of leaves a day.	Quantity of leaves at a time on one space.	Nursing.	Space, Feet.
			Inside.	Outside.					
30th -	April 4	Morning...Fair Noon.....Fair Night.....Fair	70° 72 70	47° 72 58	2	¾ lb.	¾ oz.	At 5 P. M. began to feed.	8
31st -	April 5	Morning...Fair Noon.....Fair Night.....Fair	68 71 70	52 78 58	5	3 lbs. 2 ozs.	1 oz.	At 8 P. M. bed changed, space enlarged.	10
32d -	April 6	Morning...Fair Noon.....Fair Night.....Fair	65 71 71	50 78 56	4	5¼ lbs.	1¾ ozs.	At 2 P. M. counted the worms, 1080. Space enlarged. Spread 90 worms in each space.	12
33d -	April 7	Morning...Fair Noon.....Fair Night.....Fair	67 70 69	50 76 55	4	6 lbs. 2 ozs.	2¼ ozs.	Bed twice changed—in the morning and afternoon.	12
34th -	April 8	Morning...Fair Noon.....Fair Night.....Fair	67 72 68	48 75 57	4	7½ lbs.	2½ ozs.	Bed changed twice—morning and afternoon.	12
35th -	April 9	Morning...Rain Noon.....Cloudy Night.....Cloudy	68 71 71	55 75 64	4	7½ lbs.	• 2½ ozs.	Bed changed twice—morning and afternoon.	12

FIFTH AGE—Continued.

Ordinal Day.	Date.	Weather.	Temperature.		How often food was given.	Quantity of leaves a day.	Quantity of leaves at a time on one space.	Nursing.	Space, Feet.
			Inside.	Outside.					
36th	April 10	Morning—Rain Noon—Cloudy Night—Cloudy	71 72 69	57 71 51	4	7 lbs. 13½ ozs.	2¾ ozs.	Bed changed twice—morning and after-noon.	12
37th	April 11	Morning—Fair Noon—Fair Night—Fair	65 74 72	46 74 53	4	7½ lbs.	2½ ozs.	Bed changed twice—morning and after-noon.	12
38th	April 12	Morning—Fair Noon—Fair Night—Fair	66 73 71	46 74 59	5	7½ lbs.	2 ozs.	Bed changed twice—morning and after-noon.	12
39th	April 13	Morning—Fair Noon—Fair Night—Fair	68 72 68	48 78 58	5	6½ lbs.	2 ozs.	From early in the morning some mature worms found. At 1 P. M. space decreased.	10
40th	April 14	Morning—Fair Noon—Fair Night—Fair	64 75 68	50 80 65	5	4½ lbs.	2 ozs.	At 10 A. M. space decreased. At 6 P. M. all worms went to their cocooning.	7

Total.

Temperature.		Average of the Temperature.		Feeding Hours.	Molting Hours.	Times food given.	Weight of the leaves given.	Weight of a hundred mature worms
Inside.	Outside.	Inside.	Outside.					
Morning—739° Noon—793 Night—767	549° 881 643	Morning—67° 2 Noon—72 1 Night—69 3	49° 9 75 5 57 9	241 (10 days and one hour.)	0	46	63 lbs. 15¾ ozs.	11 ozs. 5 drs.

First Age.—During this period I had three troubles with the worms: the first one was about the hatching, the second was about the rearing room, and the third was about the substances to be used in making beds for the worms.

1. On the evening of March 5, 1906, I brought the eggs of the silkworms from San Francisco, and opened the package. The color of the eggs showed the near approach of the hatching. I found that twenty per cent of the eggs had already hatched. I brushed away those that were already hatched, and placed the rest in an incubator. On the next morning I took the eggs out and again brushed away those that were hatched. I kept the worms that were hatched after these two brushings and reared them, for I considered them to be healthy worms.

2. The room which I used for the silkworms was the first floor of a two-story house. The ceiling was low and the air damp, and there was no heating apparatus. I had to use an iron stove to heat the room; consequently the temperature could not be even in all parts of the room. Thus it was very ill suited for the rearing of silkworms; but afterwards I got an idea of using electric lamps for heating purposes, and hung them under the shelves. This device enabled me to regulate the temperature.

3. In Japan millet-husks are used to prepare beds for the worms of the first age, but as millet-husks were not obtainable in Sacramento, I experimented to find the best substitute for millet-husks. I toasted cornmeal and tried it, but found it was very injurious to the worms, for almost half of them died within a short period. Then I tried graham flour, but this did not seem to be a good substitute. One evening after these experiments, I was walking on K street and chanced to see some bluegrass seed displayed in a show window. I thought this must be a good substance for the silkworms, and tried it. It was good for the worms, indeed. After I began to use the bluegrass seed I did not find any dead worms in the trays. They were sound and healthy, and without any further trouble they went into their first molt or sleep.

Second Age.—All the worms came out of their molt almost at once; and they were healthy and active almost beyond my expectations. I thought that if they grew up in this manner, in their fourth age I should not be able to get sufficient food for them, and that without any help I could not take sufficient care of them; therefore, after keeping them for two days and sixteen hours after they began to feed on leaves, I put about a thousand worms aside and destroyed all the rest. During this period the weather was changeable; but the worms were very healthy, and without any trouble went into their second molt.

Third Age.—During this period the weather was very changeable. There were not many sunshiny days; almost every day it was rainy or

windy or cloudy. I experienced much trouble in gathering mulberry leaves; but as I took special care to keep the leaves in the proper condition, the worms were not affected by the weather at all. They were all sound and healthy, and went into their third molt in very good condition.

Fourth Age.—In Japan rice husks are used to make beds for the worms in this period; but as the bluegrass seed was too expensive, and as I did not know what was a good substitute for rice husks, I simply sprinkled mulberry leaves over the worms, and as soon as the worms got on the leaves I carried them with the leaves into new trays, and if the worms were still sticking to the old leaves, I took them off with my fingers, though I was afraid that this might hurt the worms; but it afterwards appeared to me that this process did not hurt them at all, for all the worms were sound and healthy.

Fifth Age.—I counted all the worms on the second day after all of them came out of their sleep. There were a thousand and eighty worms. I gave every ninety worms a square foot of space. They were active and healthy, and I thought if they should continue to grow in this manner every hundred of them would weigh about a pound and three ounces at the time when they were ready to spin; but they did not get along as well as I expected. As I was not ready with the net to make the beds for the worms, I was compelled to handle them with my fingers, and there was no doubt that I hurt the worms a little, and also the beds were not kept quite clean and dry, for I was kept busy in gathering leaves and had no one to help me. Thus they became less healthy than they used to be. Their appetite was much poorer than I expected. They could not consume all the leaves, though I fed them only four times a day. When they were ready to spin, every hundred worms weighed only 11 ounces and 5 drams.

Thus ended my experiment in rearing silkworms. This must be considered a failure. But this failure evidently came from the lack of care and the incompleteness of the apparatus. If I could take care of them to my satisfaction and had the proper apparatus, I have no doubt the experiment would have shown far better results. Though the experiment ended in a failure, still it did not leave me without any profit. The profit that I got off the cocoons was enough to pay me for my trouble. In considering all matters, I can draw the conclusion that the rearing of silkworms is a hopeful and profitable industry in California.

Throughout all ages I used a low temperature, for I had no help and was afraid that I could not attend to them quite well. If I had kept up a temperature of 72° F. throughout, the worms would have spun within thirty days.

REPORTS

OF THE

COUNTY BOARDS OF HORTICULTURE.

REPORTS OF THE COUNTY BOARDS OF HORTICULTURAL COMMISSIONERS, FOR THE YEAR 1906.

ALAMEDA COUNTY.

To the Honorable State Commissioner of Horticulture.

SIR: I herewith respectfully submit my annual report for the year ending October 1, 1906.

The condition of fruits in this district has, as usual, been clean and free from smut. *Rhizobius ventralis* are yet to be found in some localities in sufficient numbers to collect for distribution, yet I find enough of them in all orange and olive orchards to keep the trees in a clean condition and the oranges free from smut. During the past two months I distributed about 8,000 among the apricot orchards wherever they were needed.

The prune orchards are almost free from the brown apricot scale (*Lecanium armeniacum*), which is kept in control by *Comys fusca*, whose good work on the apricot scale can be seen plainly at any time of the year.

I found four or five isolated orange and lemon trees infested with cottony-cushion scale and fortunately discovered a sufficient supply of *Vedalia cardinalis* to enable me to place a couple of colonies on each tree.

The *Scutellista cyanea* have increased beyond my expectations, and I have collected hundreds and distributed them in many orchards. I have found their larvæ in the black scale in the apricot orchards, showing that they are gradually spreading throughout the district.

These are all the insect pests we have to contend with, and hope that in the future, as in the past, we will be able to keep them in control with their natural enemies.

Apricots, prunes, cherries, pears, and peaches (very few peaches) are the leading fruits raised in this county. Oranges and lemons do well also, but are not raised in commercial quantities, as the other fruits are found to be more profitable.

The only spraying done in this district is for the ever-present codling-moth, but fortunately the pest was very scarce this year.

A new industry has been started this year in this county by a canning company, which has purchased about one hundred tons of French

prunes for canning purposes. In assorting them they select the firm fruit for canning and dry all that are too ripe. This year for the first time we cooked them for our own table (firm, fresh prunes), and I have no hesitancy in pronouncing them the most delicious fruit I have ever eaten. I presume they are just as desirable when put up by the canners, if proper care is taken in the process.

The importation of trees and plants into this district has been as follows: From France and Iowa, 160,000 seedlings, consisting of Mazzard, pear and apple, and 264 plants from Australia. Of young trees, there have been only 550 pear and peach trees imported from Utah.

Respectfully submitted.

WM. BARRY, Commissioner.

To the Honorable State Commission of Horticulture.

SIR: The yield of fruit has been extremely light in this section this year. Apricots, cherries, and almonds were nearly a failure, while pears yielded about half a crop.

Very little stock has been received from other countries, our home nurseries supplying the demand. The exception was one consignment of seedlings from France, consisting of 5,000 apples, 5,000 pears, and 10,000 cherries.

The trees are exceptionally free from scale insects, but apple trees are badly infested with codling-moth. The parasite *Caliephialtes messer*, placed in pear trees, seem to have done their work.

The pear blight has not yet made its appearance in this section.

The fungus diseases—brown rot on the stone fruits, and pear scab—have been very bad this season. Spraying did not seem to check them.

Many of the orchardists are digging up their trees and preparing their land for rhubarb, tomatoes, and cucumbers. The area in tomatoes this year amounts to about 1,300 acres, yielding nearly 14,000 tons, or over a quarter of a million cases of canned goods.

Of dried fruit, we have produced about 270 tons of prunes and 200 tons of pears. At the cannery 100,000 cases of assorted fruits were packed.

The nurseries supplying cut flowers for the market are increasing in number. At present there are over one hundred hothouses, covering over seven acres of ground.

Respectfully submitted.

EDW. O. WEBB, Commissioner.

BUTTE COUNTY.

To the Honorable State Commissioner of Horticulture.

SIR: We beg to submit the annual report of the Butte County Horticultural Commissioners.

The principal commercial fruits raised in this county are prunes, peaches, almonds, pears, and oranges. For oranges we have one of the earliest sections in the State, the first oranges for shipment East having been picked on November 7. We will have an average crop of oranges this season, and the quality will be the best in the history of Butte County. We have had one of the heaviest crops of prunes in the history of the county, but the peach and almond crops were very short, owing to the cold and late rains, which caused more or less peach blight.

During the past few years there have been heavy plantings of almond and peach trees, and in the southern part of the county a large number of grapevines have been set out. In the past, grapes were not raised here very extensively, but a few good bearing vineyards have convinced the people that grapes can be raised in Butte County, and as a consequence many vineyards have been planted. So far as we can ascertain, this county is apparently free from grape diseases.

Our orchards here are practically free from San José scale and fungous diseases. We find that we can avoid peach blight, to a great extent, by spraying our peach trees with Bordeaux mixture early in December. We used an orchard for a test, and laid it off in blocks. In December this orchard was sprayed as follows: Block No. 1 was sprayed with Bordeaux mixture; Block No. 2 was left unsprayed; Block No. 3 was sprayed with lime, sulphur, and salt, and so on throughout the entire orchard. In February all blocks that were left unsprayed in December were sprayed with Bordeaux mixture and lime, sulphur, and salt, each spray being used in separate blocks, as follows: The blocks left unsprayed in December next to the ones sprayed with Bordeaux mixture at that time were sprayed with Bordeaux mixture, and the ones left unsprayed next to the ones sprayed with lime, sulphur, and salt were sprayed with the lime, sulphur, and salt solution in February. The blocks sprayed in December with Bordeaux mixture were entirely free from blight and bore a heavy crop, while the ones sprayed with lime, sulphur, and salt in December were about fifty per cent as good, and the blocks sprayed in February showed considerable blight and had hardly any fruit at all.

In pear blight we have done considerable experimental work under the instruction of Government experts from Washington, but the results have not been satisfactory, except in cases where the work was done thoroughly and under our personal supervision. The pear blight does not seem to be nearly as bad this season as it was last.

There have been quite a number of trees imported into this county from various sections of the United States and from foreign countries. We have been very careful in examining all trees coming from other counties in this State and from sections outside the State. All trees coming from outside of this State are thoroughly fumigated, as also are all trees going out of this county.

During the past year there were imported into this county about 200,000 trees, shrubs, vines, and plants, from the following sections: New Mexico, China, France, Japan, New York, Alabama, Oregon, Ohio, Washington, Missouri, Pennsylvania, Washington (D. C.), Nebraska, Texas, Mississippi, and Korea, and different sections of California. A great many of these trees which were shipped into the county have been used for experimental purposes.

During the past year there have been shipped out of this county about 2,500,000 trees, shrubs, vines, and plants, to the following sections: New Mexico, British Columbia, Canada, Washington, Idaho, Montana, Nevada, Oregon, and various points in California. All trees shipped have been thoroughly examined and fumigated before leaving the county.

In the vicinity of Chico during the past season there have been green and dried fruits produced as follows:

	<i>Green.</i>	<i>Dried.</i>
Almonds		62,125 lbs.
Apples	898,100 lbs.	-----
Pears	428,100 lbs.	47,600 lbs.
Peaches	1,498,900 lbs.	663,685 lbs.
Prunes	8,472,900 lbs.	2,824,300 lbs.

The next season there will be a great many young orchards coming into bearing, and if given proper care and attention, in accordance with our instructions regarding spraying, there should be one of the largest crops of fruit ever raised in the history of Butte County.

Respectfully submitted.

T. F. STILE, Secretary.

CONTRA COSTA COUNTY.

To the Honorable State Commissioner of Horticulture.

SIR: I herewith hand you the report of the Horticultural Commissioners of Contra Costa County for the year ending October 1, 1906. As our county has fortunately escaped the most troublesome diseases affecting other horticultural districts, the most important work of our Board has been in inspecting orchards and advising fruit-growers in a general way.

In District No. 1 there are two nurseries—the only ones in the county. These grow and also import trees from various parts of the State, which

they sell throughout the county. Besides these, very few plants are handled by private parties, excepting grapevines, which are grown and sold by Messrs. John Swett & Son of Martinez.

Though many scale insects are to be found on various kinds of trees, no damage has ever resulted, as these can be held in check at a small expense. Several kinds of aphids appear during the spring, but these seem to have always been kept under control by their natural parasites and climatic conditions. One of the most valuable of these parasites is our California red ladybird, which is found in large quantities all over the orchards.

Owing to the late spring rains and warm fogs, fungous diseases affected to some degree almost every variety of plants. However, no great damage resulted from these, except from the mildew in the lowland vineyards. The late rains also injured fruit-blossoms, so that in many places the crop was far below the average. This is especially true of cherries and apricots.

About two years ago pear blight was first discovered in this county near Martinez. Immediate steps were taken to inspect the county and it was found to exist in several districts, especially in the Ygnacio Valley, where the largest pear orchards are located. No time or pains were spared by our Board in inspecting the orchards and instructing the growers in the method of eradicating this dangerous disease. I have personally inspected the orchards in my district, and always attended to the cutting. Last year blight was cut out in seven orchards; this year I found only three affected trees in one orchard. People in my district are very jubilant over this success, and are planting pear orchards without fear.

In District No. 2 blight had taken a stronger hold, and though several orchards have been successfully cleaned, blight is still present in a few scattered places. This winter, however, I intend assisting the Commissioner of District No. 2 in getting rid of all blight found in this county.

Of all difficult problems encountered by our fruit-growers, phylloxera, the grapevine louse, is the hardest to solve. Grape-growing in our county was one of the most profitable industries of the agriculturist for several years, and, as a result, large areas have been planted to vineyards of wine and table grapes. For the last eight years phylloxera has been steadily spreading, until now it is found in every vineyard in the county. Probably over half the vineyards are already destroyed and the rest are dying very rapidly. Several varieties of resistant vines have been tried in replanting the vineyards, but so far most attempts have been only partially successful. Owing to our long dry summers no resistant vine has yet been found that will grow table grapes and live over a period of five to eight years. This is very disastrous to our locality, as our soils, climate, and commercial facilities were all very favorable

to the table-grape industry. This viticultural problem is at present very vital to most parts of California, and in behalf of the grape-growers I would recommend that much attention be given to this matter.

Respectfully submitted.

A. JOSEPH TAVAN, Secretary.

EL DORADO COUNTY.

To the Honorable State Commissioner of Horticulture. .

SIR: I have the honor to forward this the report of the Horticultural Commissioners of El Dorado County for the year 1906.

It being late in the season when we were appointed as a Horticultural Board to look after the interests of the people engaged in horticultural pursuits, it at once became apparent that we could, for this year, it being our first experience, only work to a disadvantage and be of little benefit to the people. However, with difficulty we succeeded in engaging an inspector for the county, and he entered upon the work of inspection for one month at \$2.50 per day, but he could not be induced to continue in the work at that salary. In order to secure the services of competent men, we think the wages should be at least \$3 per day.

Our inspector found the greater part of the people ready to welcome him to their orchards, yet there were others who refused to allow him to make an inspection of their trees. The Board, considering the late date at which it had come into the field, considered it wise to enter into no litigation for this season, hoping the people would become reconciled and fall into line next season, when the Board expects to prosecute, with a more determined hand, the work of protecting those who strive to protect themselves.

In regard to pear blight, we can simply say that we have it in its worst form, and so far we find it a difficult matter to check its spread. In the past season, it has appeared in orchards farther up in the foothills than ever before, and in such cases it is found to be more destructive than lower down in the county.

Our worst insect pest is the codling-moth, which, so far, is champion, in defiance of all sprays and appliances. Climatic changes seemingly do more to hold it in check than artificial means.

So far we have found no blight in the peach trees. The little San José scale we have is easily controlled by the lime, sulphur, and salt solution.

The fruit crop for this season has been light, but, owing to the scarcity, prices ruled high, and people who had fruit to sell have done very well.

In the lower parts of the county the pear and apple crops were almost rendered worthless on account of scab.

The amount of dried fruit this season is nominal.

The setting out of young trees seems to be almost at a standstill; in fact, a great many growers are inclined to neglect their orchards altogether.

Respectfully submitted.

J. G. IRVING, Secretary.

FRESNO COUNTY.

To the Honorable State Commissioner of Horticulture.

SIR: The Board of Horticultural Commissioners of Fresno County beg leave to submit the following report for the year 1906.

The horticultural interests of this county for the past year have experienced a boom which our production of nursery stock has been unable to keep up with, causing a large importation of trees, mostly peach, from various Eastern points. We have compelled this stock to undergo a rigid inspection, and whenever found lacking have destroyed it. We advise our growers, where possible, to procure their stock for planting from reliable dealers at home, which insures them trees true to name and thoroughly acclimated.

Our peach orchards have suffered some from the so-called winter peach blight, a trouble caused by a fungus which we can now control by a liberal spraying of bluestone and lime in the proportions of 10 pounds of bluestone, 12 pounds of lime, and 50 gallons of water, put upon the affected trees before the first of December. A general campaign of spraying will be carried on, from which we expect a complete eradication of this trouble.

Our scale pests are few, and we have been able to control them with parasites.

Pear culture in this county has become a thing of the past, owing to the ravages of the pear blight, and we advocate the destruction of every blighted or liable to be blighted tree, and a stoppage of planting for two years, when we feel confident Fresno County can begin a new and successful industry in pear-growing.

Our greatest trouble or pest is the vine-hopper, for which we are trying to import a parasite from the south of France—a yellow-banded hornet called the “Sphinx,” which in its home causes a large reduction in the damage due to the hopper. So far we have been unsuccessful, but hope for results in the future.

Our peach and raisin crops show a shortage this year, but with the advanced prices our horticultural interests are in a flourishing condition, with a bright prospect for the future.

Respectfully submitted.

F. C. SCHELL, Secretary.

HUMBOLDT COUNTY.

To the Honorable State Commissioner of Horticulture.

SIR: I beg to hand you herewith the annual report of this Board.

The apple constitutes the only fruit raised in commercial quantity in this county. Both soil and climate are well adapted to the culture of this fruit throughout the agricultural area, except that portion which lies directly exposed to the summer north winds. In such sections artificial windbreaks become a necessity. The mountain sections are sparsely settled, but here and there orchards planted many years ago are found to be in very thrifty condition. There has been a moderate increase in new settings and the total yield is gradually creeping up. Total shipments for the season ending October 31, 1906, amounted to 120,000 boxes.

The general quality of Humboldt apples is above the average, especially for those varieties adapted to this section. There is no cannery in this section and very little fruit is dried.

San José scale is the only pest doing any serious damage, and while the worst cases in the more remote sections have been eliminated, there appears of late a tendency to work back toward the valley section. Spraying with distillate has been recommended in most cases, and where properly applied has shown good results. But owing to the comparatively small size of most orchards, few of the growers have supplied themselves with proper spraying outfits.

Some evidence of codling-moth has been found in the remoter sections toward the north and also in the southeastern section, and great precautions have been taken to prevent its spread. One colony of the moth parasite was liberated in the Willow Creek section, and is reported to have thrived. But the orchards there are scattered and hardly any of the fruit finds its way to market.

Apple scab makes its regular appearance each season, more or less, according to the extent that weather conditions have favored its growth. Among the more progressive fruit-growers spraying with Bordeaux mixture is now being practiced as a remedy, with good results.

Pears and peaches constitute an insignificant item of our fruit yield, although very fine pears are grown in the warmer belt. Peaches suffer more or less from late frosts, and curl leaf is not infrequent.

On the whole, it may be said that the progress being made is satisfactory, and were the separate interests larger, thereby insuring proportionately greater activity, we would be able to show exemplary conditions in the way of maintaining clean and healthy orchards.

The Board has refrained heretofore from adopting arbitrary measures, but the time is approaching when this will become the rule.

The fruit this season is hardly equal in quality to that of last year, scab being more noticeable; but, nevertheless, the average quality ranks high, and wherever known has the preference in the markets, especially by reason of its comparative freedom from insect blemishes.

Respectfully submitted.

J. E. JANSSEN, Secretary.

LASSEN COUNTY.

To the Honorable State Commissioner of Horticulture.

SIR: A very close inspection has been kept on the different pests, with the result of nearly exterminating some of them.

Pear blight has been the hardest to overcome, the trees having been cut back until, in many instances, they resemble only stems without limbs. Other trees have been cut out entirely and burned, and still there is pear blight.

The apple worm from the codling-moth does not seem to be bad this year, owing, perhaps, in some instances, to the very short crop last year, while others think that keeping hogs in the orchard keeps the worms down.

Trees as a rule have made good growth this season, and seem to be in a healthy condition.

Scale of any kind is very rarely met with in the county.

The apple crop, while not heavy, is of very fine quality, the fruit being both large and highly colored.

Peaches were very superior this year, and met a ready market at home.

Mr. I. N. Jones, President of the Board, and who lives in Susanville, reports the fruit trees in his section as being in good condition. He says the birds almost took the entire berry crop.

The apple crop from this county will find a market at Reno, Nevada, this year, the Nevada crop having been killed by frost last spring. The Nevada mines afford a good market for fruit from many sections of California.

The importation of nursery stock from outside has been small this year. One Oregon firm sold some which was free from any pests known to the inspectors here.

What this section most needs is a visit from some thorough man, one who knows all kinds of pests, so that a tour of inspection could be made of the entire valley.

Peach, plum, prune, cherry, and apricot trees are very free from insects of any kind.

Respectfully submitted.

J. B. CHRISTIE, Secretary.

LOS ANGELES COUNTY.

To the Honorable State Commissioner of Horticulture.

SIR: The Board of Horticultural Commissioners of Los Angeles County has the honor herewith to submit its annual report for the year 1906.

CROP CONDITIONS.

The climatic conditions of the last year have been very favorable, producing, with improved orchard practice, the finest and best-keeping quality of citrus fruits the growers of the county have ever put out. Prices for oranges have reached the highest and most uniform rate ever received. The business has been brought to a much more satisfactory basis through a study of citrus fruit transportation by G. Harold Powell, of Washington, D. C., which has been conducted for two years. It has been of great benefit to growers in solving shipping problems, and of assistance to the Commissioners of the south in the control of insect pests, in showing that a high percentage of fruit decay in transit is caused by smutting and the resultant washing required to cleanse the fruit.

Apples have done fairly well, and many new orchards are being established in certain sections of the county. A bumper peach crop in the territory yet devoted to this fruit is reported, bringing excellent prices and restoring the peach to favor and extension. A very light crop of apricots and some of the other deciduous fruits resulted from unfavorable winter conditions and the age of the remaining orchards. In small fruits the yield has been abundant, demand and prices good, and increased plantings of strawberries, blackberries, and dewberries have followed. The yield of grapes was fair and profitable. A large crop of walnuts of fair grade has been harvested, with an immense extension of the industry in the way of new groves, one planting alone amounting to 1,000 acres. Olives bore heavily last year, one factory turning out 60,000 gallons of oil from its own orchards. This season the crop will be very light in many groves.

Taken altogether, the fruit and vegetable industries of Los Angeles County have had a most profitable year, perhaps the most profitable the farmers have ever enjoyed.

HARMFUL INSECTS.

With the exception of two incursions of the purple scale into territories heretofore exempt, and an increase of the red scale in a few localities, there has been no outbreak of scale insect pests other than the usual invasions to which Southern California has been so long subject. The destructive plant parasites of the county, from climatic causes, from the environment of so many cities and small towns, and

from the neglect of suburban orchards arising through their subdivision into residential properties, seem to present difficulties of control not experienced in localities more completely given to commercial fruit-growing. However, the horticultural centers of the county, always in advance in the suppression of harmful insects, have been given a new impetus in this line by the perfection of methods of insect control, the improvement in the use of cyanide being especially marked. These, with the more intelligent reliance upon beneficial insects and the clearer view of the relation between the artificial and the natural forces that may be used toward insect repression, have placed the disinfection of orchard trees upon a most satisfactory basis, even to a degree of confidence that our most destructive kinds need never be allowed a foothold in places where they do not now abound.

Black Scale.—No incubus has ever borne with more destructive force upon the fruit business of the State than has this common scale pest, nor has any other been the cause of more research and experimentation in seeking means of control. The reports of two years ago gave assurance that an effective parasite had at last been secured for this scale in the *Scutellista cyanea*, yet we see a continuation of spraying and fumigating for this pest apparently larger every season. This course has not been necessary because of the increase of this scale, for it is a fact that the *Scutellista* has destroyed it immeasurably upon the citrus groves; it has also confined the broods of the scale to lesser seasonal bounds and made possible more effective fumigation, and it has depleted the scale to such an extent that the health of the trees is perhaps assured without the use of artificial remedies. But the *Scutellista* leaves alive sufficient scale under all circumstances to smut the fruit, perhaps lessening the frequency of fumigation, yet never controlling the pest to the point of immunity from the application of remedies. With a large number of plant species the black scale seems to have done; with all but the citrus family, where black smut is the apprehension, this scale has met an adversary that bids fair for final control.

Purple Scale.—The progress of the purple scale has been slow but resolute in two sections of the county since its introduction from Florida fifteen years ago. It has now received a check through the use of better methods of fumigation that has insured its confinement to its present bounds and its final extinction. Two new centers of infestation have been discovered within the last year and the scale wiped out of existence with the improved methods of using cyanide. The purple scale is known as the most difficult to kill of all the scales, and this extermination is the greatest achievement of insect remedies in this county. Much progress has been made in the control of this pest in the few remaining seedling groves of the infested districts by the cutting back

of the trees and budding over to other varieties—a convenience in disinfection and a profit to the orchardists. In the only badly infested locality a majority of the trees have been fumigated twice this season, and the outlook is good for the extermination of the purple scale.

Red Scale.—Owing to the use of distillate spray in attempting to destroy this insect, a few of the small citrus sections have been marked by a steady increase of this scale: It is almost unknown, however, in the commercial orchards where approved remedies have been applied, and it is not greatly feared in any locality where fumigation is practiced. There are sections containing hundreds of thousands of trees where this pest has been prevented from getting even a start. As with the black scale, it finds its most extensive lodgment in the orchards of non-residents and in groves of subdivisions for residential improvements. In all territories subject to red scale, where methods of control approved by the Commission have been adopted, this insect is causing little alarm.

Other Scales.—The deciduous orchards in one or two localities have experienced a visitation of *Pulvinaria innumerabilis*, which was attacked so thoroughly by hymenopterous parasites that artificial means have not been necessary for the control of this heretofore rare scale, only in one case requiring the application of sprays. The work of the *Rhizobius* upon this scale, reported two years ago as the most remarkable event of the season, has entirely ceased, to be taken up by the scale's more natural enemy of the Chalcid order.

Little is heard of the San José scale in the county. The infestations are chiefly confined to young orchards, as the natural enemies of this pest have become so effective upon the older orchards that there now seems no danger of the return of the San José scale to the list of dangerous insect pests. The Board has treated this insect most successfully the past season with a wash of six per cent of caustic potash.

A very troublesome occurrence of the *Araucaria* scale has been noticed upon some of the splendid *excelsa* pines about the city, bidding fair to destroy many of the largest trees, on account of the difficulty of applying remedies.

Another virulent scale, *Aspidiotus rossi*, has become a persistent enemy of some of our great *Araucaria bidwillii*, causing the lower limbs of the trees to die, to the injury of the health and beauty of the trees. If some means of checking these scales is not discovered soon, two of our most beautiful ornamentals will cease to be planted.

Minor Visitants.—Orchard invasions of the mealy-bug, although confined to less than a dozen citrus groves, are serious enough to justify warning. In most cases they have come from a local nursery or green-

house, spreading, in one case, over nearly a hundred trees. While not a very destructive pest, this insect is exceedingly difficult to handle. It produces smut and filth that in some instances require the quarantining of the fruit, and in one case the establishment of a separate packing-house for the infested groves. As yet, no effective method of combating this insect has been discovered. It is encouraging, however, that perhaps the most extensive and overwhelming colony of the mealy-bug ever discovered has been absolutely extirpated by a *Hemerobius* species, the "brown lace-wing fly," described twenty-five years ago by Mr. Craw as an effective parasite of this pest in the orchards about the city of Los Angeles.

It has been claimed by a nurseryman of an adjoining county who is notorious for shipping unclean stock, that ninety per cent of the apple trees of this county are infested with the woolly-aphis. He made this plea in resisting the quarantine regulations of your Commissioners. The Board discredited this statement last summer in the individual examination of 30,000 apple trees in the Cudahy orchard adjoining the city. Of this number but one tree had even a trace of the aphis. No more convincing fact can be set forth in proof of the value of rigid inspection by the Horticultural Commissioners of the State than this. The peach-twig borer is prevalent, causing great damage to the fruit over an area of 2,000 acres in one locality. The Commission has been actively engaged in its suppression for two years.

By calling together the growers of the district, after several meetings enough interest was developed to carry forward an extensive experiment in the control of the peach-worm. The lime-sulphur remedy was used exclusively and to such effect that several hundred acres of peach trees were sprayed there last spring. In orchards treated both in 1905 and 1906 the percentage of wormy peaches was below recognition, and thus the remedy for the peach-worm has become thoroughly established in the county.

The red spider has done very little damage generally this year, yet small areas have suffered the usual losses from this source. The dry sulphur treatment always proved good wherever properly applied.

Damage to the apple crop by the codling-moth was as bad as possible where no remedies had been used. One orchard of 25,000 trees was sprayed with "Disparene" without in any degree injuring the foliage, though near the coast. The arsenates have entirely displaced paris green.

Vegetables and small fruits have been unusually exempt from insect and fungoid attacks.

FUNGIOUS DISEASES.

In some portions of the county the vineyards have suffered more than usually from the attacks of mildew. The common remedies have been advised, and in some sections both sulphur and copperas have

been used with good effect. While there has been nothing alarming about this visitation, it is a fact that considerable damage has been done to the late grape crop. Perhaps the most disconcerting bacterial trouble that has to be met in our citrus orchards is gummosis. It may prove in the future to be the most destructive agency of this class. Gum disease is receiving attention at the new pathological station at Whittier, where the walnut blight is also being investigated, in both cases with no material progress. These maladies have, so far, baffled all students of plant diseases.

The walnut blight has again been prevalent in nearly every district in the county, damaging the crop as materially as it has in any previous year. Growers are anxiously awaiting the discovery of a resistant stock, or for the discovery of some cultural or remedial agency for the control of this great malady.

Two years ago the lemon crop suffered from the attack of a brown-rot, which we are informed results from the presence of a new fungus that has made its advent into the lemon groves. Much progress has been made in the study of this disease at the pathological laboratory. After repeated experiments, a solution of permanganate of potassium has been found the most potent disinfectant, and several lemon houses are now using the solution at the rate of one pound of permanganate in enough water to wash 1,000 field boxes of fruit.

No pear blight has been reported upon the young orchards. But few old trees remain in the county surviving previous attacks of this and other destructive agents upon the pear.

The peach blight has not made its appearance in the county, so far as reports and observations show.

With the exception of the leaf-spot fungus upon dewberries and strawberries, no new fungoid troubles have been encountered.

INSECT REMEDIES.

The application of remedies has reached immense proportions in Los Angeles County. Complete returns from ten districts, namely, Azusa, Glendora, Covina, Pomona, North Pomona, San Dimas, Duarte, Monrovia, Pasadena, and Whittier, show the treatment by fumigation of 587,520 bearing citrus trees, and by spraying, of 240,320 trees for the year ending October 1, 1906. The effect of this general treatment insures the finest quality of oranges and lemons for the coming crop.

Fumigation.—Never in the history of the citrus fruit business has so great advancement been made in the efficacy of cyanide in the disinfection of trees as that of the past season. For two years your Board has been experimenting with heavy dosage as the best and cheapest means of scale control. Driven to the use of greater quantities of cyanide in our efforts to stamp out the more resistant purple and red scales,

the discovery has been made that the failures of fumigation in the past years have been almost altogether due to scant dosage. Carelessness of application and improper proportioning of materials used in the production of hydrocyanic acid gas have had something to do with failures also. So efficient have been the results of this increase of dosage and the change of water proportions that we have experienced an almost universal return to fumigation this fall. The statistics given above were made largely from the returns of October and November, 1905, and do not in any measure represent the ratio of fumigated to sprayed trees of the present season's work. There are now thirty-five well-equipped fumigation outfits in the field in this county, and others would have been installed but for the difficulty of securing competent fumigators. The Board has had under constant consideration the improvement of detail, the securing of uniform material, and the training of men to do more effective work in this line. Last winter a meeting of the materialmen, contracting fumigators, and inspectors was held in our office for the consideration of all matters relating to this work, resulting in a better understanding of the requirements of efficient service throughout the county. The Board has arranged with the Bureau of Entomology at Washington to conduct a scientific investigation of the use of cyanide next season, in which examination will be employed an expert entomologist, a capable chemist, and a plant physiologist to determine many points in the use of cyanide not now clearly understood by even our most advanced fumigators. This investigation has been needed for many years, and the Board is pleased to have secured it at the expense of the General Government in funds sufficient to make it thorough. The Board has done a great deal of work in breaking in new fumigators, impressing them with the necessity of care in the detail and with the practice of using heavier dosage of cyanide. Altogether the business of fumigation is now in a higher state of efficiency, which, with the cutting off of stray generations of scale by the *Scutellista cyanea*, has made the outlook for clean fruit very bright.

Spraying.—This means of scale treatment has a few advocates among our most capable orchardists, but the use of spraying compounds in the citrus groves has nearly ceased in all the citrus fruit centers. We note a great increase in the use of sprays for codling-moth, for the peach-worm, and for fungoid diseases in deciduous orchards and vineyards. Many of the old, discarded spraying outfits used two years ago in the citrus orchards are now employed in season with this kind of service.

QUARANTINE.

Your Commission reports the more than usual activity in quarantine regulations during the year. Scores of carloads of pineapples from Honolulu have been fumigated for the mealy-bug before releasing to

the local markets. The Commission has enforced to the letter the quarantine placed against the introduction of Florida trees and plants by the State Commissioner. Many plants have been burned by agreement with the consignee or sent back to the consignor. This work also involved extensive correspondence with the postoffice authorities at Washington, in which there is affirmed inability under the law to assist in locating plants sent by mail from the quarantined districts and their detention when found. Arrangements have been made with the local postoffices to notify the Commission of the arrival of questionable packages and permitting their interception at the time of delivery. In several cases, plants subject to this quarantine have been taken up after planting and delivered to the Commissioners and destroyed. The apparent lack of authority upon the part of the postoffice officials and other weaknesses of our quarantine regulations suggest the necessity of more comprehensive quarantine laws.

Provision has been made with the news agencies to exclude the sale of Mexican oranges and other fruit upon the railroad trains coming into Southern California from the southwest, in which a general order has been issued to the train boys preventing their purchase of Mexican fruits for sale on the road.

The Board has destroyed several hundred boxes of oranges found upon the local markets infested with purple scale. No legal difficulties have been encountered in the enforcement of this drastic method.

Some idea of the success of the rigid inspection of both incoming and outgoing trees and plants may be had from the report of the Inspector of Los Angeles city. During the year ending October 1, 1906, he handled 525,490 trees and plants outgoing from the city yards, and 309,151 coming into the city from outside points. Of these, 3,124 were found infested with insect pests and diseases in the outgoing plants, and 1,294 incoming plants were detained for like causes. This shows 839,059 plants handled by the freight and express offices of the city, with only 4,418 infested with pests or diseases. The advantage of this systematic inspection throughout the county is incalculable, resulting not only in the betterment of the nursery and greenhouse conditions in the county, but also in the receiving of clean plants from distant points. With the maintenance of these reasonable quarantine and inspection regulations no new insect pest has been introduced into the county during the year.

Respectfully submitted.

J. W. JEFFREY, Secretary.

MADERA COUNTY.

To the Honorable State Commissioner of Horticulture.

SIR: As required under the law, I beg to submit the following report of work in Madera County during the year 1906.

During the past winter and spring I have sprayed 10,700 fruit trees with lime, sulphur and salt, for San José scale and shothole fungus. Where pests were under strong headway a second spraying was necessary, but in most cases the second spraying was unnecessary. This should be, and has been, followed with Bordeaux mixture during the month of April, which will thoroughly eradicate the pest for the season. The shothole fungus seems to be the most persistent pest we have to contend with. However, it is well under control.

Our county is now clean of San José scale and brown apricot scale.

Several carloads of trees have been imported into the county from Fresno County and one carload from Chico nurseries.

The pear blight has killed, or nearly so, all the pear trees in our county.

The peach blight has done much damage, but has been successfully checked by spraying with Bordeaux mixture; yet it leaves the trees with all lower fruit spurs and limbs dead. The lime, sulphur, and salt solution as a winter spray, with Bordeaux mixture applied in spring, will eradicate this pest.

Following are the fruit shipments for 1906: Raisins, 1,300 tons; peaches, dried, 400 tons; prunes, dried, 600 tons; figs, dried, 210 tons; apricots, dried, 150 tons; shipping grapes, 250 tons.

Respectfully submitted.

W. M. HUGHES, Commissioner.

MENDOCINO COUNTY.

To the Honorable State Commissioner of Horticulture.

SIR: I herewith submit my report. The fruit industry of my county is not as I would like to see it. Since I resigned as County Horticultural Commissioner, there has been no one appointed to fill the vacancy, but I have assisted the growers of pears wherever I could. Right now, myself and some of the other pear-growers have entered into a campaign against the pear blight, and I think we will be able to stamp out what we have. The peach-growers are also on a campaign against peach blight. The pear and apple men are preparing a campaign to stamp out the scab.

I have gone into the grape business, and I am encouraging the grape industry of the county because we have here perfect climatic and soil

conditions for the growing of wine grapes, and because I can combat the diseases of grapes easier than I can those of other fruits.

Respectfully submitted.

J. R. BANKS,
Horticultural Commissioner.

The Mendocino County Board of Horticulture was discontinued for some time, and Mr. Banks's report was made for the period he was engaged. Since it was written, a new Board, composed of L. W. Babcock, J. Hamilton Smith, and F. W. Wilcox, has been organized. J. R. Banks has been appointed inspector.

MERCED COUNTY.

To the Honorable State Commissioner of Horticulture.

SIR: The general condition of the county has been very satisfactory, so far as the work of the Horticultural Commission is concerned.

Trees throughout the county have made a fine growth this year, which is accounted for by the fact that the fruit-grower has begun to realize that he can not expect a crop unless he gives his trees proper care and cultivation.

A considerable amount of nursery stock was imported from Missouri into this district the past season, enough from stocks alone to plant 1,000 acres of peaches, the principal fruit grown in this county, closely followed by apples, prunes, grapes, etc.

The orange and lemon crops promise to be of extra quality, but less in quantity this season.

In regard to diseases, we have examined every shipment of trees and vines that has come into our county, and have found them to be in fine condition.

We have succeeded in getting more orchardists to spray each year, and the people are beginning to realize and appreciate the benefits arising from the work of the County Board of Horticultural Commissioners.

Among our grapevines there is no disease that we can discover, although we have given all our vineyards a thorough examination, and all indications of disease have been thoroughly investigated.

Our peach crop for the past year was short, on account of the peach blight. We are advising fall spraying as a preventive and as a cure.

We marketed in this county about 250 tons of dried peaches. The canneries took the bulk of the peach crop. Although we are not a prune county we marketed about 200 tons or more.

The coming season will see a larger acreage of peaches planted than ever before, as the people are enthused over the high prices.

Respectfully submitted.

N. H. WILSON, Secretary.

MONTEREY COUNTY.

To the Honorable State Commissioner of Horticulture.

SIR: The past season has not been as prosperous for the orchardists of this section as in former years. The fruit of this section is mostly apples, and among the disappointments were the shortage of cars during the packing season and the presence of the apple scab. The scab appeared late, and many of the orchards that were neglected and not sprayed during the winter with the Bordeaux mixture were badly affected, and the majority of the fruit in such orchards was fit only for the drier. Last year we had little of the scab, yet sufficient to warn the fruitmen of the necessity of spraying. While the lesson has been a costly one, the orchardists are preparing to do thorough work the coming season. The bluestone and lime spray, where used early, has proved effective, and very little scab is to be found where trees were treated with the mixture.

The apples have dropped early, for reasons which are hard to determine. The world's crop of apples appears to be large and the prices for such fruit have not been as high as in past seasons. So far shipments this season, as compared with the last at this date, are about four hundred carloads less.

The apricot crop was a short one, but the high prices prevailing at the time of drying the fruit made up for the short yield.

The peach and pear blights have not made their appearance here yet. A careful watch is being kept, and should they appear the best known methods will be employed to eradicate them.

Most of the land that can be used profitably for fruit has been planted, and hence but few trees have been set out the past season, and about all of them came from local nurseries.

Young fruit trees have made a fine growth the past season.

Respectfully submitted.

D. W. ROHRBACK, Secretary.

ORANGE COUNTY.

To the Honorable State Commissioner of Horticulture.

SIR: There is comparatively little to report of the past year's work of the Horticultural Commission in Orange County.

We are seriously troubled with only one insect pest and more or less with two others. Purple scale has become scattered over a large territory and, but for thorough fumigating, would have been a serious menace to future citrus crops. Red scale and black scale are present in small quantities, but have been easily held in subjection. Few apples

and pears are grown, so the codling-moth is not the subject of much attention. No blight has been noticed on pears or loquats.

Spraying for various pests is being more and more discontinued, because of poor results and damage to trees. The county now owns a good outfit of fumigating tents, and several private outfits are in use. Those of the county are rented to the growers at a fixed price for each tree fumigated. Excellent work by fumigating has been done, and the question of keeping down scale insects seems to be one of attention and expense.

Parasites for scale are present in more or less quantity, and in the case of *Scutellista cyanea* much success is apparent, but the black scale is by no means eradicated. The chalcid fly is destroying many of the red scale, but not enough to hold it in check.

Many trees and plants are handled in the county, but no great number are shipped in or out. Several carloads of palms and ornamental plants and a little nursery stock of various kinds have been sent to neighboring counties, but no record has been kept.

The question of destroying obnoxious weeds has been the subject of much discussion by the Commissioners, although little active work has yet been done. But it is the plan to begin such work in earnest this next season, for it is the belief of the Board that such weeds are likely to prove more expensive to farmers and fruit-growers than insect pests, if something is not done soon to check their spread.

Respectfully submitted.

FRED RAFFERTY, Secretary.

PLACER COUNTY.

To the Honorable State Commissioner of Horticulture.

SIR: In accordance with the provisions of Section 4 of the Act relating to County Boards of Horticulture, I have the honor to submit this, the annual report of the Board of Horticultural Commissioners of Placer County.

The past fruit season in this county has, on the whole, been a fairly profitable one. The season opened with good prices for all kinds of fruit, but nearing the end of the season prices dropped. Plums were an average crop, but peaches and pears were below the average, and not more than two thirds of the pears were marketable. This falling off was entirely due to the pear scab.

I regret to have to report that the so-called pear blight and pear scab are doing considerable damage, notwithstanding the vigilance of the Commissioners, as well as of the orchardists. At this time (the end of October) many of the growers are busy spraying their trees with the Bordeaux mixture, using double the quantity of bluestone. These

same growers contemplate spraying again in January with a similar solution, and again when the fruit begins to form, but the solution to be of reduced strength. Reports have been received that in cases where this method of spraying had been carefully performed in 1905-06 results were highly satisfactory.

Another pest that is causing considerable trouble in this county is Johnson-grass. This grass was sown some years ago under the belief that it would make good forage. Now it has spread to such an extent as to threaten the destruction of many orchards, and the difficulty of its eradication is increased by the fact that its seed is easily carried about.

Trees have been imported into this county during the year from the following points: Oroville, Fancher Creek, Niles, and Salt Lake, and were found satisfactory, with the exception of one shipment from Salt Lake, which was condemned and destroyed.

Shipments of fruit from this county during the past season were as follows: Green fruits, 1,296 carloads; canned fruits, 15,700 cases; and about 40 tons of dried fruits.

The olive crop will be nearly up to the average. Many of the growers have sold their crops on the trees to Los Angeles firms, and received good prices.

Respectfully submitted.

W. J. McCANN, Chairman.

RIVERSIDE COUNTY.

To the Honorable State Commissioner of Horticulture.

SIR: As Secretary of the Board of Horticultural Commissioners of Riverside County I respectfully submit the following report of the work and expenses of the Commission in combating insect pests and diseases and destroying weed pests, as prescribed by law, for the year ending September 30, 1906.

The Horticultural Commissioners worked $703\frac{1}{2}$ days, superintending the work of the inspectors, keeping a record of their work, also looking after the work of the fumigators and spraying machines. Fourteen inspectors worked $2,575\frac{3}{4}$ days, reporting the inspection of 8,512 acres of orchards (mostly citrus) and platting the location of 25,756 trees infested with insect pests. About one eighth of the inspectors' time was used in doing quarantine work, examining trees and plants coming into the county, and nursery stock going out.

The total expense of the work of the Commission for the year ending September 30 was \$10,523.10. Of this amount, \$468 was paid for office work and supplies, railroad fare, and livery bills, as per itemized accounts rendered each month to the Honorable Board of Supervisors for their

approval. Of the above expense, \$867.99 was "enforced eradication" bills paid by the county and returnable to the treasury. Eradication bills to the amount of \$953.76, paid by the county in 1905-06, have been collected and turned into the treasury by the District Attorney.

The eradication reports show that 50,501 trees were sprayed or fumigated to destroy red scale, and 327,003 trees were treated with sprays or fumigation to destroy black scale. The inspection force use no time inspecting for black scale.

No valuable results have been derived from the introduction of the black-scale parasite, *Scutellista cyanea*, although it has been well colonized in all the black-scale infested orchards of the county.

Our observations indicate that if it were not for the "off" hatch of scale on the pepper trees during the winter, which furnishes a limited amount of food for the *Scutellista* (which appears to have no hibernating season), it would entirely disappear from our county.

The parasites that were introduced, bred out, and colonized by our Commissioners for red scale have been of small benefit so far, as they were indifferent breeders and had small appetites.

In connection with the inspection work, I will state that the work of the Commission is often handicapped by the resignation of an experienced and valuable inspector, because he can command higher wages in other lines of work. The physical work of an inspector is not hard (except to the eyes), but the work does demand intelligence and some education, and it would be a great help to the work and value of any County Horticultural Commission if the inspectors could be paid, at least in part, for their ability to do intelligent work, as men are paid in other occupations which skill and a knowledge of their work demand. If there was a law for raising the wage of experienced inspectors it would be of great economic benefit to the work of the Commissions and the orchard owners as well.

New orange orchards have been planted in Riverside, Corona, and the San Jacinto foothills on the irrigated lands of Hemet and Valle Vista. A settler on the Hemet tract is experimenting with a ten-acre patch of peanuts, which at the present date indicate a record-breaking yield per acre.

The orange orchards of Moreno show what can be done without much irrigation. At Banning, on the edge of the Desert, they had a fair crop of all kinds of deciduous fruits except almonds, which were several tons short of the usual output.

In the Coachella Valley, below the sea, the farmers would get rich raising cantaloupes for the early markets if the melon-bugs (aphids) and commission ("middlemen") could be exterminated. It is hard to tell which is the most aggravating, the pest that takes the crop just before harvesting, or the one that robs you after you have reason to believe you will be paid for your hard labor.

At the "Date Farm" the trees that look the best are those which have alfalfa between the rows, and there are a few bunches of beautiful fruit on some of the oldest trees.

The rising Salton Sea is getting close to the Date Farm, and no more improvements will be made until the Colorado River is turned back into its old channel. Superintendent Johnson is trying a new leguminous cover crop, which he will be able to report on next year. It is the wild hemp of the Colorado River bottoms. It makes a rank growth of about seven feet in six weeks from planting the seed, and has "nodules" on the roots. This crop may prove of inestimable value to fruit-growers in this section and all similar climates.

In the month of July the Russian thistle was discovered in the southwestern part of the county, and the Commissioners took immediate steps to have it eradicated.

The orange and lemon crops of this county are several hundred cars short of last year's output, but the prevailing good prices for this year have largely made up for the shorter crop, and on the whole the growers are better satisfied.

The pear blight and codling-moth have caused considerable loss in the deciduous fruit belt, but those who are thorough in cutting out the blight and spraying for the worms have raised considerable clean fruit, and are encouraged to keep up the fight.

Good prices were received for peaches and apricots, both dried and green.

The county has never produced many walnuts, as no large walnut orchards were ever planted, but the scattering trees throughout the county are loaded with nuts.

Before closing this report I wish to inform you that the Riverside County Horticultural Commissioners are deeply interested in the introduction of beneficial insects for the destruction of insect pests or the control of the same, and they feel confident that our most efficient State Horticultural Commissioner will succeed in securing many beneficial insects that will be of great assistance to the fruit-growers in controlling the insect pests which they now have to spray and fumigate for.

Respectfully submitted.

H. K. SMITH, Secretary.

SACRAMENTO COUNTY.

To the Honorable State Commissioner of Horticulture.

SIR: The County Horticultural Commissioners submit their report of the horticultural conditions of Sacramento County for the season of 1906.

Insect Pests.—There has been no spread or increase of scale insects, due largely to the multiplying of beneficial insects that have been

introduced in the past, together with the annual spraying, which all commercial fruit-growers concede is part of the business.

In the past, the spraying has been done as late as possible to catch the peach-moth, which becomes active as the bud begins to swell. Prior to that time the spraying has been done more or less early.

Peach Blight.—Late spraying, with the late, wet springs for the past two seasons, has allowed the peach blight to develop in a very severe form, causing the entire loss of the crop in places. The blight has been noted in a light form many years back, always after a very late, wet spring. The two past springs have developed it to an alarming extent. Realizing the seriousness of the situation, the Board sent out a circular letter to all peach districts inquiring as to conditions, washes used, and results. From all reports received we note late spraying with any kind of wash had no effect. Those who sprayed early in December with a strong Bordeaux mixture (16 pounds of bluestone, 32 pounds of lime, and 100 gallons of water) had perfect results. Early spraying with lime, sulphur, and salt did good work, but the Bordeaux mixture has the preference; a later spraying with lime, sulphur, and salt would be no loss. After the fungus works its way into the bark of the tree, which is done as the season advances, no wash can reach it. With an early dry spring, and free use of the Bordeaux mixture, we hope to save our peach orchards. We note that old trees, and young trees where replanted in an old orchard, are most susceptible. Japanese varieties of plums are affected also.

Pear Blight.—The Board has given special attention to this disease, working with the agents of the United States Department of Agriculture and the State University. Many of the growers club together and hire an expert to keep their orchards free from blight. But with all the careful attention that has been given this work, there will still be quite a loss from butt blight. The growers who have kept the blight well in hand feel encouraged. If no cutting had been done the orchards surely would have been in a discouraging condition. The large growers claim the income is so great that it pays to keep a close watch and cut out the blight in the first stages, thereby losing only the small twigs, which the new growth replaces. This refers to other than butt blight—a condition which nothing will check, as the disease gets into the roots.

The Alexander apple tree is very susceptible to blight, more so than the pear tree, and such cases are very hard to control.

There was a loss of about 3.8 per cent of the pear trees from butt blight last season.

Hop Aphis.—This insect made its first appearance in a mild way last season. This season the development was great, causing such a loss of hops from mildew that the growers have become alarmed. The native

ladybird (*Hippodamia*) was very plentiful, but whether enough to keep the aphid in check another season is a question; with a dry season it might be. The two past seasons have been very favorable for the aphid, the vines putting out a very heavy crop, and foliage with the honeydew from the aphid caused the mold. Little or no spraying for the aphid has been done. The growers should equip themselves with spraying outfits for another season.

Pear Scab.—This has spread to sections where it was never known before, the crop as a whole being very scabby. In some few cases where Bordeaux mixture was used freely the results were thought to be improved. We connect the conditions with the late, wet spring, which will improve with a dry spring.

Grape Crop.—Late cold rains cut the crop of wine grapes one half to three fourths, but the increased prices made the net returns about normal. The grapes shipped East netted one fourth to one third less, owing to the lack of color and sweetness. It has been observed that there has been less sugar in all fruits this season, which impaired the keeping qualities.

Nursery Stock.—This comes from Oregon and different counties of the State; all, as a rule, in good condition.

Fruit Crop.—Peaches from ten to twenty per cent of a crop; prunes a full crop; pears medium; grapes one half to three fourths of a yield; apples half a crop; plums and prunes light, some varieties none; tomatoes, on account of late ripening and early frost, a light crop.

Respectfully submitted.

GEO. H. CUTTER, Secretary.

SAN BERNARDINO COUNTY.

To the Honorable State Commissioner of Horticulture.

SIR: The past year has produced some new features in our Horticultural work. In 1905, the fall of the year was occupied with spraying and fumigating. Upwards of 76,000 pounds of cyanide were used in that campaign against destructive insects. Besides this, five power sprayers were in operation, using distillate as the means of disinfectant. When the season was over and the field inspected, we found that orchards sprayed were very generally damaged by the distillate. The foliage had dropped to a considerable extent, and the trees showed much dead wood. So bad were the results that at the present writing nearly every spray pump used in the western part of the county is for sale. Orchardists are relying almost entirely on fumigation in the cleaning of their orchards. We shall have use, still, for some of the

county's spray pumps in disinfecting for Florida red spider, codling-moth, powdery mildew, and all troubles of deciduous trees.

A new feature in our work this year was the breaking out of pear blight in a number of our apple orchards. Work was commenced immediately to check it, and so closely was this followed up that hardly a vestige of the blight can be found. In some instances the whole top of a tree was cut away and burned. The method used was to cut off every twig or limb showing signs of blight. After each cut, the shears or saws were disinfected by dipping the tools in a weak solution of corrosive sublimate, and each cut on the tree was sponged with the same solution.

Powdery mildew also has caused considerable damage in the apple orchards. Experiments will be tried to see if it can be substantially checked. The first treatment will be given about December 1st. This will be followed by another one in March, using Bordeaux mixture and other fungicides.

We have liberated one colony of the parasite for codling-moth, but as yet the test is incomplete, and we hope to reinforce the colony liberated with another colony at a later date.

We have found it necessary to do some spraying this season for the Florida red spider. We used the sulphur-potash solution, and obtained very satisfactory results.

Scutellista cyanea, as a parasite for black scale, has proved a failure in this county. They eat only the eggs of the scale, and as these are all hatched out by the first of September, the flies are practically starved out. Very few survive, and they are not again in sufficient force to cope with the scale until they have had time to breed two generations. They are usually found quite numerous again in the latter part of the month of August.

Time has thoroughly tested the *Vedalia cardinalis*, and they are always equal to any emergency.

Complaints from orchardists as to soft brown scale or San José scale are seldom heard, internal parasites keeping them thoroughly in check.

The red scale is the worst enemy we have in this county, and we rely entirely upon fumigation for fighting it. It is much harder to kill than the black scale, so much more so that we double the dosage for black scale in fighting the red.

There is such a wide difference of opinion about the dosage in fumigation that a move is under way to have a scientific test made to find out what the proper dosage is for the different scale insects, and the effect of added amounts of water, and sulphuric acid, and so on.

Probably 40,000 citrus trees have been shipped into this county from contiguous counties. To insure against the possibility of introducing pests with trees—pests new to the locality where they are to be planted—

our method has been to have the leaves all taken off and the bodies of the trees scrubbed, using a stiff brush and whaleoil soap—not less than one pound to a gallon of water.

We quarantine entirely against grapevines from any locality known to be infested with phylloxera.

Experience has taught us that it is the height of folly to take continual chances of introducing new pests from locations known to be infested. Such indiscretions have caused California millions of dollars of loss already.

I heard a nurseryman who had *Florida trees to sell* make the statement that the purple scale would not live in Southern California; that if trees were planted out that were infested with this pest, they would not live two years, and he would give \$5 each for every scale found after that time. Yet, any one posted in this matter to-day knows that even a Rockefeller could not begin to pay that price for what can be found in Southern California.

With this experience, we say again, in all candor, that it would be the height of folly to relax our quarantine in the least.

In 1905, 2,000 acres of citrus trees were fumigated by our own county outfits, using 200 tents. This season we have more tents and expect to use upwards of 40 tons of cyanide of potassium. It takes fumigation to get results. Our motto is, "Don't try to economize by cutting down the dosage when you have tents on the trees." See that conditions are all right and then hit as hard as is necessary to get good results. Comparatively few realize how hard a tree can be hit without damaging the trees, provided conditions are just right.

Respectfully submitted.

S. A. PEASE,
Horticultural Commissioner.

SAN DIEGO COUNTY.

To the Honorable State Commissioner of Horticulture.

SIR: The Horticultural Commissioners of San Diego County have the honor to submit herewith, as provided by law, a report of the conditions of the orchards for the year 1906.

The past year has been one of unusual favor to the growers of citrus fruits. The season just closed produced an average crop of superior quality, which sold in the markets for prices that have made it for the growers the best financial year in our history.

Peaches, pears, and plums were a poor crop, except in some few nooks in the mountains. Apples, apricots, berries, and cherries, about an average crop, of excellent quality. Grapes and walnuts produced a heavy crop, of superior quality.

Great progress has been made during the past two years in the cultivation of early vegetables, such as cucumbers, cantaloupes, and melons, and the outlook is good for a much greater growth to follow.

The rainfall of the year was above the normal, extending throughout the entire season, causing the cereal crop to grow so rank in general that the heads were not well filled. Corn is a big crop; reports are that large fields averaged eighty bushels to the acre.

Oranges have produced about the same as last year, the quality being somewhat improved over other years.

Lemon shipments were heavier and the fruit of finer quality than usual. Prices have ruled higher and the producers are in better cheer than during past years. Many of the lemon orchards that were abandoned during the years of light rainfall are now being brought into bearing, and during the coming season we hope to increase the output.

The condition of the apple and pear orchards throughout the valleys has not improved during the year, the codling-moth practically destroying the crop.

The mountain districts are now marketing an average crop of fine fruit. The apples set in great abundance, but dropped during the months of May and June. The cause is thought to be dampness during the blooming season.

The warfare waged against the codling-moth and the beetle that punctures the apple has been very successful throughout the Julian district the past year. The general opinion is in favor of the dust spray, as it better controls the work of the insect that punctures the fruit than does the liquid spray.

This season for the first time some of the pear and apple orchards of the mountain district were attacked by the apple scab, which caused considerable damage to both fruit and foliage.

No trace of the much-dreaded pear blight has been found in our county. In some localities a form of fungous dieback has done some harm in the apple orchards, attacking occasionally some of the small branches during midsummer, causing them to dieback, but to no serious extent.

Seventy thousand deciduous fruit trees were planted during the past season. Peaches were in the lead, and the industry will soon be well established again. Most of the fruit trees planted came from nurseries in Fresno and Orange counties. A few citrus trees were planted during the year. The stock came from Los Angeles and San Bernardino counties. Some extra fine apple trees were imported from the states of Nebraska and Minnesota, and some peach trees from Missouri.

Thousands of apricot trees have been planted in this county, being furnished by California nurserymen, under the names of Royals and Early Royals, but were propagated in the Eastern states. They have,

however, proved a complete failure in producing fruit, seemingly being some strong-growing sort that makes no provision for fruit.

The grape crop was abundant, and the exceptionally fine quality of all varieties has commanded big prices throughout the whole season. There are no diseases of the vine to discourage the industry. The only objectionable feature is mildew, which is readily controlled by the use of sulphur, although we are preparing to plant resistant stock.

The walnut industry, though limited in the county, is profitable. No form of disease has as yet interfered with its development. Quantities of the best nut trees are now sold to nurserymen at prices far above the market price for propagating.

Insect pests, we believe, are gradually diminishing, due to their natural enemies. We have succeeded well in the control of the mealy-bug (*Dactylopius citri*), in both the greenhouses and in the open, with the *Cryptolæmus montrouzieri*. These have proven as great a success with us in San Diego County in controlling this pest as has the *Vedalia cardinalis* in controlling the *Icerya purchasi*. The purple scale (*Mytilaspis citricola*) is well under control in many of our large citrus orchards. The *Rhizobius* family has the credit for this.

All of our olive orchards and many of our citrus orchards are now depending wholly on beneficial insects to control the scale insects; and we are well satisfied with the results. Others, who depend on fumigation, are of the opinion that it is the only practicable means of producing clean fruit. By a few, spraying is still thought to be the cheapest means of controlling orchard pests.

We have found that dusting the citrus orchards with refined sulphur is the best means of controlling the different species of mites. Ground or native sulphur is a failure. Use only refined sulphur in the vineyards, as other grades of sulphur, containing quantities of lime, have ruined the grapes.

I have not noticed that our peach trees are suffering from any form of blight. The orchards throughout the valleys during the several dry years went down, owing to unnatural causes. The industry is now well established again, and new orchards that have had three summers are vigorous, fruitful, and healthy.

This season the Harlequin cabbage-bug (*Murgantia histrionica*) made its first appearance during the early winter of 1905, feeding on cabbage and cauliflower, and doing great damage. The only means of control as yet is by hand picking and burning.

All plants and fruits brought into our county are inspected on arrival. Respectfully submitted.

F. AUSTIN, Secretary.

SAN JOAQUIN COUNTY.

To the Honorable State Commissioner of Horticulture.

SIR: According to your request to this Board for a report on crops, conditions, etc., a full report for the season ending October 31, 1906, is submitted.

Crop Statistics of Deciduous Fruits and Grapes Raised in San Joaquin County for 1906, as reported by Packers, Shippers, and Growers.

Apples, Peaches, Pears, Plums, and Cherries—

Exported	106 cars or	1,412	tons
Local shipments and consumption		10,650	"
Table grapes—			
Exported	639 cars or	7,668	"
Local shipments and consumption		6,200	"
Wine grapes—Wineries and shipping		127,000	"
Canned fruit—Stockton and others		800	"
Dried peaches		510	"
Dried pears (light crop)		50	"
Dried apricots (light crop)		25	"
Dried prunes		600	"
Dried figs, etc.		25	"
Almonds		125	"
Quinces, pomegranates, etc.		125	"
Berries		20,000	crates
Total, 157,220 tons, 20,000 crates.			
Market value, \$3,415,470.			

Nursery Statistics, showing Fruit and Nut Trees, Ornamental Plants, etc., Raised in San Joaquin County and Imported from Other Counties, in 1906.

Apples	trees	2,600
Pears	"	4,700
Plums and prunes	"	2,500
Peaches (different varieties)	"	17,600
Apricots	"	1,800
Nectarines	"	200
Quinces	"	300
Cherries	"	7,750
Almonds	"	10,450
Walnuts	"	2,150
Olives	"	7,300
Figs	"	450
Oranges and lemons	"	1,175
Grapes	(cuttings and rooted)	1,010,000
Ornamental and shade	trees	2,300
Gum	"	14,500
Palm	"	230
Roses		1,600
Ornamental plants and shrubs		3,500
Currants		200
Gooseberries		250
Strawberries		25,000

Importations of nursery stock were made from the counties of Alameda, Butte, Fresno, Los Angeles, Napa, Placer, San Francisco, Santa Cruz, Sonoma, Stanislaus, and Tehama.

The San Joaquin County Board of Horticulture has employed three and four inspectors during the year, and has covered almost every portion of the county. The condition of the trees and vines is as follows:

Lodi, Acampo, and vicinity are in good condition. Most of the vineyards and orchards are young and well taken care of, besides having a sandy loam soil, where trees are disposed to be free from insect pests.

The orchards in the vicinity of Stockton, and on the Islands, are not quite in such good condition, owing to the many old trees, which need replacing, especially the peach and apple trees. We find the twig-borer and peach blight are the worst enemies here, and the codling-moth on apples. The red spider is not very bad, and there are also very few scales. The apricot fungus, or shot-hole fungus, is quite bad, and also scales on pears. Spraying has been adopted according to the recommendation of the State Commissioner of Horticulture and the advices received from the State University.

On the whole, excepting the twig-borer, peach blight, and pear scab, we find our orchards in better condition than they have been for several years, and by continuous work and persistence on the part of the grower in spraying his trees annually we will soon be practically without any insect pests whatever.

Mildew has prevailed this year in the Lodi district, causing damage to some of the grapes. Also, some damage is reported from thrips, but not enough to cause alarm. In all cases sulphur was quickly applied to relieve the cause.

Grasshoppers did no damage to speak of in this county last season. Respectfully submitted.

J. N. SOUTHEY, President.

R. C. TUBBS, Secretary.

SANTA BARBARA COUNTY.

To the Honorable State Commissioner of Horticulture.

SIR: The Santa Barbara County Board of Horticultural Commissioners herewith presents its annual report for the year ending September 30, 1906, as follows:

Insect Pests and Diseases.—The black scale (*Lecanium oleæ*) and the brown scale (*Lecanium armeniacum*) have become much less troublesome than they were last year, owing largely to the beneficial work of the *Scutellista cyanea*, although on account of the lateness of the season the parasite was somewhat behind time and the scale got quite a start of its enemy; but since June these scales have been decreasing rapidly, until at the present writing very few live scales are to be found where, during the early part of the season, they were abundant.

The red scale (*Aspidiotus aurantii*) has been kept in check by the distribution of the steel-blue ladybird (*Orcus chalybeus*), and in orchards where the scale was a prominent feature on the trees and fruit last year it has now become somewhat scarce.

In two circumscribed localities in the Santa Barbara district the dreaded San José scale (*Aspidiotus perniciosus*) has been discovered and the proper methods for its destruction recommended.

The purple scale (*Mytilaspis citricola*) is still in evidence. In some orchards spraying with distillate and sulphuric acid appears to have been beneficial, but we are anxiously looking forward to the advent of the promised parasite from China.

The cottony-cushion scale (*Icerya purchasi*) made its appearance early in the season in numerous localities, but as the result of collecting and distributing its predaceous enemies (*Vedalia cardinalis* et al.) it is no longer a menace.

In regard to the trees and plants which serve as hosts for the last-named scale, no hard and fast lines can be drawn; for example, a published horticultural article which gave the names of numerous trees upon which the scale may be found, ended by stating that "The cottony-cushion scale is never found on *Ricinus* plants." In a few days after reading the above statement I found, in the lower part of the City of Santa Barbara, a *Ricinus* tree covered with cottony-cushion scale, a part of which I sent to San Francisco to feed the *Vedalias* at the rooms of the State Commission.

The principal plant diseases which have presented themselves are walnut blight, pear blight, and root-rot of the apple. In the Lompoc district the pear crop has been a failure, owing to the pear blight. The walnut blight threatened to do serious damage, but moderated, and the walnut crop has turned out good. Apples in the Lompoc district have yielded a large crop, but owing to scarcity of boxes, the growers have not been able to market a large portion of their crop; in some instances the apples are piled under the trees and covered up, awaiting better facilities for shipment.

Exports and Imports of Trees, Plants, and Fruit.—Careful inspection of all imports and exports to and from Santa Barbara district has been continued, and as a result the standard of the fruit market has been raised.

In the Lompoc district the export of deciduous fruits has been carried out, and efforts been made by the Commissioner for that district to exterminate the noxious weeds.

IMPORTS. (Santa Barbara district.)

October 1, 1905, to September 30, 1906.

Deciduous Fruits: 89 barrels, 8,518 boxes, 71 sacks.

Citrus Fruits: 2,036 boxes.

Trees and Plants: 1,383 consignments from different localities, and 1,000 trees from Oregon to Lompoc, Cal. (Among these imports were 1,500 grape-cuttings for planting and 16,000 trees for forest planting.)

Deciduous fruits have been received from Colorado, and from the following California counties: Sonoma, Ventura, Humboldt, Santa Cruz, San Luis Obispo, Fresno, Los Angeles, Santa Clara, Contra Costa, San Francisco, and others.

EXPORTS.

Deciduous Fruits: Very few.

Citrus Fruits: 83,860 boxes.

Trees and Plants: 54 consignments, to the following localities: Texas, Maine, Michigan, New York, Oregon, Washington, Colorado, Utah, Illinois, Victoria, B. C., and Belgium, and the majority of the counties of California.

Respectfully submitted.

LORENZO G. YATES, Secretary.

SANTA CLARA COUNTY.

To the Honorable State Commissioner of Horticulture.

SIR: As Entomologist and Horticultural Commissioner for Santa Clara County, I beg leave to submit the following report for the year 1906.

My appointment was made to take effect June 1, shortly after a temporary suspension of the work caused by the earthquake. Owing to the well-organized condition of the office under my predecessor, Mr. Dudley Moulton, I have been enabled to continue the work without any appreciable loss due to the interruption.

The increase in vineyards during the year is about 750 acres. Approximately 408,000 fruit trees have been planted. Among those which show the greatest increase are peach, 13,500; French prunes, 288,000.

The most injurious insects are the peach-tree borer, woolly-aphis, codling-moth, peach-moth (*Anarsia lineatella*), cankerworm, thrips (*Euthrips pyri*), and pear scale (*Diaspis pyricola*).

The peach-tree borer is controlled by digging out the larvæ in the spring before the moths issue and painting the base of the tree with some substance which will prevent them from depositing their eggs.

The codling-moth has been reduced to a minimum, and a large percentage of the fruit saved in most cases where spraying with arsenate of lead has been carefully done. Banding has also proved beneficial.

For the peach-moth, orchardists will spray with lime, sulphur, and salt as soon as the larvæ begin to show activity in the spring.

The cankerworm is common in some parts, but not general over the county. Tree-tanglefoot applied to the base of the tree before the moths issue has proved effective.

The thrips was much less numerous this year than last. This was probably due to climatic conditions and the work of a parasitic fungus which has been found attacking the insect.

The scale insects have given comparatively little trouble in most districts. The parasites seem to be doing good work. The pear scale (*Diaspis pyricola*) is the most abundant, because it conceals itself under the lichen, which must be removed before the scale can be attacked.

The past season has been favorable to the growth of fungi. Among the most common are brown rot (*Monilia fructigena*), prune rust (*Puccinia pruni*), apple scab, and pear scab.

The prune rust has appeared in some orchards and prematurely defoliated trees. We believe that by destroying the fallen leaves, which carry most of the spores, and by spraying with Bordeaux mixture, this may be controlled.

Peach blight has made its appearance, but has not done great damage. Early winter spraying will be used.

The pear blight is not known to be in this county. A careful watch is being kept, and should it appear the best methods known will be employed to eradicate it.

Fruit trees are lost yearly by wood-destroying fungi, many of them undoubtedly being wound parasites. An effort is being made to have all orchardists become familiar with the habits of these fungi, so that they may in great measure protect their trees from them.

Respectfully submitted.

EARL MORRIS, Entomologist.

SANTA CRUZ COUNTY.

To the Honorable State Commissioner of Horticulture.

SIR: The Board of Horticultural Commissioners of Santa Cruz County herewith submits its report for 1906.

Owing to a combination of unfavorable conditions which prevailed last spring, our horticulturists have not enjoyed prosperity to the degree to which they are accustomed.

A warm winter caused the deciduous fruit trees to bloom two weeks ahead of the normal period. Continued wet weather during the blooming of the stone-fruits caused the embryo fruit to drop, and a very light crop was the result. The brown rot also made its appearance in some districts and added further damage to the stone-fruits.

With the exception of prunes, prices for stone-fruits have ranged high.

Berries of all varieties have yielded well, and prices have been remunerative.

Grapes in the northern part of the county produced satisfactory returns in both quantity and price, while in the central districts the early predictions of a bountiful crop did not materialize, owing to adverse weather and the development of mildew.

Apples, our leading fruit, fell somewhat short of the normal in yield. A visitation of scab also aided in reducing the output of choice apples. However, our apple-growers are not discouraged with the reverses of the season. On the other hand, the great demand for our product at good prices in the face of a phenomenally large world's crop inspires renewed confidence in the stability of the industry. This confidence is strengthened also by the knowledge that we are now able to effectually hold in check all the insect pests and diseases to which the trees in this locality are subject.

Respectfully submitted.

C. H. RODGERS,
S. N. TRUMBLY,
F. W. HITCHINGS,
Horticultural Commissioners.

SHASTA COUNTY.

To the Honorable State Commissioner of Horticulture.

SIR: Our work during the past season has been largely confined to fighting the pear blight; also a careful inspection of nursery stock imported into the county. The pear blight, until the past season, was not very widespread, being confined to the river bottom districts. During the past year it has become general all over the county. The season was very favorable to its spread, and it seemed to take a most virulent form. Sections where it had never been known were as badly affected as any. In some orchards as high as sixty per cent of the trees are in a dying condition. The fight has been most successful in the small orchards, where the careful owner could personally attend to its eradication and knew how the work was to be done.

The red spider did considerable damage to prune trees along the Sacramento River bottoms, but nothing serious resulted from their work, as the growers used a sulphur dust spray which was effective.

There were about 10,000 trees imported into the county the last planting season, consisting of all varieties of fruit, principally peaches and pears. Of this amount about 1,000 were condemned; in most cases on account of root-knot. There were some cases of San José scale on the stock.

As to the fruit crop in general, it was a fair one. In most localities peaches were light. The Elberta and Muir peaches were, however, about an average crop, as they both seem particularly adapted to the conditions of this district. The pear and prune crops were large. Pears were not of good quality this season. Prunes were about an average with other years.

Our Board is now making the fall campaign against the pear blight, and from present indications there is plenty of work to be done.

Respectfully submitted.

GEO. A. LAMIMAN, Secretary.

STANISLAUS COUNTY.

To the Honorable State Commissioner of Horticulture.

SIR: The Board of Horticultural Commissioners of Stanislaus County beg leave to submit the following report for the year 1906.

During the past year we have been constantly at work with the fruit-growers, recommending and assisting in the eradication of scale and other injurious insects and the Russian thistle. We have San José scale, brown apricot scale, cottony-cushion scale, black scale, codling-moth, peach-moth, pear blight, apple and pear scabs, grasshoppers, diabroticas, and other insects which infest garden plants and vines. Each of the varieties of scale bugs seems to have a parasite feeding upon it, consequently we are not damaged much by scale.

Caliephialtes messer, the parasite for the codling-moth, seems to be a failure, as we find no results, nor any of the insects since they were liberated. Spraying is still followed to eradicate the codling-moth.

In the spring of 1904 the pear blight made its appearance over the entire county, and was very bad in places. Cutting out of the blighted limbs was done by most of the orchardists. In 1905 the blight was much less prevalent, but I could see no more improvement in orchards where blight had been cut out than where it had not. This season the blight was more prevalent than any previous year, and indicates that our pear industry is threatened with destruction. It also appears that the blight is equally as bad in uncultivated orchards as it is in well-tilled orchards. There seem to be cases where the blight does not attack the wood, only the leaves and buds; in such cases the young trees have made little growth during the past two years.

The shothole fungus and peach blight did much damage to peach trees that were not sprayed this spring, with the exception of the Muir variety. The trees that were affected lost most of their fruit buds, leaves, fruit spurs, and small limbs. Where spraying was done with lime, sulphur, and salt, the damage was slight, but where orchards are protected by windbreaks, such as high board fences or evergreen trees, the damage was greater than where the orchards were exposed to the north winds. The past season seems to have been more conducive to fungous diseases than usual; even our alfalfa was badly injured by fungus or rust. Apples and pears were badly marked by scab.

The importation of fruit trees and grapevines into our county during the past season was greater than in any previous year, the number reaching into the millions. All trees are inspected upon their arrival. If there are any visible diseases or insects the trees are fumigated, if such treatment will eradicate the insects or disease, otherwise the trees are either returned to the shipper or burned. All trees from out the

State are thoroughly inspected and then fumigated before delivery. We found it necessary to burn a number of shipments, consisting of several thousand trees, that were either affected with root-borers or were from states where the peach yellows exist.

Our county produces excellent almonds, apricots, peaches, plums, prunes, grapes, olives, and figs, also apples, and pears previous to the introduction of the pear blight. In the eastern part of the county, along the foothills, citrus fruits grow to perfection. Some of our grapevines have produced seventy pounds of grapes to the vine at three years old from the cutting, and twenty-seven tons of wine grapes were taken off a six-acre vineyard that was two years old. We claim that the Flame Tokay grape will color earlier and as good as in any other part of the State. Cherries, pomegranates, and walnuts have not been sufficiently grown to determine their suitability for this soil and climate.

Respectfully submitted.

A. L. RUTHERFORD, Secretary.

TEHAMA COUNTY.

To the Honorable State Commissioner of Horticulture.

SIR: We herewith submit our annual report and beg to advise that during the past season this Commission has labored diligently and faithfully, principally with the so-called pear blight, and in some instances has been very successful.

To our minds, the pear blight is a serious fruit disease and requires heroic treatment. We shall continue, as in the past, to enforce strict disinfection in every orchard within our domain.

We are not much troubled with the so-called scab or other fungous diseases. After carefully studying the different fungous diseases, and noting the condition of the trees, this Commission is of the opinion that spraying during the fall months, November and early December, is of more benefit in killing insects that are housed in the trees during the warm months, than to allow the insects to live during the winter months and then spray the trees in the spring. We are of the opinion that a strong spray early in the winter before the rains will go far toward killing all foreign diseases, and the early rains will cleanse the trees.

Respectfully submitted.

JAMES FEELEY, Secretary.

TULARE COUNTY.

To the Honorable State Commissioner of Horticulture.

SIR: The Board of Horticultural Commissioners of Tulare County has the honor to submit herewith its annual report for the year 1906.

In deciduous trees (peaches, plums, prunes, apricots, apples, and quinces) nearly 3,000 acres were planted; two thirds to peaches of the

Philipps, Tuscan, Muir, Elberta, and Lovell varieties. Prunes planted mostly for resetting. Apricots, apples, and quinces, small plantings for home orchards.

Many thousand vines were planted along the foothills, from Dinuba to Porterville. In this section the vines grow wonderfully fast, and produce very early. All raisin varieties, up to this wet year, have shown heavy sugar. Malagas, Thompson Seedless, Emperors, and Tokays have proved splendid bearers and A1 shippers, and we believe the next season will prove this section to be the earliest carload shipper in the State. At that time vineyards will be old enough to produce in car lots.

The raisin crop this year promised to be very large, but, on account of excess of water, dried away one fourth of the estimated crop. We fought mildew with all the sulphur that could be obtained; many vineyardists could get enough only to go over a part of the vines, and a heavy hailstorm damaged a small section. With all these drawbacks, vineyard owners in this county have made money, and are well satisfied. Many tracts of land are already sold for planting this season (1906 and 1907), and many strangers have purchased bearing vineyards and are now taking possession. This county is free from phylloxera and the Anaheim disease, and many old vineyardists from other parts of the State are investing here. We have had a long, hard fight to keep out infested vines, but we believe that vineyard owners are with us, and with their help we can keep out these dread diseases.

The prune crop promised to be the largest ever grown here, in fact it was the largest ever handled, but it dried away from three and a quarter to four pounds to one—many hundreds of tons of small sizes; very short on large sizes. Early in the season offers of $2\frac{1}{2}$ c base were made—very few sold. Then base dropped to $2\frac{1}{4}$ c, 2c, and $1\frac{3}{4}$ c. At this date (November 1) 2c base is being offered. We estimate the gross crop at 5,360 dried tons. On hand at the present time, 2,300 tons. Very small per cent of large sizes in French prunes; all large size in Robe d'Sergents.

Apricot crop very light; prices high. Dried peach crop small; prices A1.

Canning peach crop about three quarters of last year; all early peaches and apricots were shipped to Los Angeles and the East. Gross tonnage of peaches (canning, drying, and shipping), 9,370 tons.

The citrus orchards in this county are growing so fast that we find them hard to keep track of, as the planting runs nearly sixty miles along the foothills from the Fresno County line on the north to several miles south of Porterville. Every one in this long strip of country is either getting ready to set out an orange or lemon orchard, caring for a young one, preparing to gather from an old one, or estimating the

cost of planting, and testing for water. Land is being surveyed for orange orchards; trees are being contracted for, wells bored and electric lines being run to the different sections of land for power to pump the water on the new orchards.

During the past season we have inspected 123,720 citrus trees, mostly in carload lots from nurseries in the southern part of the State—all clean, fine trees. Also, 221,380 deciduous trees have been inspected; nearly all California grown. Small lots of trees came from Oregon and Washington; also small bales and boxes of trees from Iowa, New York, Alabama, Wisconsin, Missouri, and Nebraska. All shipments were closely inspected.

Many thousand trees and vines were shipped out of this county by our nurserymen. In fact, every tree and vine were sold out early in the season.

This Board and its inspectors devote all of their time during the planting season to watching the importation of vines and all nursery stock shipped from other states.

Peach blight was first noticed in the spring of 1904, but very little attention paid to it, as it was not severe enough to hurt the crop. In the spring of 1905 it showed up very bad in all wet places, and several orchardists did some late spraying, with no good results. This last spring, 1906, it looked as though a fire had run through our peach orchards, touching only the lower limbs. Great drops of gum were hanging from the under parts of the twigs or limbs, and slowly working higher up in the tree. We find that all varieties of peaches and apricots were affected more or less. In orchards that had been sprayed with lime, sulphur, and salt the trees came out in much better shape and seemed to recover much sooner. No one used the bluestone spray as early as December. Many had just finished the last of February. Every peach-tree owner expects to spray, and spray early, this season. We are having trouble in getting bluestone, but hope to procure it before it is too late to do the work.

We have distributed the past season 213 colonies of *Vedalia cardinalis*; fumigated 731 orange trees for yellow and red scales; and condemned seven shipments of trees from Eastern states, on account of the black-knot.

We are having printed a pocket bulletin with instructions for mixing and applying the different formulas of sprays; also, warning against the buying of rooted grapevines outside of the county. We have placed in every freight house and railroad station a copy of the State horticultural law, the plant and inspection law, and our county ordinances.

Respectfully submitted.

C. S. RILEY, Secretary.

VENTURA COUNTY.

To the Honorable State Commissioner of Horticulture.

SIR: The Horticultural Commissioners of Ventura County have the honor to submit their report for the year 1906.

We are pleased to be able to report at this time that Ventura County was never so free from black scale as it is at present. This is due to two causes: the very large amount of fumigating done in the citrus districts, and the *Scutellista cyanea*. The past two winters have been very wet, and, back from the coast, the *Scutellista* were killed; as a result, the black scale was much worse than usual. This caused the fruit-growers to purchase several large fumigating outfits, which have been at work constantly for the past two months. Near the coast the *Scutellista* were not killed by the cold and wet weather, and have practically wiped out the black scale.

A recent visit to Olivelihoods, the largest olive orchard in the county, and for many years the worst infested, shows the trees to be nearly clean, and Mr. Ramsey, the proprietor, says that the *Scutellista* were so numerous this fall that he found thousands of them in the windows of his residence, which is located in this large olive orchard. We prophesy that the black scale will give little trouble in this county in the future, for the *Scutellista* will spread from the orchards which have not been fumigated into those which have, and will keep the scale from ever becoming numerous again,

We have found some more purple scale this season on Ventura avenue, and there is still a small amount of this scale in Santa Paula Cañon. We have been trying a new formula, recommended by the Los Angeles Commissioners, for fumigating this scale. The formula is: cyanide, 1 ounce; sulphuric acid, 1 ounce; water, 4 ounces. We find that we can use twice or three times as much chemicals without injuring the tree, and when so used seems to get all of the scale.

The codling-moth has been bad on the apples this season, and we do not know that the parasite has been established in this county yet.

The principal tree-planting done last spring was walnuts and apricots.

We have very few peaches in the county, and have not discovered any peach blight.

Respectfully submitted.

J. F. McINTYRE, Secretary.

YOLO COUNTY.

To the Honorable State Commissioner of Horticulture.

SIR: The Yolo County Board of Horticultural Commissioners was organized on January 3d of the present year. The Yolo Board of Supervisors was moved to action because of the agitation caused by the pear blight—the most fell disease that has ever attacked our pear and apple orchards.

Mr. August Brinck, the chairman of the Commission, divided the county into three sections; each member having his respective territory. Meetings were held and different phases of the disease were thoroughly discussed.

Summing up the situation, we find that where orchards are isolated and in which good work has been done, the disease has been largely eradicated, thus creating strong hopes of ultimate control. We fully realize, however, that a constant warfare must be waged. Some seasons are more favorable than others for its development, and those who do not personally superintend this work are apt to be disappointed in results. At Winters and Rumsey the pear blight this fall is worse than it was last year; this in the face of much work, but work which was not thoroughly done. Along the Sacramento River the situation is very encouraging.

The San José scale is present, as is also the greedy scale. These are controlled by the use of salt, sulphur, and lime wash. The codling-moth was taken care of by the use of paris green and arsenate of lead sprays. Some growers prefer the latter to the former.

Peach blight is not so bad here as in other parts of the State.

There were good crops in all lines of fruit excepting apricots and almonds. Good prices were realized.

Pear scab, causing second-grade fruit, was abundant in some sections this year.

Our county, rich in agricultural resources, is being rapidly developed. The influence of the State Farm, near Davisville, in this county, will add greatly to her prestige. The county has a bright future.

Respectfully submitted.

HAYWARD REED, Secretary.

YUBA COUNTY.

To the Honorable State Commissioner of Horticulture.

SIR: In accordance with prescribed duties, we herewith make to you the annual report of the Yuba County Horticultural Commission.

During the past year this Commission has devoted especial attention to inspection of trees shipped into this section from points abroad;

principal shipments were of deciduous trees from nurseries in this State. One shipment of a few apple trees came from an Eastern nursery, and after a careful inspection was duly passed. Four shipments of apple, plum, and pear seedlings from France were inspected, over two hundred thousand seedlings; all duly passed except one lot of five thousand pear seedlings, which were condemned, on account of being covered with a fungous growth.

A number of inspections have been made in Marysville during the year to ascertain the condition of the orange trees infested with the yellow scale and the destructive mealy-bug. These inspections show that the pests mentioned are well held in check by their natural enemies, the chalcid flies and the ladybirds.

Especial attention has been paid to pear blight in Yuba County. Situated in this county is the well-known New England pear orchard, where the most careful work has been done by Mr. Howard Reed, the owner, in the way of eradicating the blight; and in this connection it may be added that the satisfactory condition of the New England orchard has been brought about by much hard work and the expenditure of considerable money. Let no one imagine it is an easy task to get rid of pear blight. Great difficulty was experienced in treating the New England orchard, but the same results can be obtained on upland orchards with less trouble and expense. Pear-growers ought to make the fight against blight, for it is evident that very many orchards are going to perish through neglect and unskillful treatment. Those who care for their trees, scrupulously following out the rules laid down by Professor M. B. Waite, are sure to reap in due time a rich reward in the high prices that are eventually to be paid for sound Bartlett pears. Experience at the New England orchard proves that summer and early fall work against the blight is the most important; the summer work should be done by experts, as there is then danger of spreading the blight by careless work. Pear blight can not be eradicated, but it can be kept in check by following carefully the Waite system.

This Commission has not been able to obtain any reports on production and shipments from Yuba County for the past year.

The Yuba County Horticultural Commission has recently been reorganized by the appointment of G. W. Harney, of Marysville, W. B. Meek, of Camptonville, and Howard Reed, of Marysville.

Respectfully submitted.

G. W. HARNEY,
for the Commission.

PROCEEDINGS

OF THE

THIRTY-SECOND STATE FRUIT-
GROWERS' CONVENTION,

HELD AT

HANFORD, DECEMBER 4-7, 1906.

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PROCEEDINGS

OF THE

THIRTY-SECOND CONVENTION OF THE CALIFORNIA STATE FRUIT-GROWERS.

HANFORD, CAL., December 4, 1906.

Pursuant to call, the Thirty-second Fruit-Growers' Convention met at the Opera House, Hanford, Tuesday, December 4, 1906, at 9:30 A. M.

PRESIDENT ELLWOOD COOPER, State Commissioner of Horticulture, called the meeting to order.

REV. J. W. MAUNT, of Hanford, opened the Convention with an invocation.

PRESIDENT COOPER. MR. JOHN ISAAC will act as secretary of this Convention and MR. A. E. BAGLEY, of Los Angeles, will act as official stenographer. The first on our program is an address of welcome by H. A. Beekhuis, Mayor of Hanford.

ADDRESS OF WELCOME.

MAYOR H. A. BEEKHUIS, of Hanford, welcomed the visitors in the following words:

Mr. President, Ladies and Gentlemen: On behalf of the citizens of Hanford I extend to you a most cordial welcome. Hanford has for several years coveted the honor of entertaining the fruit-growers of this State, and now that we have the honor of seing you among us, to meet in convention with the Nurserymen of the Pacific Coast, we can assure you that we will use our best efforts to make your visit as pleasant as hospitality can make it. We welcome you as the representatives of a great industry—of the greatest industry of this State and one that has brought California to the fore as the greatest fruit-producing State, not only of this American Union, but of the entire world, and is bringing a constant stream of intelligent people from the Eastern States to this coast to engage in the profitable and pleasant business of growing fruits.

We also welcome the distinguished gentlemen whose names appear on the program—the men who continually give their time and thought

for the betterment of conditions of the fruit-growers, and are always ready to solve the difficult problems that present themselves and threaten to destroy the industry which has been gradually built up to its present level. Judging by the nature of the subjects that will be discussed by you during this Convention, we do not doubt but that you will, when you return to your homes, possess considerable knowledge and information that will be of great benefit to you in the pursuit of your calling.

We further welcome the gentlemen of the Nurserymen's Association, especially those gentlemen who have come from neighboring states and have traveled for hundreds of miles to enter into the discussions.

We also extend a cordial welcome to Hon. George C. Pardee, the Governor of our State, who has come to deliver an address before you, and whose presence with us proves the importance of your convention.

While we realize, ladies and gentlemen, that you have come here for the transaction of important business, we hope that you will find the time and the desire to become better acquainted with this country and its people. Our ladies will tender to you this evening a reception with entertainment and banquet in Odd Fellows' Hall, and the citizens of our neighboring city of Lemoore will entertain you at luncheon Thursday afternoon. For Saturday morning we have arranged an excursion to the Tulare Citrus Fair at Porterville, and we expect that the beautiful orange groves of that section will be a novel and refreshing sight to most of our visitors. If anything has been left undone to make your stay in Hanford pleasant and comfortable, our committees are ready and willing to fulfill your slightest wish.

Again, ladies and gentlemen, I extend to you a hearty welcome.

PRESIDENT COOPER. The next is a response by Hon E. L. Smith. Mr. Smith, I presume, is with the delegation from Washington and Oregon, and has not yet arrived, so we will have to omit that from this morning's exercises.

PRESIDENT'S ADDRESS.

Ladies and Gentlemen: This is the thirty-second Fruit-growers' Convention and the fifth held under the auspices of the California State Commission. The first held by the Commission was in Los Angeles, in May, 1903; the second in Fresno, December 8, 1903; the third in San José, December 6, 1904; the fourth and last in Santa Rosa, December 5, 1905.

This last Convention was, as usual, well attended and of wonderful interest. The essays were of the highest type on fruit subjects.

I regret that I can not make as favorable a report on the result of the sales of deciduous fruits as for last year. A great deal of the fruit was not delivered in sound condition—was much damaged by decay—some

growers attributing the cause to improper icing. The orange crop brought better prices than during the previous year. The lemons sold at satisfactory prices, and the result was very encouraging.

The olive industry remains as reported at the previous Convention, not encouraging for oil-making, but with an increased demand for properly cured pickles. There is a scarcity of good, sound, ripe olive pickles. The demand comes from every part of the United States, without finding a supply.

The nut crop was not heavy, but the prices good. All will be cleaned up and none left over for next season. There is no increase of walnut blight, but a new defect in the nuts, many of the shells being imperfect, having holes or openings that prevent bleaching and making them unsalable as first-class nuts. This defect, without further investigation, would indicate the want of material to make a perfect shell. In Santa Barbara district as much as ten per cent was reported in a few orchards.

The prune crop was fairly good and the present prices satisfactory. Raisins have advanced, selling higher than for several years, owing to a short crop in Spain, caused by continued storms there.

To return to the subject of the refrigeration of deciduous fruits, I was informed by Mr. A. H. Jones, Freight Traffic Manager of the Southern Pacific Company, vice Wm. Sproule, resigned, that the Southern Pacific was building its own refrigerator cars and that during the period of an insufficient number to do the California business, the company would rent cars, but run them as Southern Pacific cars, and that they would be properly iced at every point. This will eliminate the friction and dissatisfaction heretofore existing with the Armour private car line.

The pear blight is very bad in one or two localities, but generally less damaging than during the previous year. Prof. M. B. Waite has returned to California to inaugurate a vigorous campaign against the hold-over blight. Professor Waite is very sanguine as to the result.

The most serious problem that confronts the fruit-growers is labor. Without greatly increased numbers the present area planted to fruit can not be properly managed. California can not progress without an increased number of workers. On the Atlantic shore we had last year an immigration of 1,100,000, and of a class that involves a heavy tax to care for, while the best workers for California are excluded without any organized plan for supplying others.

Pure Food.—I refer to my address at the Santa Rosa Convention, pages 10 and 11; also to the report of the committee, page 190.

As the United States Congress has passed a pure food law, it is the duty of every State in the Union to pass a similar one. The Governor-elect in making his canvass declared himself in favor of a pure food

law. Every fruit-grower should urge the assebmlyman and senator from his district to support such a measure.

I will read from the journal "What to Eat," published in September, of serious sickness and deaths caused by consuming poisonous foods: Deaths, 21; sickness nearly 500, in a short period of time. This only includes cases appearing in the Associated Press dispatches and only a small part of what occurs throughout the entire country. Deaths, 1 from eating canned oysters, 3 from wood alcohol, 6 from ice cream flavoring, 2 from arsenic poison in candy, 1 from poisoned beer, 2 from anilin dye, 3 from meats, 1 from butter color, 2 from formaldehyd in milk.

Insect Pests.—The most formidable enemy that the fruit-grower has to contend with will, at an early date, I hope, be decreased sufficiently to cause little damage, and uncertainty of the crop from this cause will be eliminated. We have now in California parasites for nearly every pest that has been a serious detriment to the growers of fruits. The greater part of the past year the effort of the searcher, Mr. Compere, has been directed toward transporting the parasites of the red and purple scales from the Orient to be propagated here and distributed throughout the orchards of California. Many difficulties have occurred in this effort, the great distance and climatic changes destroying the parasites before reaching our shores. Experience, however, has taught us how to overcome the difficulties, and soon we hope to be propagating them in California. The Commission has been devoting every energy to the propagation of such parasites as are now known and demanded by the fruit-growers.

The parasite of the codling-moth has claimed our special attention. The first great difficulty was to get worms; this was mentioned in the address at the Santa Rosa Convention. I was successful in making an arrangement with the Department of Agriculture in New Zealand and had five shipments of worms from that country. We had the disastrous earthquake in San Francisco, which almost destroyed everything in the insectary. What we could gather together we moved at once to Sacramento, where we have a small insectary and are successfully propagating many of the parasites. We need a much larger place. Owing to the wording of the Act appropriating money for the parasitic work we have been hampered, and could not erect a suitable insectary. This we will try to remedy at the coming session of the Legislature. We are now prepared to propagate the parasite of the codling-moth and will distribute throughout the State sufficient numbers to end the destruction of apple and pears by this insect.

I wish to call attention to the fact that parasitic insects will not work successfully in orchards where spraying or fumigating is prac-

ticed. There is a transition state between the two methods of destroying the pests. If the orchardist feels that the growing crop must be saved by spraying or fumigation and trusts to the possibility of the parasites getting established for the succeeding year, he will find that he can continue his remedies and make the expense from year to year and scrub and wash his fruit. Parasites will not work successfully under those conditions.

Quite a controversy arose in Western Australia concerning parasitic work in that country, as reported in their *Journal of Agriculture*, published in September last. One or two entomologists and their supporters contended that it was a useless waste of money. This opposition became so formidable that the government appointed a commission to take testimony and examine into the subject. In the report of the opposition they laid down as the basis of their theories the following:

"This is an old, abandoned scheme, founded on unnatural and impossible working principles, making a vain attempt to force nature to overreach immutable laws contrived and welded by an allwise and beneficent Creator. Our present-day naturalists versed in this knowledge declare this precious scheme to be diametrically opposed to the workings of the sublime laws of nature."

We in California have claimed the very opposite. It is the foundation, the fundamental principle upon which our every effort has relied for success. We believe that in nature everything is balanced, and that it is our duty to study the natural law and seek relief through nature's remedies. The Commission of Horticulture not only decided in favor of the parasitic work, but recommended that one or more competent agents be employed to meet the searcher at various points in foreign countries, and care for and bring to Western Australia the beneficial insects collected, so that the expert searcher would not lose his valuable time in transporting his collections. I had decided upon this method before receiving the *Journal*, and was happy to learn that others had seen the necessity of such a course.

Some forty years ago, I attended a lecture delivered by Louis Agassiz, the great naturalist, after his voyage to the head waters of the Amazon River, in which he gave the history of monkeys. He stated that there were in the world five distinct species, differing in many respects, different conditions of climate and surroundings producing a different animal, which enabled the naturalist to readily give the nativity. To relate a circumstance showing Agassiz's knowledge of fishes, the captain of a Boston ship, voyaging in the seas off East Africa, caught a fish and took from it a few scales which he inclosed in a letter to the owner of his vessel. The owner put those scales in a letter addressed to Professor Agassiz, without mentioning from whence they came. The Professor, when he received the letter, was lecturing to a class of students at Har-

vard. He took the scales, went to the blackboard, drew the fish, placed the scales on the drawing, and said the fish from which the scales were taken was only known in East African waters. I mention this to show what can be known of the animal kingdom or of the fishes of the seas by study, investigation, and observation.

To return to insect pests. These differ in different countries, and it is possible for the student and investigator to know the native home of the pest, and there will be found its natural enemy, the parasite.

It has been stated that the destruction of plant life and fruits amounts to more than \$300,000,000 annually in the United States. If this be true, it is reasonable to suppose that throughout the civilized world it would amount to more than a billion dollars. It seems to me, therefore, that as nature has provided the remedy for the greatest amount of this destruction, it would be sound financial policy to study the natural law and profit by it.

All of you no doubt have read of the efforts made in Massachusetts in fighting the gypsy and brown-tail moths. Millions have been spent, and yet the danger increases. It is claimed that these moths have spread throughout New England and are in New York and New Jersey; that they can fly a distance of twenty-five miles and are liable to become a scourge in every State of the Union, and entail an expense greater than the cost of the Civil War. I have not been unmindful of this danger and have taken up the matter, not only in arranging for the quarantine, but also in looking up the parasite. Dr. L. O. Howard, chief of the Division of Entomology in the Department of Agriculture at Washington, has charge of the parasitic work in Massachusetts. He paid our department a visit a few weeks ago, and expressed himself as being pleased with our work. He said he proposed to carry on this work in the same manner as it is carried on in California, that he would at once begin the propagation of the parasite of the codling-moth, and that he would furnish every State in the Union with the parasites.

The agricultural journals of the Northwest and Middle West have published much in the past few years about breeding corn and wheat and have stated the great improvement made in the quality of the corn and wheat as well as in the increase in production on measured acres of land.

In fruit-growing in California we have proceeded in a haphazard way, without any care in the selection of seeds. I am fearful that we will have to go back and begin again on scientific principles. The selection of seeds from the matured perfect tree and from perfect fruit raised on new land, might result in trees that would resist the blights now making such havoc in our orchards.

My proposition would be to get the wild pear from the mountain districts of China, where no disease was ever known, or of Europe, and

propagate new stock from the seeds. Also to get wild peach seeds from Georgia and propagate new stock. These could be budded or grafted with the varieties wanted, taken from trees where there had been no infection. I have in a very small way, merely for experiment, ordered some wild pears for the above purpose and propose to do the same thing with the wild peach.

It appears to me that it would be good policy for the State to take up this matter. It would not require a large appropriation, and it should be under the control of the State Horticultural Commissioner for two reasons: *First*, the searcher for parasitic insects, who travels to all parts of the world in his line of search, and who knows where these wild fruits grow, could, by a small outlay, have them gathered and shipped to Sacramento. *Second*, the employés of the Commission, who are employed to protect fruit trees and fruits from infection, could safely be trusted with this work. A clause in the Act appropriating money for parasitic investigation, authorizing this work, would be sufficient to make the experiment.

With these few remarks I will close. We have asked for essays on special subjects that will deal with the fruit problems and these essays will be read before this Convention, hence it will not be necessary for me to take up these subjects at this time.

PRESIDENT COOPER. The selection of two vice-presidents is now in order.

MR. A. N. JUDD. Mr. President, I move that their selection be referred to the Committee on Arrangements, and that the names be presented at 1:30 o'clock this afternoon, after recess.

Motion seconded and carried.

PRESIDENT COOPER. We have about fifteen minutes. Suggestions will be in order.

PROF. FOWLER. I move you that a committee be appointed to consider the President's address. The committee usually consists of three, I believe.

PRESIDENT COOPER. How would you have that committee appointed, Professor?

PROF. FOWLER. By the Chair.

MR. H. C. ROWLEY. I second that motion, and I would like, in seconding, to add to the motion that in the report of that committee especial attention be given to the Horticultural Commissioner's paragraph on labor.

The motion was put by the Secretary, and carried.

PRESIDENT COOPER. I might state at this place that Mr. Briggs, one of the members of the State Board of Trade, desires to make some remarks in regard to the next exhibit at Jamestown, and I understand

that two of the representatives of that body are present. I will ask Mr. Briggs at this time to take about fifteen minutes to explain the necessity of the fruit-growers making an exhibit at Jamestown the coming year.

MR. BRIGGS. I did suggest to your President that this would be an opportune time to bring to the attention of the farmers the thought that I have in mind with reference to an exhibit at the Jamestown Exposition. The California State Board of Trade, which I have the honor to represent here to-day, need make no apology for its interest in any matters with reference to the farmers or the domestic products of our State.

It has occurred to us, and this thought comes from our Governor, who is here to-day, through letter to the State Board, that we ought, in justice to ourselves and to the products of the State, make an exhibit at Jamestown in 1907. You are well aware that that exposition begins in April, 1907, being the third centennial anniversary of the first landing of white people on the Atlantic coast. It is therefore a historical matter; and aside from the patriotic sentiment that we all feel, there is a selfish sentiment which we ought to and should recognize. No one who visited the National Irrigation Convention can help feeling that the patriotic sentiments expressed there must go throughout this country, and that every man and every woman who feels an interest in the nation, should, so far as they are able, attend the Jamestown Exposition.

But bringing it down to ourselves, since the fire and the earthquake on the 18th of April of this year, San Francisco and the State of California at large have suffered and are still suffering from false reports. These reports are spread broadcast, and are, whether we know it or not, working injury to the advancement of the State. It has seemed to us, therefore, that this was a fitting time for the people of California to show their faith in the State and exhibit the products which we are growing; to show to the world—not only to the United States, but to the world—that we have a country equal to any under the sun, and that we have faith in the future of San Francisco; that we have faith in the future of our State.

Now, Mr. Chairman, I want to say that this can not be done except by the employment of money. The exhibit at St. Louis, I believe, cost \$130,000. The appropriation for Portland was very considerably less. It may not be necessary for us to have \$130,000 at Jamestown, but we should, in justice to ourselves, favor an appropriation by the Legislature which will enable us to make a suitable exhibit at Jamestown in 1907. My own impression is that that exhibit might be made, in view of the fact that we have a large collection of articles which were used at St. Louis and at Portland, for a very much less sum than was required at St. Louis. And I would say in passing that possibly \$50,000 might suffice for that purpose.

Now, I want to make a motion that it is the sense of this Convention assembled that an exhibit at Jamestown, Virginia, in 1907, should be made by the State of California, and that we favor and will work for, so far as we can, individually and jointly, an appropriation for that purpose, which shall not be less than the sum of \$50,000.

Motion seconded and carried.

PRESIDENT COOPER. I now have the pleasure of introducing to you his Excellency, the Governor of the State of California. (Applause.)

GOVERNOR GEORGE C. PARDEE. *Mr. President, Ladies and Gentlemen:* As his honor, the Mayor, so well said, the industry which you represent is the most important of any in this great State of California, and that, in a State of this size and a State having so many important industries as California has, is saying a very great deal; but, as you perhaps appreciate more than I, the industry is to-day merely in its infancy. This great valley, stretching from Bakersfield to Redding, should have, and will have—not perhaps in our time, but will have—from five to six million happy and contented people living within its borders, and those people will be dependent for their living and for their wealth—for they will be a wealthy people in their time—entirely upon the horticultural interests which you here to-day represent. And therefore, I say again, it is the most important industry which the State of California has or can have.

I am especially pleased to be here to-day, Mr. Mayor, in the city of Hanford. Two years ago I was here and had the pleasure of visiting the county fair and saw there the products of the county of Kings. I was, I am free to admit, amazed at the variety and the size of the products exhibited at that fair; and I am here to-day, Mr. Mayor, to express my thanks and the thanks of the stricken people of the city of San Francisco for the kindness, the benevolence, and the fraternity shown by the people of the city of Hanford in the county of Kings when the flames were sweeping over the city that they laid in ruins at their feet. This city did, I think, more per capita to relieve the distress in the city of San Francisco than any other part of this State or this Union, and that, ladies and gentlemen, is saying a very great deal. (Applause.)

I am here to-day to speak not upon horticultural subjects. I took the liberty of asking the President for permission to appear and talk to you about revenue and taxation. That is perhaps a dry subject, and is perhaps one which should not be spoken of before a fruit-growers' convention such as this; and yet I am going to make no apologies for doing it, for, although you are fruit-growers, you are citizens of California and you are taxpayers, and, therefore, every one of you is interested, greatly interested, in the subject of the revenue and taxation

system of this State. It is a matter which appeals not only to the hearts but to the pockets and the pocketbooks of every man, woman, and child in this State; and if the women and the children have not the pocketbooks, their husbands and their fathers have, and therefore the matter is of still more importance to him who holds the pocketbook.

Now, I suppose I may, as the subject is rather a complicated one, be pardoned if I use some manuscript in keeping strictly to my text and in presenting this matter in an intelligible, intelligent, and consecutive way, and therefore bringing the matter into such a shape that when I cease I sincerely hope that this Convention will take up the matter and discuss it, and if there is anything wrong with the system proposed by the State Revenue and Taxation Commission, I hope that it will be mercilessly exposed here upon this floor, because all that that commission wants, and all that the people of this State want, is a better system of revenue and taxation than we have, and going farther than that, the best possible system of revenue and taxation which can be devised. Therefore, I sincerely hope that the gentlemen and ladies of this Convention will take it upon themselves to criticise and flay mercilessly, if they can, anything which, as the representative of the Commission on Revenue and Taxation, I shall here to-day put forth.

REVENUE AND TAXATION.

By GOVERNOR GEORGE C. PARDEE.

Mr. Chairman, Ladies and Gentlemen: It may, at first glance, be considered out of place for me to address you on the subject of the proposed changes in the revenue and taxation laws of this State. But you are all taxpayers and citizens of California and, therefore, interested in anything that promises to redound to the benefit of the State and its people. For that reason, then, if for no other, I shall not apologize for addressing the California Fruit-Growers' Convention on this subject.

You are all aware that our present system of assessment and taxation, especially for State purposes, is very unsatisfactory. For instance, about 85 per cent of the taxes paid in this State is borne by real estate, while only about 15 per cent is paid on personal property. Yet no one imagines for a moment that the personal property in this State amounts to only 15 per cent of everything of value we possess. The personal property of the farmer, his horses, chickens, swine, plows and the like are all taxed, because the assessor can easily find them; but the greater part of the personal property in the cities escapes taxation. In 1870, personal property was 39 per cent of the entire assessment roll; in 1905, personal property was only 18 per cent of the entire roll. Yet,

In 1870 there was nowhere near the amount of personal property in California that there was last year.

Not only has the percentage of assessed personal property fallen off during the last thirty-five years, but, strange as it may seem, its actual assessed valuation has not increased. For instance, in 1872, personal property was assessed at \$220,000,000. Until 1903, a period of thirty years, the assessors were never able to find that amount of personal property again. Yet, during these same years the aggregate assessment roll rose from \$600,000,000, in 1872, to \$1,600,000,000 in 1903. In 1872 the State had a population of something like 575,000; it now has at least a million and three quarters. Over one million increase in population has added practically nothing to our assessed personal property; and practically all the increase in taxation has been borne by real estate.

In 1880 the assessment of personal property was \$201 per capita. In 1890 it was \$139 per capita. In 1896 it was \$122 per capita. In 1880 the assessed valuation of real estate was \$523 per capita. At present it is \$840 per capita. In other words, the per capita of assessed personal property has decreased 38 per cent, while the assessed per capita of real estate has increased 60 per cent—which is, of course, absurd. For everybody knows that, with the increase in number and size of our cities, with the increase in per capita real estate assessed valuations, there must also have been a great, if not an equal, increase in the per capita value of personal property in this State. Yet the assessment figures show that, per capita, we have much less personal property now than we had forty years ago.

Our taxation and assessment laws require that money and solvent credits shall be assessed and taxed. In 1872 the assessors found \$111,531,623 of money and solvent credits in the State. Thirty-two years later, in 1904, there were only \$77,000,000, about two thirds as much, of such property assessed, in spite of the fact that our population had increased nearly three times. Everybody knows this is absurd.

According to the assessment returns our people have at present only \$13 worth of furniture apiece, for each man, woman, and child in the State, hardly enough to buy a bed and bedding. Absurd, of course. And the worst part of it is that it is safe to say that the greater part of this assessed valuation falls upon the farmer, whose land is already taxed very high.

In 1860 the State collected for its own uses a little less than \$900,000. It collects now, including the railroad taxes, which latter are collected by the State and turned over to the counties, nearly \$8,000,000 in taxes. Since 1860, therefore, the burden upon the individual of taxation for State purposes has increased over ninefold; while our population has increased a little more than fourfold. Besides the amount mentioned

above, the cities and counties collect, for their own uses, about \$24,000,000 more, making a total of \$32,000,000 paid in taxes in this State.

The State derives its annual revenues from the following sources and in the following sums, in round numbers, exclusive of money collected by the State and turned over to counties:

The ad valorem property tax.....	\$6,800,000 00
Poll tax.....	460,000 00
Inheritance tax.....	300,000 00
Tax on insurance premiums.....	200,000 00
Annual franchise tax.....	300,000 00
Miscellaneous fees.....	300,000 00
Collections by State boards and institutions.....	200,000 00
Earnings of State property and investments.....	940,000 00
<hr/>	
Total State revenues.....	\$9,500,000 00
Out of this the State pays to public school districts and for the support of the University, the five normal schools, farmers' institutes, etc., in other words for education	\$5,000,000 00

In other words, the State pays out over half its income for education, leaving but \$4,500,000 for the support of the State government and its many, many institutions.

Let us see how the burdens of State taxation are distributed, taking, for instance, the farmers. The United States Census Bureau gives as the total value of California farms, including improvements, buildings, implements, and live stock, the sum of \$796,527,955. This property was assessed, for purposes of State and county taxation, at \$474,731,497, or about 65 per cent of its real value, and paid State and county taxes in the sum of \$8,265,000. In addition to this, California farmers paid something like \$765,000 more in personal property taxes—making a grand total of something over \$9,000,000 paid in direct ad valorem taxes by California farms and farmers.

If you will remember, it was shown above that the total ad valorem taxes, State, county and municipal, paid in this State is about \$32,000,000. It will thus be seen that the farmers, although they pay no city taxes, nevertheless pay, in State and county taxes, nearly 29 per cent of the whole amount of taxes, State, county and municipal.

As we saw a moment ago, the total value of farm property in this State is \$796,527,955, assessed, for State and county purposes, at \$474,731,497, or about 65 per cent of its real value. The \$9,000,000 of State and county taxes paid on this valuation is 1.14 per cent of its real value. The net value of our farm products was, deducting the farmer's compensation and the compensation of those members of his family who work with him, \$91,491,866, which is about 11.5 per cent of the real value of all the farm property in the State. The taxes paid on the

property are 6.85 per cent of the gross returns, and the per cent of taxes to net returns, including farmer's own compensation, is 9.88. In other words, the farmers of California pay taxes which are equivalent to a tax on net income of about 10 per cent.

No other industry and no other equally extensive class of property in California bears such a burden of taxation.

Let us compare briefly the burdens of taxation borne by the farmers and the manufacturers of California, the data being taken from the Census returns:

	Manufactures.	Agriculture.	Per Cent Total Capital.	
			Manu- factures.	Agricul- ture.
Total capital.....	\$205,395,025	\$796,527,955	100.0	100.0
Land.....	34,735,416	630,444,960	16.9	79.0
Buildings.....	22,562,385	77,468,000	11.0	9.7
Machinery, etc.....	62,440,759	21,311,670	30.4	2.7
Other assets.....	85,656,465	67,303,325	41.7	8.5
Assessed value.....	63,500,000	474,731,497	31.0	65.0
Taxes.....	1,049,932	9,030,000	.51	1.14
Gross product.....	302,874,761	131,690,606	147.0	16.5
Net product.....	52,172,862	91,419,866	25.4	11.5
Per cent of gross product paid in taxes.....			.346	6.86
Per cent of net product paid in taxes.....			2.01	9.88

In other words, manufactures pay one half of one per cent on their capital in taxes, while farms pay nearly two and a third times as much, or 1.14 per cent on their invested capital. Manufactures pay about one third of one per cent of their gross incomes in taxes, while farms pay about twenty times as much, or nearly 7 per cent of their gross incomes. Manufactures pay 2 per cent of their net incomes for taxes, while farms pay about five times as much, or nearly 10 per cent.

If manufactures are allowed 10 per cent on their capital as a fair return on their investment, then, on the average, manufacturers should pay 2.9 per cent on gross earning, instead of the one third of one per cent really paid, to equal which would only be allowing farmers a return of 4.75 per cent on their capital.

To make a comparison from another standpoint: The Census estimates that the 145,801 farmers in this State earned, on the average, \$499.70, in 1899; while the 113,155 manufacturers earned, on the average, \$870 each, nearly twice as much as the farmer, while paying for taxes only about one twentieth as much of their gross incomes as the farmers do.

It would seem then, that, on a per capita earnings basis, manufacturers could afford to pay nearly 75 per cent more taxes than could the farmers. As a matter of fact, the average farmer pays twenty times more taxes, based on gross income, than does the manufacturer.

The farmer pays, on the average, \$50 per capita in taxes on an income of \$500; while the average manufacturer pays \$17.50 in taxes on

an income of \$870. The farmer pays 10 per cent of his income, while the manufacturer pays but 2 per cent of his.

Other illustrations of the inequality of taxes could readily be given. The above, however, will, at this time and place, I think, suffice.

The average total tax rate levied on property outside incorporated cities and towns is \$1.75 per \$100 of assessed valuation.

The average total tax rate levied on property inside incorporated cities and towns is \$2.10 per \$100 of assessed valuation.

The rates average 1.14 per cent of the full cash value for country property, and 1.25 per cent of the full cash value of the city property on the rolls.

The following table will illustrate the percentages of taxes paid by different classes of corporations in this State:

	Per Cent of Taxes to Capital.	Per Cent of Taxes to Gross Earnings.
State commercial banks.....	.65	.....
Savings banks	1.02	.....
National banks.....	.20	.....
Railroads .....	.65	3.64
Street railroads .....	.605	4.624
Express companies.....	.14	.514
Telephone companies.....	.52	2.073
Telegraph companies.....	.33	3.06
Light, heat and power companies.....	.58	3.03
Farmers	1.14	6.86

In other words, the average corporation pays for taxes 0.52 of one per cent of its invested capital; while the average farmer pays about two and one half times as much, or 1.14 per cent. The farmer pays 6.86 per cent of his gross earnings in taxes, while the average corporation pays about 2.78 per cent, or about one third as much.

It will thus be seen that the burdens of State and county taxes are unequally distributed—something that we have all known for a long time. But this inequality is not so much the fault of the county assessor as it is the fault of the system. The latter, and not the former, is to be blamed.

The last regular session of the Legislature created a commission to examine into the matter of revenue and taxation and formulate some scheme by which the burdens of at least State taxation may be regulated and equalized. That commission, composed of Senators Curtin and Ward, Assemblymen Treadwell and McCartney, Professor C. C. Plehn, of the University of California, and the Governor, has been hard at work for two years; and the results of its labors are set forth in a preliminary report. The final report is in the hands of the State Printer and will soon be ready for distribution to all who will write to Professor Plehn at Berkeley for it.

The following are the conclusions of the commission in regard to the faults of the present system of taxation:

1. In general, the present system of taxation does not meet the demands made upon it. It is antiquated, having been adopted fifty years ago, and has not been revised to keep pace with modern conditions.

2. It is full of inequalities, which impose a handicap on the growth of the State, a handicap which only the vigor and inexhaustible energy of our people can carry. These inequalities twist and distort our industries and prohibit a symmetrical development of our resources. They place an undue burden upon agriculture especially; the foundation of our wealth, the one industry which most fully exploits the great natural resources of the State.

3. The taxes paid by farmers in California are equivalent to an income tax of 10 per cent. This is in contrast to many other industries; for example, the taxes paid by manufacturers, which amount only to 2 per cent on income. The persons engaged in agriculture, with an average yearly income of about \$500, pay \$50 per capita per annum in taxes. The persons engaged in manufactures, with an annual average income of \$870, pay \$17.50 per capita per annum.

4. Our chief tax, called a general property tax, has in fact become a real estate tax. Only from 15 to 18 per cent of the entire taxes are levied on personal property.

5. The amount of personal property on the tax rolls to-day is hardly larger than it was in 1872.

6. Money and credits escape taxation almost entirely. Our laws in regard to the taxation of this class of property are full of absurdities and utterly unenforceable.

7. National banks pay no taxes at all, except on real estate, of which they are not permitted to hold much, by the provisions of the Federal laws.

8. State commercial banks, subject to our tax laws, are badly handicapped by the competition of the untaxed national banks. Many of them have become national banks partly for the reason that they would not then be subject to taxation.

9. State commercial banks, to live at all, in face of this competition, are forced to evade taxation whenever possible and are hampered in their investments by unwise provisions of our tax laws.

10. Savings banks, which harbor the savings of the workers, and which are, in many states, granted special rebates in taxation on that account, are the only class of banks which pay their full quota of taxes.

11. "Equalization," so called, does not equalize, and in the nature of things, can not equalize. After the officers have exhausted their best efforts in this direction there are inequalities—glaring ones—between real estate and personal property; between different classes of personal property; between county and county; between city and city; between city and country; between man and man. All of which are rarely removed and often intensified by so-called equalization.

12. The original inequalities in the assessment are intensified by the constant piling up of tax on tax on the same base. If a city has a rate of \$1, which may be "reasonable" enough, there often comes on top of that a county tax of another \$1, a few special school taxes, or a sewer tax, or a tax for bonds, or a levee tax, or a drainage tax, etc., etc., until the effects of any inequalities in the original assessment have been multiplied anywhere from two to five fold. Aggregate tax rates falling on city property range from \$1.65 per \$100 to \$5 per \$100 of assessed valuation.

13. Counties with relatively undeveloped resources often have very high tax rates on relatively high valuations, while some of the richest counties enjoy a low tax rate on low valuations.

14. The present system takes the revenue derivable by taxation from large general organizations, like the railroads, which revenue belongs by right to the people of the State at large, and distributes it most inequitably among the local divisions of the State which have no proper claim to it whatsoever.

15. Under the present system it is impossible to adjust the burden of taxation equitably between different classes of corporations.

16. Our present system is a "school for perjury," puts a penalty on honesty and pays high premiums for dishonesty.

Our present system is so embodied in our Constitution that it can not be bettered without a constitutional amendment.

In order to equalize, as near as may be, the burdens of taxation, the commission recommends as follows:

1. Separation of State from local taxation as to sources of revenue. This is the first step in reform. Complete separation implies that the State shall collect its revenues from sources other than a direct levy on real and personal property of individuals, leaving to the counties and cities the exclusive right to tax such property for local purposes.

This will take the burden of direct State taxation off real estate, and save the owners of real estate over \$3,000,000 annually.

It establishes, at once, home rule in matters of local taxation.

It abolishes, at once, any necessity for equalization between counties, and cures the evils State equalization fails to reach.

The property selected for State taxation shall be exempt from local taxation.

Separation while not a remedy in and of itself, except for the evils arising from the breakdown of so-called equalization, opens the way for a proper classification of the subjects of State taxation, and makes it possible to tax each class with a greater approximation to equality than is possible without it.

2. That an absolute divorce between State and local taxation shall be the ultimate aim, and that as nearly complete separation as possible be attained at the very outset.

3. That the State derive its revenues from the following sources:

(a) *Old sources continued.*

- (1) A poll tax.
- (2) An inheritance tax.
- (3) A tax on insurance premiums.
- (4) An annual franchise tax on corporations (modified and made proportional).
- (5) All fees now collected.
- (6) All collections by State institutions (some of which may be increased).
- (7) All earnings of State property and investments.
- (8) The revenue from sale of State lands.

(b) *New sources.*

(1) A gross earnings tax on railroads: street railroads: express companies: car companies: light, heat, and power companies: telegraph and telephone companies, at rates fixed for a period of years by constitutional enactment, after which time they may be amended by the Legislature, but not more frequently than shall be determined by law.

This tax is to be in lieu of all other taxes except taxes on property not necessarily used in the operations conducted by the companies, and excepting, also, any so-called "taxes"* paid as a consideration for the grant of a franchise. The counties and cities would, therefore, be forbidden to tax this class of corporations.

The rates of the gross earnings tax should be fixed in the first instance by determining what percentage of the gross earnings will normally equal 1 per cent on the value of the corporate holdings, determined by its gross revenue-producing capacity.

A simple and logical method for computing this has been devised by the commission, and the data necessary to determine the rates have been compiled.

One per cent of the value is deemed a fair tax rate on real estate and other property on the tax rolls, and the popular demand for "equal" taxation makes it necessary to find a rate on gross earnings which shall be as nearly equal thereto as may be.

(2) A tax on the shares of capital stock of all banks at 1 per cent of the book value of the stock. The book value is the sum of the paid-up capital and the accumulated surplus and undivided profits.

* Bonuses or fees.

This tax, like the gross earnings tax, is to be in lieu of all other taxes on the banks, except taxes on real estate, the assessed value of which is, however, to be deducted from the capital before the 1 per cent rate is applied. Cities and counties would be deprived of the right to tax banks except on their real estate and mortgages.

(3) A tax at the rate of 1 per cent on the assessed value of all corporate franchises of every sort, not covered by the above mentioned taxes, such franchises to be valued by the State Board of Equalization. This tax, also, would be in lieu of local taxes on such franchises, excepting, of course, so-called taxes paid as part of the consideration for granting the franchise.

On looking up the legal aspects of the matter the commission found as follows:

The Constitution expressly prohibits separation, by declaring that "No county, city, town, or other public or municipal corporation, nor the inhabitants thereof, nor the property therein, shall be released or discharged from its or their proportionate share of taxes to be levied for State purposes, nor shall commutation for such taxes be authorized in any form whatsoever." (Sec. 10, Art. XI.)

Other passages can be interpreted so as to make the same restriction.

The Constitution has, however, a most liberal clause permitting an income tax. "Income taxes may be assessed to and collected from persons, corporations, joint-stock associations, or companies resident or doing business in this State, or any one or more of them, in such cases and amounts, and in such manner, as shall be prescribed by law." (Sec. 11, Art. XIII.)

Under this provision it is clear that the State may levy an income tax, not only upon its citizens in general, but upon any class of corporations, or, possibly, even upon any one corporation. This is altogether the broadest provision of the Constitution relating to taxation. It places almost unlimited power in the hands of the Legislature.

It would be perfectly possible to provide a system of State revenues under this grant of power.

The commission believes, however, that it would not be wise to take advantage of this section.

A *general* income tax is un-American. Our people have so much respect for labor that what is won by honest toil is regarded as sacred and not to be reduced by direct taxation. Sixteen states have tried the income tax. In every case it was a failure, being evaded, disliked, laxly enforced, and yielding small returns. Virginia, the only State which made any success with it at all, and that a small one, has recently, by constitutional convention, adopted the general plan proposed by this Commission.

A *special* income tax on selected classes of corporations, in addition to the taxes now paid, is a possibility under the Constitution, and a possibility which this commission recommends shall stand. But the commission does not believe that a resort to such drastic methods at present is either necessary or wise. The necessary reforms can be accomplished in other ways.

The commission has in preparation a constitutional amendment which will make it possible to accomplish the general results aimed at.

This amendment proposes:

1. The repeal of Section 10 of Article XI. This section, quoted above, prohibits separation.

This section serves no good purpose and never has served one, having been copied from a provision of the Missouri Constitution, which was widely copied in other states. It has no bearing on other provisions of our Constitution.

2. The entire revision of Article XIII, which is the chapter or article bearing on revenue and taxation.

The revision is to accomplish the following results:

- (1) To eliminate or modify those provisions which might be held to prohibit separation of State from local taxation.
- (2) To enumerate the subjects of taxation to be set aside for the exclusive use of the State, and to specify the method of their taxation.
- (3) To bring all the exemptions now scattered through several sections into one.

On the question of separation of State taxes from municipal and county sources of revenue, the commission's argument is as follows:

The separation of State from local taxation as to sources of revenue has come to be generally recognized as the one feasible pathway for tax reform.

As this commission uses the term "separation of sources," it means that the counties and local governments shall tax only the private or individual real estate and tangible property within their boundaries; property, that is, which is clearly and distinctly localized. This class of property has a distinctly local situs and benefits obviously and directly by local government. Upon this class of property there ought to be no State tax. The State, on the other hand, should tax all those industries and classes of property sometimes called "corporate" to distinguish them from the "private or individual" industries and properties. Such property does not have, in the same sense, a local situs; it extends over many communities, serves all, and all contribute to its income. Steam and electric railroads, telegraph and telephone companies, express companies, insurance companies, banks, trust and loan companies, light, heat and power companies, and even certain manufacturing and trading companies with branches in different localities, all of these have no distinct local situs, as does a piece of land, or a business block. The characteristic of all such corporate enterprises is that the value of the business which they carry on in any particular municipality is more or less intimately dependent upon the business carried on by them in one or more other municipalities, rural or urban, and can not, therefore, be properly estimated or taxed in any one place, or even in a series of places. Such property and industries are general. They belong to the people of the State as a whole, not to any particular community in which by accident their rails, wires, or offices may be.

The general, non-local character of corporate property is so obvious that it seems almost superfluous to argue that the taxes thereon do not belong to the localities. But as this idea is comparatively new in practice it may need illustration. A carload of butter and cheese may be shipped from Humboldt County to New Orleans. On its way it will pass through many counties. We should hold it robbery if each county erected toll-gates and collected tolls on that carload of Humboldt products. But that is practically what we allow when we permit, as we practically do, the counties to tax the railroads. Or, again, a vineyardist in Napa may ship a cargo of wine to London; a San Francisco bank buys the bill and "finances" the operation. San Francisco in taxing the banks virtually levies a toll on the Napa vineyardist's goods. Every year the banks bring in large sums of money to "move the crops." This money goes all over the State, even into localities where there are no banks. Every producer in the State contributes to the profit which the banks make on the transaction. Why should this business be taxed only in San Francisco, Stockton, Sacramento, or Los Angeles? The business is general, and the taxes on it should be for the support of the State government, which represents all the people and all parts of the State alike. Does the fact that San Bernardino County, Nevada County, and Siskiyou County sit at the gateways through which the railroads enter the State give them a right to tax every yard of cloth, every box of crackers, every plow, and all the other multitudinous wares which the people of this commonwealth bring in?

The right to do business that is enjoyed by corporations is a privilege granted by the State, and not by the cities or counties. Therefore, any tax that may be levied upon the revenues derived from the enjoyment and use of the State privileges used

by corporations, especially public-service corporations, ought to be paid into the State treasury for the support of the State government, from which the privileges are derived, rather than into city and county treasuries.

Obviously there is a perfectly clear line of demarkation between property local in character which should be subject to local taxation, and property or industries general in character which should be subject to general or State taxation.

To accomplish separation it is necessary to define clearly and sharply the boundary line between State and local powers of taxation. This boundary line having been once defined, neither of the two parties ought to trespass upon the territory set apart for the other. It implies that there shall be an end to the everlasting piling up of tax on tax on the same subjects or the same foundation, which is the bane of our present system of taxation.

Separation will give the counties substantial home rule in matters concerning their own taxation, and to the same extent there will be home rule in matters concerning city taxation. Within strictly defined limits the county, or the city, should be permitted to determine its own policy concerning the raising of revenue. This does not preclude general laws intended to bring about a certain amount of uniformity as to methods, but it does preclude that constant deference to the effect of State or other taxes which tends to divert the attention of the assessing officers from their primary duty, which is to establish uniformity and equality of taxation between man and man. It is indisputable that separation would abolish the chief incentive to and cause for undervaluations and remove the chief source of the existence of discriminations.

Separation would at once abolish all the evils which "equalization" is intended to prevent, but which it unfortunately fails to remedy.

The crude assumption that each and every interest should be taxed in the same way in proportion to the property which it uses is one of the fundamental iniquities of our present system. This it is which prevents us from taxing each interest in accordance with its ability to pay.

The theoretical principle for the separation of State from local taxation is found in part in the natural distribution of functions between State and local governments. The activities of the local governments, such as the protection of property by the police, the fire departments, the local courts, the construction and maintenance of roads, streets, bridges, and the like; the provisions for schools, the care of the sick and of the poor, redound distinctly, directly, and peculiarly to the benefit of local real estate owners, or local industries, and enhance and sustain the value of real estate and of other tangible property in the localities. This has always been the ground for making local government expenses a local charge. Separation makes no change in this respect, but it would relieve local property from State taxes and from the expenses of general activities, the benefits of which are not directly traceable to the activities of the local government.

In the counties, outside of the cities, the chief local industry is agriculture, and it seems peculiarly fitting that the local industries should bear the expenses of its own protection and support the local expenses. There is probably no better way of apportioning the taxes among a group of farmers for the support of the charges of the local government than by the taxation of real estate. The property tax originated as a neighborhood tax, and works best when used to apportion neighborhood charges among neighbors. It can be made effective only among a group of persons who know each the other's affairs to a large extent, and where deception and concealment are not easy.

In cities it is the growth of the city that, to a great extent, gives value to real estate. This may be admitted without going the full length of the claims of the single taxers, that it is the activities of the city alone which give value to real estate. From either point of view it seems proper that such property should bear the greater part of the expenses of the city which creates its value. Strong arguments have been advanced in support of the contention that the local expenses should be *limited* to the amount which the local real estate can afford to pay:

whether these arguments are valid or not, they point the conclusion that real estate should pay the local expenses.

On the other hand, all the activities of the State are broad and general. This is uniformly recognized in the provisions now found in almost all State constitutions prohibiting local or special laws. The duties of the State are mainly legislative. It provides a uniform code of laws for its entire territory. It provides laws under which business is conducted. It grants charters to industrial and other corporations. It administers such public institutions as are in no sense local in character. In general, the State cares for all those interests that are too broad or too large for the local governments to handle.

Corresponding almost precisely to the general activities of the State government, we find the properties and business of the great public-service corporations which pervade the whole State, such as the railroads, the telegraph and telephone companies, the express companies, and, of late, the light, heat, and power companies, which have spun their wires like spiders' webs over so many communities, or the insurance companies and the banks, whose business is in no sense confined to one locality. These industrial corporations are distinctly and peculiarly the creatures of the State, and it is to the State, and not to the counties or the cities, that we naturally turn for their regulation and control. They serve the people of the State as a whole, and are prohibited from bestowing favors on any one community. There is little or nothing localized about them, nor are they benefited by the activities of the local government, save, possibly, in so far as their local franchises are concerned, in the same peculiar and direct manner as is private individual real estate.

There is, thus, ample theoretical ground for making a separation as to the sources of State taxation from those of local taxation. The general classes of corporations, which we have had under consideration are so broad in their activities, their stockholders, and the oft-forgotten consumers of their products, or of their services, are so widely scattered, that it is clearly illogical to tax them, where, by some accident of organization or of legal enactment, their head office may be or their property may lie.

The practical reasons for the separation of State from local taxation are:

1. Complete separation will abolish at once the expense, friction, and annoyance of the vain attempt to equalize between the different counties. Partial separation will lessen this evil, because as the proportion of State taxes to the total tax burden on each citizen is reduced the inducement to undervaluation is reduced in like proportion.

A large part of the inequalities in the assessment have their origin in the attempt of assessors to save part of the State burden to their counties by undervaluation.

The State assessment roll in California is, as a consequence of the prevailing tendency to undervaluation, practically at a standstill.

From 1850 to 1860 the assessed valuation increased from \$57,000,000 to \$148,000,000, or at the rate of 16 per cent per annum.

From 1860 to 1870 the increase was at the rate of 8.7 per cent per annum.

In 1872 the codes were adopted and the State Board of Equalization established. Such was the activity of this board and the efficiency of the new law that the assessment increased by 130 per cent in two years, from 1870 to 1872.

From 1872 to 1880 the increase was only at the rate of 1.3 per cent per annum.

From 1880 to 1890 the rate of increase was $6\frac{1}{2}$ per cent per annum.

From 1890 to 1900 only 1.1 per cent per annum.

From 1900 to 1902 the roll increased 3 per cent each year.

In 1903, after great efforts by the State Board of Equalization and slashing increases in many counties, the roll reached nearly \$1,600,000,000. It dropped back about \$50,000,000 the next year, and this (1905) year has gone to \$1,625,000,000, a gain of $1\frac{1}{2}$ per cent in two years, or an average of three fourths of one per cent per annum for the two years.

No one will assume that this represents the true increase in the wealth of the State in the past two years.

2. When separation is permitted it is possible to place each tax in the hands of that branch of the government which is best adapted to administer it. The taxation of public-service corporations, for example, whose business pervades the whole State, can not be adequately handled by the local assessors. In every case, in order to obtain any sort of equality, uniformity, and justice in the treatment of these great corporations, it is necessary to call in the assistance of a State board, even if the resulting taxes are distributed among the localities. This is one of the several points at which the general property tax breaks down, and in which our present administrative organization in California is especially weak. If we have separation the State alone would deal with these corporations. This would save a great amount of friction and expense.

The different classes of corporations can not all be successfully taxed by one and the same method. That has been partly recognized in California already in the taxes imposed on the premiums of insurance companies. The local assessors and other administrative officers, engaged, as they necessarily will be, largely in the administration of the local taxes, ought not to be entrusted with the administration of several other sorts of taxes. What is needed is separate machinery for the administration of each of the different taxes.

3. The different taxing districts could each have practical "home rule" in matters relating to taxation. There would no longer be any object in underassessment if there were no State tax on the things assessed by the county assessors. If for any reason one county preferred to have a high rate of assessment and a low tax rate it could do so without assuming more than its fair share of the State burden. If another county preferred to have a low assessment and a high tax rate it could do so without evading any portion of its obligations to the State. If for any reason a county preferred to have its assessment roll revised once in several years only, it could do so without damage to any other community and with a considerable saving in expense to itself.

If each branch of the government collecting taxes did so independently of the others there could be no clashing of interests, and the administration would be much simpler and more economical.

To secure uniformity in the distribution of the burden and equality between different classes when taxes are levied by different authorities is the function of the general revenue law of the State.

This proposed separation of State sources of revenue from those of municipalities and counties is no new thing. Pennsylvania has not taxed, for State purposes, its real estate for many years. Neither does New York. And Connecticut, Ohio, Minnesota, and other states have more or less complete separation.

If this proposed scheme of the Revenue and Taxation Commission should meet with legislative approval (and it will if the people of the State so desire), the owners of real estate, who now pay the greater part of State taxes, will be relieved of nearly \$4,000,000 of taxes annually, which means a saving of at least 21 cents on each \$100 of our present assessed valuations.

In the following table is shown how much the tax rate in each county will be decreased and what proportion of the total assessed valuation of the county will be taken away by giving the State the taxes on certain corporate property and leaving to the cities and counties the assessment and taxation of real and personal property:

	Saving in the County Tax Rate, in Cents per \$100 of Assessed Valuation.	Percentage of Assessed Valuation of Public- Service Corporations and Banks to the Total Assessed Valua- tion.
Alameda	20.58	11.86
Alpine	49.00	0.00
Amador	34.63	8.46
Butte	27.90	10.54
Calaveras	35.50	5.76
Colusa	40.91	5.85
Contra Costa.....	34.75	11.31
Del Norte.....	47.73	0.79
El Dorado.....	16.86	13.85
Fresno	31.46	11.12
Glenn	36.18	7.96
Humboldt	40.94	5.60
Inyo	35.22	7.00
Kern	16.21	2.06
Kings	31.14	10.44
Lake	46.71	1.05
Lassen	41.23	4.45
Los Angeles.....	29.76	10.61
Madera	7.986	17.68
Marin.....	34.61	9.57
Mariposa.....	16.83	13.68
Mendocino.....	38.32	6.46
Merced.....	23.83	14.69
Modoc.....	47.12	1.74
Mono.....	34.15	7.78
Monterey.....	27.16	13.25
Napa	39.16	6.91
Nevada.....	10.13	14.96
Orange.....	31.46	11.16
Placer.....	14.86 loss.	26.94
Plumas.....	44.60	2.77
Riverside.....	10.82	19.04
Sacramento.....	22.37	9.80
San Benito.....	39.41	5.62
San Bernardino.....	46.13 loss.	36.94
San Diego.....	16.81	14.00
San Francisco.....	34.60	10.99
San Joaquin.....	29.89	11.50
San Luis Obispo.....	30.72	10.63
San Mateo.....	41.50	4.08
Santa Barbara.....	28.52	11.88
Santa Clara.....	41.67	4.80
Santa Cruz.....	27.97	8.60
Shasta.....	13.76	18.91
Sierra.....	26.50	7.63
Siskiyou.....	2.356	28.47
Solano.....	37.59	7.54
Sonoma.....	36.20	9.14
Stanislaus.....	24.15	13.66
Sutter	36.93	10.15
Tehama	30.67	11.87
Trinity.....	45.37	16.93
Tulare.....	21.30	17.56
Tuolumne.....	33.50	8.07
Ventura.....	0.7 loss.	17.56
Yolo.....	37.02	9.19
Yuba.....	20.54 loss.	18.21

It will be seen that all but four counties make a gain by the proposed change of system. This gain is from 8 cents in Madera County to 49 cents in Alpine, which latter has no public-service corporations, and hence saves the entire State tax.

The counties which lose are Placer, Ventura, San Bernardino, and Yuba. The long stretches of railroads in these counties account for their loss. The question of the justice of the loss is discussed in the report of the commission.

The property of the corporations of this State is taxed on the basis of its cost value, while our real estate is taxed, without any reference to its cost, on its real value, which is always determined by what it will produce in rents or products. An acre of land is an acre of land, whether it lies in the driest part of the Mojave Desert or at the corner of Kearny and Market streets in San Francisco. Yet the value, for taxation or any other purpose, of the San Francisco acre is very much more than the desert acre, and for no other reason but because more can be gotten out of it. A mile of telephone wire is taxed about the same whether it is on the desert or in San Francisco. Yet the San Francisco mile of wire, like the San Francisco acre, is worth more, for taxation or any other purpose, than the mile of wire in the desert. A Pullman car, in the hands of the Pullman Company, brings in a very large income on its original cost of considerably less than \$15,000. Yet the Pullman cars in this State are assessed on the first Monday in March of each year on the basis of what they cost the company to build them, not, as in the case of your real estate, on their true value, which is, and in the case of the Pullman cars ought to be, determined by its revenue-producing power.

A railroad is assessed and taxed in this State on the basis of its cost. Locomotives, cars, rails, and nearly all the things that go to make up a railway property, cost about the same, whether they are used between Oakland and Sacramento or between Gloster and Lancaster on the Mojave Desert. Yet, locomotive for locomotive, car for car, rail for rail, the Oakland-Sacramento stretch of road brings in a much greater income than do those used on the desert. Nevertheless, all locomotives, cars, and rails are assessed and taxed in California with regard to what they cost, not with any regard to what is their true value, which is based upon the income they produce. Were real estate taxed in the same way as railroads are, many a man in San Francisco, who paid tens of dollars for land that is worth thousands now, would be paying taxes on the small sum that it originally cost him; and many another man would be called upon to pay taxes on the thousands of dollars which he paid for land that is now worth but hundreds.

The same argument applies to the property of every other corporation in this State; its value, for purposes of taxation, as it is for every

other purpose, ought to be determined by its power to produce income, just as the value of real estate for taxation and all other purposes is determined. If anybody buys a piece of real estate, except under extraordinary circumstances, he pays such a price for it as he thinks the revenues he can derive from it will justify. And this price determines the basis of its valuation for assessment and taxation purposes. If one buys a railroad, a telephone system, an electric light plant, a bank, a water company, a telegraph company, he pays, not what the physical property cost or, as junk, is worth, but he pays such a price as the income from it will, in his judgment, warrant him in paying. The buyer of a piece of land cares nothing what it cost the man from whom he bought it; neither does he who buys out a corporation.

Real estate is taxed, as the commission has shown, at something over one per cent of its income. We have also found that a little over one per cent of the true value of the farms of this State is paid out in taxes—and this without any regard to whether or not the individual owner of any property is making any money out of it. Making money or losing it, the farmer is taxed one per cent of the true value of his property, which is determined by what it brings, or ought to bring, him in.

If real estate is thus taxed, why should not the corporations be taxed, not upon the cost or junk value of their property, but upon its true value, determined, as in the case of real estate, by its revenue-producing capacity? The commission has formulated a rule by which the true value of the property of the corporations may be determined for taxation, as it is for other purposes. And that rule calls for the taxation of the corporation at such a percentage of its gross earnings as will, as is the case with real estate, equal a tax of one per cent on the true value of its property, which, as in the case of real estate again, is determined by its income-producing power.

To illustrate: If money is worth 10 per cent, any piece of property that will produce \$1,000 per annum is worth, all other things being neglected, \$10,000, and is taxed with regard to that, its true value. A mile of telephone wire is taxed only on a value of \$100, or less, what the wire and instruments cost or are worth as junk, even though its income should be \$1,000 per annum, and the true value of the property is, therefore, other things being equal, the same as that of the piece of real property which produces \$1,000 per year.

The commission thinks that what is assessment and taxation sauce for the individual tax-paying goose ought to be assessment and taxation sauce for the corporation tax-paying gander. And it hopes that you and the people of this State will see the matter as it sees it.

I have no doubt in the world that there will be some opposition to

this scheme which is intended to make everybody, individual and corporation, bear his just proportion of the burdens of taxation for State purposes. One of the grounds of attack will probably be the commission's proposal that the franchises of all corporations, except such as are otherwise taxed by the State, shall be taxed by the State. The commission argues that when the State permits individuals to form themselves into corporations it gives those individuals valuable privileges, for which valuable privileges those enjoying them should pay a return to the State in the form of annual taxes. That the privilege to incorporate and do business is a more valuable privilege than the right to do business as individuals, co-partnerships, or associations, is proven by the fact that all large enterprises are conducted by corporations. Being a thing of value, then why should not those who avail themselves of the privilege to do business as a corporation pay taxes on that valuable thing, just as the owner of anything else of value is compelled to pay taxes on it? And to whom else shall this tax be paid but to the State, which confers the privilege?

Viewed from another standpoint, the privilege to incorporate and do business is the property of the State, which confers that privilege upon individuals in such manner as it may see fit. In California the State lends, so to speak, the corporation privilege for periods specified in the law. Is there any reason why those who borrow from the State the privilege to incorporate should not pay rent, interest, taxes, if you please, for its use, exactly as the private renter, borrower or user of any valuable property owned by another pays rent, interest or taxes for the privilege of using it?

In addition, therefore, to a tax upon the true value of its property, a like tax being paid by every individual property owner, the commission is of the opinion that all corporations not otherwise exempted should, in addition to the tax on its property, pay the State an annual rent, or tax, upon the valuable privilege to do business as a corporation, which privilege is the property of the State and confers benefits of which individuals, as individuals, can not avail themselves.

The State also imposes a poll tax upon males between the ages of twenty-one and sixty years, which yields something like \$450,000 per annum and is used for the support of the public schools. If the individual, in addition to the tax upon his property, is called upon to pay a poll tax, why should not the corporations also pay an annual poll tax into the coffers of the State? The commission thinks they should. And it thinks that this tax should be a certain small percentage, say one twentieth of one per cent, on its capitalization. It seems to the commission that any corporation can well afford to pay this small poll tax.

In addition to his property tax and his poll tax, every individual

who desires to record the deed to his property must pay the county recorder for the privilege. California requires that any corporation which takes advantage of the privilege allowed it by the State to do business as such corporation shall pay into the State treasury a certain sum, varying with the amount of its capitalization, when it files its articles of incorporation with the Secretary of State. The fees paid the county recorder vary with the size of the document presented for record; the fee for filing articles of incorporation varies with the amount of the capitalization of the corporation. The commission sees no reason why these fees should not be continued.

It may be contended that all these taxes should not be piled, one after the other, upon the corporations. Why not? You pay a general county tax, a road tax, a school district tax, probably a bond tax, State taxes for various purposes, and, if you live in an incorporated town, you pay various and sundry other taxes for schools, police, streets, lights, fire departments, etc., etc. Roads, streets, schools, police, lights, fire departments and all the other things for which you pay taxes go to make the business of the corporations more profitable. Why, therefore, ought they not to pay, as you do, their due shares of the cost of maintaining them? Or, what amounts to the same thing, why should you not be relieved from your State taxes, which, without injury to them, the corporations can, with justice, be called upon to pay? The commission is of the opinion that you should be, and hopes that you will agree with it.

As I have shown above, your real property is taxed on its true value, which has nothing to do with what it cost you, but is dependent upon what it will, or ought to, produce. The property of the corporations, however, except their real properties, is taxed, not on its true value, (which is determined, as in the case of real estate, by what revenue it will produce), but on its cost, or junk, price. Is it not time that the same taxation rules should be applied to all property, private and corporate, in this State? If so, the plan proposed by the Revenue and Taxation Commission ought to be adopted; for that plan will bring about that result.

Finally, let me say that the State Board of Equalization, and the County Assessors' Convention, the members of which two bodies have more practical experience than any one else with our revenue and taxation laws, have examined into and heartily approve the commission's plan. And no one who has studied it has been able to pick any flaws with the principles of the plan or to find any real objections to its theory or its practice.

If it suits the members of this Convention, and I hope it will, the commission would be very glad to have you say so.

MR. JOHN MARKLEY. I would like the permission of asking the Governor a question.

GOVERNOR PARDEE. Certainly, Mr. Markley, with the greatest of pleasure.

MR. MARKLEY. Has the commission investigated the matter to the extent that they have satisfied themselves that the State of California can tax the foreign franchises?

GOVERNOR PARDEE. Yes, sir; for that portion of it which is used in the State of California.

MR. MARKLEY. When the railroad was assessed in 1884, it was claimed that the value of the Federal franchise was mingled with the value of the State franchise. The Supreme Court of the United States, if I am not mistaken, held that the State of California had no power to tax a Federal franchise.

GOVERNOR PARDEE. But, if you will remember, in that famous decision in which they whipped the devil around the stump, the Supreme Court of the United States said that while you could not tax the franchise, you could tax the gross income, or that proportion of the gross income which would be within the State, at such a figure as would tax the franchise; and that the commission proposes to do.

MR. MARKLEY. Then you tax the franchise of the California companies?

GOVERNOR PARDEE. By taxing the gross income of it.

MR. MARKLEY. You would not levy a direct tax on the franchise?

GOVERNOR PARDEE. No, not as such. That is the way we talked about it; but the Supreme Court decided as I have said. It is called colloquially "the decision that whipped the devil around the stump."

MR. MARKLEY. You spoke of the tax on the franchise.

GOVERNOR PARDEE. That was particularly referring to California franchises; but the others can be reached in the other way around.

MR. DIXON PHILLIPS. Can I ask you a question, Governor?

GOVERNOR PARDEE. With the greatest of pleasure.

MR. PHILLIPS. I think it ought to be explained to these people what the purport of that decision was wherein it was ruled that the national banks could not be taxed. I think the general statement made in the report might lead some to an erroneous conclusion of what that decision was.

GOVERNOR PARDEE. Have you the decision on the end of your tongue?

MR. PHILLIPS. I have not, but I do have something of a general idea of what that decision was.

GOVERNOR PARDEE. Would you kindly state it, being a lawyer?

MR. PHILLIPS. It was with reference to deposits in the banks, also its bonds and the certificates that were used, based upon the bonds

that they hold that are deposited with the United States Treasurer. I don't think I can give you a clear idea of just what the decision was, but I do not think that that decision goes to the effect that if you had in one of these national banks \$100,000 on deposit on the first Monday in March, but what that \$100,000 is taxable property.

GOVERNOR PARDEE. That is your property and not the bank's, however.

MR. PHILLIPS. Certainly; but some years ago, Governor, there was a member of the Legislature of this State who introduced, for the purpose of remedying that "escape" from taxation, a bill providing that the banks should give in a statement to the assessor based upon the report that was given either the State bank or National bank examiner. And since that time that member of the Legislature is still "going some." They have never heard from him since. And it has been held by a great many people who have thought upon that question that that is one of the solutions of the great evil of inequality of taxation arising from the assessment. It is simple, because of the sworn statement given to your bank commissioners or the national bank examiners. It prevents them from so juggling the figures that we can not reach them.

GOVERNOR PARDEE. They send money out of the State, and I don't blame them. We ran up against that kind of proposition you spoke of in regard to the \$100,000. The \$100,000 goes into the bank and is henceforth out of your possession. Somebody else borrows it. There is \$300,000 represented by \$100,000. If you taxed it all it would be triple taxation, which would be a bad thing for the farmer and a bad thing for everybody. That famous decision of the Supreme Court of the United States that whipped the devil around the stump went to the effect that the law of California, which taxes national banks and their shares of stock, was not exactly of the same wording and to the same effect as the tax law upon other banks in the State of California; and, therefore, the court said you can not tax national banks at all, because you don't tax them as you tax other moneyed property, to use the word of the law. And to-day the national banks are escaping all taxation in this State, except upon their real property, of which they have very little. Now, if there are any national bankers here I do not think that even they would claim that that is a fair thing. Of course, I do not blame them for one moment for taking advantage of it while the law is in that condition.

MR. PHILLIPS. The commission points out clearly the general decrease in the assessed valuation of personal property. Now, will not that proposed system—if I remember, it is something like two years ago that a constitutional amendment provided for the exemption of \$100 worth of personal property. Would that not materially reduce the assessed valuation of personal property?

GOVERNOR PARDEE. The first in 1903, I remember very well.

MR. PHILLIPS. Then, as I remember it, there was something upon the question of growing fruits and vines.

GOVERNOR PARDEE. Growing trees.

MR. PHILLIPS. Yes; that is to say, if they were only three years old.

GOVERNOR PARDEE. Yes; up to the age of three years.

MR. PHILLIPS. It provided for their exemption. They applied that on the theory which came from the common law, that it is personal property; but it is personal property incapable of manual delivery, and still it should not be regarded as fixed to the ground—that it should not be regarded as part of the realty for the purpose of valuation; and under the general provision of the Constitution it says the improvements and the land itself must be separately assessed. On that theory those who oppose your system would argue against your statistics and would say that that, to a large extent, is responsible for the reduced valuation of personal property.

GOVERNOR PARDEE. But when we look back forty-five years and remember that the assessed value of personal property and that of realty in this State at that time were equal, and when we remember the great increase of personal wealth in this State since those days, when we remember the great influx of people who have nothing but personal property to bring with them—millionaires, perhaps—and note that the personal property in this State is to-day only fifteen per cent of the total valuation of the real and personal property in the State, I don't think, Mr. Phillips, that even those who would oppose the scheme on that ground would stand more than a minute on their feet when they stop to think about it. We have done a great many foolish things in exemption. I don't think there is anybody who appreciates more than I do the value of churches, but we have exempted church property. We have exempted Stanford University property. We have exempted growing crops. We have exempted three-year-old trees. We have exempted \$100 worth of personal property. How can the assessor get away from that? I will tell you. If a fellow is going to take advantage of that and put in his \$100 worth of personal property, the assessor assessed it for just that much more than it is worth. We have been talking of these things and have been trying to find a remedy, but still the assessors, poor fellows, haven't been able to find the personal property. Take San Francisco and Oakland alone. The value of the stocks of goods in the stores and warehouses of those two cities is not assessed at one one-hundredth of their true value. Of solvent money and solvent credits in this State, the assessors only find \$77,000,000, and thirty years ago they found \$122,000,000 worth. Now, nobody imagines for a moment that there is only \$77,000,000 worth of solvent credits

and money in this State at this time, or that there was only \$122,000,000 of that property in this State thirty-five years ago. I am free to say that I don't believe at all that you are going to get anywhere if you try to assess money and solvent credits, but the law says you must.

MR. JUDD. I move, to get this important subject before this Convention, that a committee of three be appointed to make a report. It is of such vital importance that it should be properly gotten before the public. I make a motion to that effect.

Motion seconded and carried.

PRESIDENT COOPER. Before we take a recess, I will state that we invited the Governor-elect to be present at this Convention. The Secretary will read his reply.

EUREKA, CAL., November 23, 1906.

To ELLWOOD COOPER, Esq., Santa Barbara, Cal.

DEAR SIR: Your letter of November 16th at hand. I would be pleased to meet with the Fruit-Growers' Convention on the 4th and 7th of December next, but it will be impossible for me to do so, because I am now trying to arrange my business matters here in Humboldt County before taking my departure for Sacramento. However, I shall be ready at any time to extend any assistance I can to advance the interests of the fruit-growers of the State.

Yours truly,

J. N. GILLETT.

MR. R. D. STEPHENS. I move that we give a vote of thanks to the Governor for his able address.

Motion seconded, and carried by a rising vote.

(At this time an adjournment was taken until 1:30 o'clock this afternoon.)

AFTERNOON SESSION—FIRST DAY.

TUESDAY, December 4, 1906.

The President appointed the following committees:

On Governor's Address—John Tuohy, John Markley, Andrea Sbarboro.

On Chairman's Address—Prof. D. T. Fowler, C. B. Messenger, Dr. W. M. Sherman.

On Resolutions—Judge W. H. Aiken, A. N. Judd, Leonard Coates.

PRESIDENT COOPER. I will state that it is the usual custom in these Conventions that all resolutions be referred to a committee for their place in the discussion of the Convention.

The first paper on the program this afternoon is "Table Grapes," by Mrs. Minna E. Sherman.

TABLE GRAPES.

BY MRS. MINNA E. SHERMAN, OF FRESNO.

The poetry of the vineyard is found in its symbolism. Think of the clinging tendrils reaching out appealingly to seize a support, grasping it, at first softly as a baby's fingers, then maturing to hold the heavy vine with the grasp of a man. The grapes ripen; the wine press is ready, for the vintage has come. The world laughs, for it is again young; once more is the joyous rule of Pan, for the grape has given up its liquid sunshine—the years roll back to the days of Greece. Yet, further on comes the symbolism of the Bible, with the beauty of the vineyard, the strength and then the sorrow of the wine press, and again the enduring strength of the perfect wine.

These thoughts are rather for the eventide, when the lamp is lighted and the closely drawn blinds shut out the day's work. It is now daylight—noontide—and let us away to the vineyard. The day is for work and the night-time for dreams. First comes the land. To some is given the opportunity to select the ground for their vineyards; to others, myself included, the land is already owned, yet it becomes necessary to study the best trees and vines for its capacity. In selecting land for a vineyard—in an irrigated country—it should be level enough for the water to flow readily along the furrows. If it is not level, make it at least level enough so that, by a reasonable amount of labor, the water can be used. The first and second years' growth of the young vines is greatly increased if they are irrigated in June.

The land should be deeply plowed both ways, and well harrowed before planting. Use every care to have the rows straight, and set a short whitewashed stake at each vine. The horses will then see these stakes and avoid stepping on the vines when the land is being cultivated. These stakes are usually made by cutting a bundle of three- or four-foot plastering lath into three pieces.

The newer vineyards are planted with the rows considerably wider apart than the older ones. It is a wise economy, for heavier tools can be used, with more horses and less men—wages are not only high, but careful men are few.

Subsoiling is to be recommended for quick and permanent results.

The vines planted in the wider rows after the fourth year are found to fully occupy the soil, and the tonnage of fruit is not lessened. It has been a matter of common observation that if the crop on the vines along the avenues were used to estimate the amount of grapes in the vineyard, the estimate was always too high, the increased space making the vines along the avenues more productive. The distance the roots extend can be observed by digging in the center of a sixteen-foot avenue; the roots will be found extending from both sides and meeting.

The harrow should be freely used; it needs to follow the plows to break up any clods and to smooth the soil. The moisture from the rainfall is too valuable to be lost, for the water from ditches carries into the vineyards Bermuda roots and Johnson-grass seeds.

Humus, not irrigation, is the need of our soils. The earlier grape-growers filled the soil with water, to its detriment. We to-day can do better by filling the soil with humus, to conserve the rainfall; and then have the cultivation of a dust mulch perfect during the dry season. If there had been less water in the ditches, we would have better vineyards around Fresno, for the alkali would not have been raised to the surface by excessive irrigation.

Humus is added most readily to the soil by growing cover crops and plowing them under. As a summer growth can not be maintained to advantage in a vineyard, the fall sowing of bur clover is resorted to, it being a self-seeding plant that has already the proper bacteria in the soil. Before resorting to cover crops humus is added to the soil by the use of barnyard manure. The vineyard is trenched between the wide way of the vines. After plowing back and forward in the same furrow, the "V" is put in; a ditch 24 to 30 inches deep is made, and manure is filled in nearly to the top. The earth is then thrown back by the "V," and the revolving harrow makes the land smooth once more. This trenching should be done early in the season, and if repeated every fourth year will keep the land open and porous.

The root pruning which the vines receive by the deep furrow method of plowing causes them to form new root ends down deep in the soil. Many vineyards suffer from drying out in the summer time, because their roots lie at the surface. When the vineyard is four years old force the roots downward by cutting off the surface ones. Set a sharp plow down to five inches and run close to one side of the vines. The next season do the same on the other side. Until the fourth year it is not well to do this pruning, as the vines are not firmly anchored in the soil and their foothold may be disturbed too much.

The roots of a vine absorb at the tips, where the root hairs are found; the rest of the root becomes like the stem or trunk, a mass of cells, through which the food is passed out to the growing portion. Cutting off the ends of the roots causes new growth and more root hairs—the same as taking off the tops of an old orchard tree renews its growth. Now, while the roots must be down deep—where it is cool and moist—they need air. The difference in a soil that contains humus is that it lies lightly and holds air. Without abundant humus the dust mulch can not be formed. To form it at all, the cultivation must be deep and thorough. The cultivators must be strong tools; those used in most of the vineyards never reach more than three inches in depth, because they are too flimsy to stand more power in front of them. Money is lost by

running them to cut weeds, for that is about all they do. We saw Mr. Teague using at Lemoneera a cultivator heavy enough to go down ten inches and strong enough to stand the draught of four mules. It is a riding tool, one that has been modified and strengthened from an Eastern pattern (by Mr. Teague) to meet the needs of his lemon orchard. We purchased two, and the marked improvement in the work this cultivator does, over the smaller and lighter cultivator, is shown in my young vineyard, which to-day is nearly as large at two years as other vineyards are at four years old.

About October first, before any rain had fallen, the dust mulch was perfect up to the surface; the moisture was nearly to the top, and the earth was friable down seven inches. This big cultivator ran only one way of the vineyards; this left a core that was cross-cultivated by the ordinary vineyard cultivators. The soil in this core was hard and dry at three inches from the surface.

The commercial fertilizers, bone meal and Thomas slag, are put into the plow furrow at the first plowing. In the spring the nitrates are put into the ground after the growth starts. One year commercial fertilizers are used; two years barnyard manure is broadcast, and the fourth year the vineyard is trenched and manure put in deeply. In a healthy vineyard this will keep up the vines to a maximum production, and balance the leaf growth with the fruit products.

The use of sulphur to control mildew is universal in all vineyards; it is applied when the vines are just beginning to break bud, again when the foliage is out six inches, and sometimes the third time if mildew shows at all. The sulphur acts through the fumes given off by the sun heat. If it is cold and dark weather the mildew travels fast, while the sulphur does not volatilize.

In growing red grapes, like the Emperor, sulphur can not be used late in the season without marring the beauty of the fruit; wherever it strikes a berry it makes a light spot that is a blemish. The Emperor grape matures late in the season, and may have several showers fall on it before the temperature is low enough to prevent mildew. We have used Bordeaux mixture for this. I advise this practice with due caution, for the University professors do not indorse it. They think it useless to control mildew. I gave in once and had four carloads of mildewed grapes to cull out for the winery. The sulphuring was attended to regularly and plenty of it used. Last year the Bordeaux mixture was carelessly made; it could not be seen on the vines; as a result we had to buy extra sulphur at \$70 a ton in Los Angeles after the San Francisco disaster. The vines mildewed and many grapes were culled in the packing-house this year. Some years we never use any sulphur for the vines at all. No mildew showing, we do not hesitate to let the Bordeaux mixture have the credit, for when the vines are show-

ing mildew on the next vineyard the conditions are certainly favorable for it. The new French sulphuring machine will be here in time for next season's use, and we hope it will overcome the objection the white men have to using sulphur.

The varieties commonly shipped to the East are the Thompson Seedless, Sultana, Malaga, Muscat, Tokay, Cornichon, and Emperor. In less than carloads are the Rose of Peru, Black Prince, Verdal, Colmar, Black Muscat, and a few others. The Thompson Seedless and Sultana are raisin grapes, but since the seeding of the Muscats has become a commercial success, the demand has lessened for them, and the amount shipped green has largely increased. When planted on sandy loam the fruit ripens early; both varieties are light green in color, shading to amber; the bunches are large. While the shipping of these varieties pays well, they have never commanded the fancy prices paid for Malagas, Tokays, or Emperors. The pink form of the Sultana, sent out by the Government as Sultana Rosea, has not as yet proven a heavy enough cropper to be largely planted; it is a beautiful grape, but has as yet to make its way to market.

In a good vineyard the culls should be light. The entire crop should be sent through the packing-house, when it is on the ranch; then the culls can be weighed and some definite idea arrived at as to what is being done. If the culls exceed more than ten per cent, the grower should watch the pickers and packers closely. If the fault is not found there, then the attention must be turned toward the vineyard.

The pedigree of a vine is as important as the pedigree of an animal. The Emperor grape has been a favorite of ours for many years. When the culls were very heavy one year, the thought came (probably suggested by the success in grading up a dairy herd) that the vines needed culling. I started in the next season two weeks before picking time and marked every vine that had merchantable fruit—fruit of high color, size, and large bunches—with a stroke of white paint on the trunk of the vine. The next season I repeated the work, using red paint. The vines having the two colors were used to furnish nursery stock for a new vineyard. When the roots were set out only the strongest were used. The result was an increased tonnage, with a large per cent of fine fruit and the culls less than a quarter. The marking of the vines in the second vineyard was again repeated for the cuttings for a third vineyard, and when this vineyard came into bearing three acres produced as much as four of the original vineyard.

The nurseryman never seems to think that a vine is an individual, but takes the buds or cuttings from any tree or vine, so long as it is true to name. The weakest is mixed with the strongest, until the average production is reduced greatly. Many varieties of fine strawberries have been run out by this lack of care. While the careful going-over

of the vineyard as described cost nearly a month of hard labor, the first year's increased production paid for it handsomely. The dairymen, who are classed as ignorant, are fully aware of the necessity of making every cow do her duty. It is now time the learned fruit-grower follows the dairyman's wise example.

The packing of Tokays and Emperors calls for greater skill than the packing of green grapes like the Malaga. The red grape packages must have even coloring and the bloom must be preserved. The bloom is injured by careless picking and hauling in the small forty- or fifty-pound picking boxes. The large raisin sweat-box, with four inches of clean hay in the bottom, and covered with a heavy sheet of paper, makes a good carrier from the vineyard to the packing-house.

The pickers cut the bunches and hold them by the stems, never touching the berries. They lay them, with the stems up, carefully along in the sweat-boxes, one layer only. The wagons have springs under them, and the teamsters are warned to drive slowly. Two men lift these boxes and carry them from the wagon into the packing-house, stacking them across each other, log-cabin style, to leave an air space between them. After twenty-four hours the grapes are ready for the packing tables, as the stems are softened enough not to snap. The large boxes are then sent into the packing-house and a woman stands ready to pick the clusters out of the boxes before they go to the ordinary packers' tables.

Constant watchfulness is necessary to keep the ordinary packers from putting poor fruit into the crates. They seem to think they are doing you a favor by making as many crates as possible out of a given amount of fruit. They can not understand that it is expensive business to ship poor fruit East. The poor fruit is worth something in the pig pen, but is worth nothing with a crate and refrigerator charges added when sent off in a car. Over and over, until I think they must have it driven into their brains, I say, "If you are not certain it is good, put it in the cull box, for it is better to be sure than sorry."

A man who is often overlooked is the car-loader. As he wheels the fruit into the car he can give it some ugly jolts. Every box of grapes that fails to keep is bruised by rough handling, often by the nailing down of covers on fruit that is packed too high. Eggs are really tougher than grapes. We do not consider them so because they make a troublesome mess when broken. The grapes make their troublesome mess later and show up in bad shape to the Eastern buyers. The railroad's handling of the refrigerator cars is much rougher than it used to be. The heavier engines and longer trains bump them around to such an extent that even with the heavy export shock we use on our grapes, nearly every car shows one or more broken crates.

When I first began to pack grapes, the bunches were clipped and fitted into little baskets and put into a double crate holding eight. We refused to have the double crates after the first season; the second season we refused to cut up the big bunches to fit the small baskets. I took the baskets and cut down a side of each, laid it across the bottom of the other basket, and fastened it there with a double-pointed tack. This made two baskets to a crate. They sold for surprisingly high prices. The next season the baskets were purchased in Chicago in advance. One morning I came over from the packing-house and hunted up pieces of baby ribbon around the house. I then decorated ten crates and sent them to Eastern friends. One crate was put into the car for the auctioneer who had encouraged the packing of the clusters. When the car reached New York a telegram came, "Put ribbons on all the clusters." Only one car was left to be packed. The Fresno stores never before had such a run on baby ribbon. That car then sold for the highest price ever received for a car of grapes at that time, over \$1,900. Since then we have sold for over \$2,000 a car, and one year a car sold at the rate of \$3,000 for the grapes; unfortunately it had other fruit in it.

We have had years when three fourths of the crop was clusters. One car had only fifteen crates that were not clusters. At times we have used a half crate for the finest clusters, and marked them "Imperial." In this package there are never more than two bunches, and these must be perfect in color, with large berries. These are decorated with twenty or thirty yards of baby ribbon of a becoming shade.

Bunch packing is again coming into use, for the trade has at last recognized that the faced pack is a very homely package; the grace and beauty of the grape being entirely lost in the mechanical regularity. The name is all that is new in the bunch pack. It is simply the plain cluster as distinguished from the Fancy Cluster and the Imperial Cluster.

Overproduction has been the cry ever since I began to grow grapes. This has been held up at every fruit-growers' meeting. We have found in the shipping of green fruit that it was lack of distribution that kept our fruit from selling. In the early nineties we shipped from the ranch ten cars of Emperors; our previous shipments had never exceeded seven cars. The last car slumped. The auctioneer wrote that the market was absolutely overstocked and the trade could not handle more. He was really troubled for fear we would send in more next year. When the lists were returned the grapes were seen to have been sold to people outside the larger cities. Since then these smaller places have been heavy purchasers of fruit.

The secret of a successful trade is honest packing; but I confess that after the last two years' experience I am not sure that I can ever make

the pack I used to with girls at the tables. The packing-house was then a delight; every one vied in doing good work; all was orderly, no strikes, no rough people anywhere to annoy. The "bloom was on the grape" and on the packers. But the women are gone. I suppose they all made money and got married; any way they are scarce. In the old days the joy of the vintage was there; the packers sang at their work; the joy spirit lifted us all above drudgery. The last two seasons—"a plague and curse on them"—the Japanese have been the bulk of our packers. I have yet to see a Japanese packer that could equal a green girl hand, after two days' packing under my instruction.

The real issue to-day, gentlemen, is not growing, selling, or marketing the table grape, but labor—men to work the vineyards and packers that can be trained to do intelligent work. In the San Joaquin Valley to-day the "Jap" is the only packer easily secured; he is a high-priced piece of inefficiency that is neither ornamental nor useful, but must be endured.

PRESIDENT COOPER. There being no objection, the paper you have just heard read will be received and placed on file. The paper is now open for discussion.

DR. E. A. HARE. I have been much pleased with the paper of Mrs. Sherman, and I wish particularly to emphasize one point. I was pleased with what has been said regarding the growing and cultivation of grapes, but I will confine myself to the one point of marketing. The acreage of table grapes is being increased every year very rapidly, but the market for table grapes is not increasing rapidly, for the simple reason that for two years past the grapes have not been as satisfactory as formerly. That is something for us to think about, if we would maintain grape-growing as an industry. I spent three years in Eastern cities, particularly in Washington and New York, and I followed this market very closely. My experience with California fruit was not at all pleasing. I did not want California fruit on my table—at least the grapes that were coming to market, for they were in very poor condition. One of the reasons why we do not get good prices for our grapes is the simple fact that we do not know how to pack and put them on the market. I do not mean that we don't know how to do it; I mean we don't do it. On the tables in the East I saw hundreds of bunches of grapes that were sour, green, and absolutely worthless, not fit to come on any table. I would not put them on my table, nor would anybody else. Yet we ship carload after carload of that kind of fruit. There never was a year when California had the world by the ear as it had this year. The first carload or two of grapes that came through were sour and very bad fruit. The people who bought them said they did not want any more of them, and of course, even though the grapes came

through later in good condition, the people would not eat them after their former experience. A man who puts up a good grape, and only a good grape, is the man who will establish a reputation for good fruit that will bring him a good price; but a single car of bad fruit will injure the entire market. I do not think we realize that every one of us who ships a carload of bad fruit injures the entire market for his neighbor and for everybody else.

PRESIDENT COOPER. The next paper on the program is "Wine as a Remedy for the Evil of Intemperance."

WINE AS A REMEDY FOR THE EVIL OF INTEMPERANCE.

By ANDREA SBARBORO, OF SAN FRANCISCO.

Mr. President, Ladies and Gentlemen: I am going to speak to you on the most important question of the day. I am going to show you how we can drive the curse of drunkenness from our midst.

St. Patrick was made a saint for having driven the snakes out of Ireland. It is a pity that at the same time he did not drive the curse of drunkenness from that country, for it is surmised that the people of the Emerald Isle brought the baneful evil of drunkenness to the United States.

The man who will succeed in driving this great evil from our country will be a public benefactor and deserves to be made a saint; more so than even the holy St. Patrick.

Drunkenness is the greatest curse and causes more crimes and misery than any other evil this country is afflicted with. Many attempts have been made to remove the vice from our midst. Benevolent and philanthropic people have joined together and formed temperance societies, and for the past fifty years have wasted millions of dollars and much valuable time in trying to eradicate the evil.

From temperance they have formed prohibition societies and striven hard to prohibit the sale of wine as well as really intoxicating beverages in cities and towns; but, alas! prohibition does not prohibit.

From the very beginning of the world Adam and Eve were placed in that glorious Garden of Eden, and told that they could partake of all the fruits and delicious things before them, but were prohibited from eating the fruit of the apple tree. It was just the apple tree which tempted them most, and of which, to their and our sorrow, they did partake, and since that time we, their children, have inherited the same desire.

Then, what is the remedy for the removal of drunkenness? The cure is a very simple and pleasant one, and all we have to do is to take the example of the people who live in the wine-producing and wine-drinking countries of the world. In France, Italy, and Spain, where every

man, woman, and child use in moderation wine with their meals, intoxication is almost unknown. Whilst in countries like Russia, Holland, England, Scotland, Ireland, and our own United States, where wine has not been produced, except in California in recent years, and the people have not as yet become accustomed to the use of it, drunkenness exists to an alarming extent.

The fact that wine is a remedy for the cure of the evil was well known one hundred years ago by that grand President of the United States, Thomas Jefferson, who, when Congress was debating the placing of a high tariff on the importation of wine, said, "Wine is a necessity and not a luxury, and that no nation is drunken where wine is cheap; none sober where the dearness of wine substitutes ardent spirits as its common beverage." The wise words of President Jefferson have been fully verified by sad experience.

WINE SHOULD BE USED IN THE ARMY AND NAVY.

Just before the last presidential election Mr. R. P. Jennings and myself, on behalf of the California Promotion Committee, went to Washington and called on the President and different heads of departments for the purpose of inducing them to introduce in the Army and Navy some of the surplus products of California, which were both healthy and cheap.

On calling upon the Secretary of the Navy, then Mr. Paul Morton, Mr. Jennings recommended the use of raisins and prunes in the navy, and I said: "Mr. Secretary, as California is now a wine-producing State, where wine can be had pure, good, and cheap, why not serve the men of the navy with a ration of wine, as is done by the wine-producing nations of Europe?" The Secretary—whom we found to be a very genial gentleman—smiled at me and touched an electric button. In a few moments appeared before us a tall, thin gentleman, in the full uniform of an admiral. The Secretary said, "Admiral, Mr. Sbarboro here, suggests that we furnish a ration of wine to our marines. What do you think of it?" The Admiral raised his hands in holy horror, and said, "Mr. Secretary, do you wish to make drunkards of our boys?" The words of the Admiral shocked me. I could not see how a man could have arrived at such an elevated position and yet be so deficient in the knowledge of the effect of serving the navy with a small ration of wine at the meal of the marines, and I said, "Admiral, I have been living in the seaport city of San Francisco for the past fifty years. I have seen warships steam into the bay from all countries of the world, and let me tell you, sir, that when there arrives in port from the wine-producing countries a man-of-war which furnishes its officers and sailors with a ration of wine daily, the day after its arrival we

see these men walking our streets neat, straight, and sober, like gentlemen, whilst when there arrive war vessels from Russia, England, and—I am sorry to say—from our own United States, the following day we see sailors staggering along the streets of the city, beastly drunk; sometimes even lying in the gutter, disgracing the uniform they wear.”

This fact has recently been fully demonstrated in a very forcible manner by no less a person than the Surgeon-General of the United States Army.

It will be remembered that some years ago there was introduced in the United States Army, among the soldiers, the canteen, which was simply a club-room where the soldiers could meet and buy their wine, beer, and light beverages, and the profits derived from the sale of these things by this little club were used by the soldiers themselves in purchasing little dainty edibles which are not furnished by the Government.

Although the canteen worked very satisfactorily, some of the deluded women of the country made an appeal to Congress for its abolishment. They feared that their children would become drunkards, and threatened to call them home unless the canteen was abolished. And sure enough, at the next Congress a law was introduced to abolish the canteen. As president of the Manufacturers and Producers' Association of California, by order of the directors, I wrote a forcible letter to Senator Perkins, representing our State, showing him that the canteen was a benefit to the health and sobriety of the soldiers, and also a benefit to the viticultural industry of California. The Senator answered me that he admitted every word I said was true, but that he had been so pestered by the women of the country that he dared not vote against the bill! And, in fact, the bill passed and the canteen was abolished.

The officers of the army soon discovered that it had been a serious mistake to abolish the canteen, and petitioned Congress to reestablish the same.

The report of Dr. O'Reilley will show you the consequences of the non-existence of the canteen, which plainly demonstrates the good or evil done by using or not using wine by the people.

I quote from the San Francisco Bulletin of November 12, 1906:

EVIL EFFECTS OF CANTEEN REMOVAL.

America Now Has the Distinction of Having the Drunkest Army in the World, Says Surgeon-General's Report.

WASHINGTON, November 12.—The United States Army is the drunkest in the world, according to figures contained in the report of Surgeon-General O'Reilley, head of the medical department of the Army, which has just been made public. Though General O'Reilley does not so state specifically, this undisputed eminence has been attained since the abolition of the canteen system. Several commanding generals have made this plain. The report also makes it clear that many diseases from which soldiers suffer are caused by driving them outside of the posts for amusements.

DRUNKARDS SHOULD NOT MARRY.

Rev. Frank Crane, author of "The Religion of To-morrow," writes: "We might refuse to allow marriage to those tainted with insanity. According to the sixtieth report of the British Lunacy Commission, 'a quarter of the cases of insanity can be clearly traced to heredity.' Do you know how insanity is increasing in Massachusetts?" [Which, by the by, is one of the strongest prohibition states in the Union.] And he adds: "And we might forbid marriage to the 'habitual criminal,' and to the 'habitual drunkard.' No person twice convicted of drunkenness should be allowed to reproduce his kind."

CURE OF DRUNKENNESS IN FRANCE.

Some fifteen years ago the French Government noticed that insanity was increasing to an alarming extent in that country. A commission of eminent physicians and scientists was appointed to investigate the cause of this evil and report the remedy. The commission, after making a most careful research, reported to the authorities that since the phylloxera had destroyed the grapes in France, the people, not having any wine to drink, had acquired the baneful habit of drinking absinthe, a strong alcoholic beverage something like whisky, which was the cause of the large increase of insanity. They further said that the only remedy for the evil was to extirpate the phylloxera and reproduce the grapes.

For this purpose France spent millions after millions of francs, and finally found a remedy by pulling up all their grapevines and setting out the resistant variety; and further, the government removed all license on the sale of wine, so that the people might again have their healthy beverage, and have it at such a price that it would be within the reach of all. And thus was the evil of insanity in France checked.

The eminent Dr. Lyman Abbott, of New York, in an article published in the "Outlook" of October 22, 1904, concluded his able address by showing the propriety of the American people using wine with their meals, by saying: "Personally I have entire respect for the total abstainer who really does abstain, and also respect for the one who believes that it is legitimate to use wine in moderation upon the dinner-table, but I find it very difficult to maintain respect for the total abstainer who abstains from the dinner-table and then drinks it out of a closet between meals and calls it medicine. About such an one there appears to me rather a serious deficiency, which it is charitable to hope is intellectual rather than moral. Such imbibers are often entirely honest, but they are usually deluded."

EDUCATE YOUNG CHILDREN TO DRINK WINE AT THEIR MEALS.

Again, Dr. Martin Regensburger, President of the California State Board of Health, says: "If the people of this country were educated, from babyhood up, to drink wine, alcoholism would be a rare disease, as has been proven in wine-drinking countries. It is the forbidden fruit that tempts. In my experience, in families where the wine flows freely, drunkards are the exception, whereas many of the offspring of teetotalers and wine-abhorrrers who have not tasted alcoholics until they almost have grown to be men, become drunkards. It would be interesting to compare the statistics of drunkards in wine and beer drinking countries with those of England and America."

These statistics have been shown by our Surgeon-General of the Army, R. M. O'Reilley, who reports that, for the fiscal year 1906, out of every 1,000 soldiers 29.65 cases of alcoholism are sent to the hospital for treatment every year. He added: "As compared to other countries, this is a remarkable showing. The British army is next on the list, and it shows 2.1 cases of alcoholism in every 1,000 soldiers. The lowest percentage is that shown by Spain, the figures of which are put at 0.08 in every 1,000 men, or less than one man in ten thousand drunk." If the figures of the armies of Italy and France, the other nations which furnish wine to their men, should have been given, I am sure that they would have been minimum like that of Spain.

To further illustrate the truth of Dr. Regensburger's assertion, I will tell you of an incident which, although somewhat personal, is too realistic for me to omit. Some fifteen years ago I was called upon to speak at a meeting of the Manufacturers and Producers' Association of California, which was held in Santa Cruz, to an audience of four hundred or five hundred people, among whom were many ladies, some ministers and several representatives of the Salvation Army. My subject was for the encouragement of our people to use home products. Incidentally I remarked that the hills surrounding Santa Cruz could produce very fine wine grapes, and that the many acres of land which were now worth \$6 per acre as sheep ranges, could be made to pay interest on \$100 per acre in producing wine grapes; but, I remarked, it must be remembered that every bunch of grapes makes a glass of wine, and that unless we find consumers for this glass of wine we will not be able to dispose of the grapes. Therefore, I said, we must encourage the industry and commence right here and become educated to the moderate use of the healthy beverage of wine at our meals; and you, ladies, should give it, diluted with water, to your children at an early age.

From some parts of the house I heard disapproval of my last remarks. Then, I said, ladies, I want to tell you of an incident which happened to me twenty years ago at the Wilkins Hotel, right here in Santa Cruz.

I had just arrived with my wife and babe of eighteen months old at the dinner table, where there were over one hundred people. As soon as we sat at the table I ordered, as usual, my bottle of wine, and when it was opened my wife, imitating what her mother had done for herself when she was a baby, poured a little wine and then a little water in the glass and gave the babe to drink. The ladies in the dining-room were shocked! I could hear them murmur, "Oh, poor child! see what cruel parents, to give that little baby wine to drink. Shame! what cruel parents!"

Now, let me tell you, ladies, I said to the meeting, that babe and four others of my children, who are now grown men and women, have been using wine at their meals from the time they stopped nursing, every day of their lives. They don't know what intoxication is, and should they live as long as Methuselah they never will. I hope that you mothers, who have disapproved of my remarks here this evening, can say as much for your children.

ON DRINKING WINE AT STANFORD.

In a very interesting address delivered last June in Napa at a Promotion Committee meeting, the honorable and brilliant Chester H. Rowell of Fresno ended his discourse by saying: "I should not be surprised to see the time come when we send temperance lecturers East, to preach the merit of wine as a temperance drink."

That is the keynote to the situation. You ladies and gentlemen of temperance societies, who have done so much to abolish drunkenness, but without success, now just try the true remedy, and I am sure that you will succeed in removing drunkenness from our midst.

An eminent lady at Stanford University has started the ball a-rolling. A dispatch published in the San Francisco "Chronicle" of November 20, 1906, says:

STANFORD UNIVERSITY, November 19.—The most interesting article that has ever been written at Stanford on the question of drinking among the collegians, appears in the issue of the *Sequoia*, which is just out. This article was written "by a Stanford woman," but the writer's identity is concealed under that broad name. The article defends the drinking habit among collegians at Stanford and shows that it really serves to teach a man how to drink and prevents him from ever becoming a common drunkard.

I have heard some people say that whilst wine may be used in Europe without causing intoxication, it is perhaps due to the climate, and that in the United States it has a different effect. To disprove this, I have only to say that at the vineyards of the Italian-Swiss Colony at Asti, this State, where from two hundred to three hundred common laborers are employed daily, several pitchers of wine are furnished on the tables for their meals and the workmen help themselves and drink all that they desire. This colony has been in existence now over twenty-six

years, and I assure you that it has never had an intoxicated person on its premises. So evidently wine may be used in any climate. In fact, in California, where much wine is already made and larger quantities are used than in other states, intoxication is much less than in any other State of the Union.

It will probably be interesting for you to know that in Italy there is consumed twenty-five gallons of wine per capita per annum, while in the United States there is used less than one half gallon per capita of wine, but the enormous quantity of one and one half gallons per capita of whisky per annum, or three times as much whisky as wine. In the one country drunkenness is almost unknown, and in the other drunkenness exists to an alarming extent, and our army has been pronounced by the Surgeon-General of the United States the "drunkest in the world."

Now I want to show you, ladies and gentlemen, that by educating the American people to the use of wine at their meals, in addition to the State of California—which is the only State in the Union where the true wine grapes grow to perfection—being the happy means of having driven the evil of intoxication from the United States, the benefit derived by our State will be simply enormous.

France produces one billion and a half gallons of wine per annum, from which it derives over three hundred million dollars. Italy, with a population of thirty-five million people, produces one billion gallons, and derives from it two hundred million dollars per annum.

California is one third larger than the kingdom of Italy. Her soil and climate are almost identical.

CALIFORNIA WINE AWARDED A DIPLOMA OF HONOR AT THE MILANO EXHIBITION.

We now produce just as good a quality of wine in California—if not better—than that produced in either France, Spain, or Italy. This may be seen from the fact that England, Germany, Switzerland, and Belgium, near the wine centers of Europe, are now purchasing California wines, and is further confirmed by the recent award to California wine produced by the Italian-Swiss Colony at Asti, Sonoma County, of a grand diploma of honor by the Milano Exhibition in Italy, our wine coming in competition with the best wines of Europe. When the consumption will require, we can produce in this State as much wine as is produced in either France or Italy.

The population of the United States is now about equal to the population of France and Italy combined, but Prof. Frederic T. Bioletti, of the State University of California, in a splendid address on "Viticulture and Temperance," recently delivered at the Farmers' National Convention, at Rock Island, where he was sent by our esteemed Governor Pardee—who, it must be said to his credit, has always taken a great interest

in this growing California industry—to address the farmers of our country on the viticultural industry of California, said that if the United States contained two hundred million inhabitants, the State of California could supply all of them with pure wine at their meals. Therefore, as soon as we will have reached the happy period when our people will have become accustomed to the use of wine at their meals, the viticultural industry of California will give employment to many thousands of people, and then every hillside in almost every county of this great State will be covered with beautiful vineyards and wineries, squeezing rivers of wine from our juicy grapes.

WINE CREATES GENIUS.

I was amused one day in reading a lecture delivered by a minister, who stated that in Italy, where the people soaked themselves, so the minister said, with wine, they were stupid and deprived of intelligence. Well, now, nothing could be farther from the truth. You take any of the encyclopedias showing names of the great men of the world, and you will find more men of genius born in Italy than in any other part of the globe. Commencing with Michael Angelo, Raphael, Dante, Galileo, and many others in the early ages and coming down to Columbus, Donizetti, Verdi, and Marconi of the present time, we find that they were all wine-drinkers. In fact, it is said—and it must be true—that the imbibing of the grape juice creates genius.

HOW TO USE WINE.

Wine should be used at meals not only by the rich, but by everybody. While those who can afford it can purchase their wine by the case and thus obtain wine of well-known brands and with fine bouquet, the mass of the people must obtain good sound wine in bulk by the gallon which will not necessarily cost them more than their tea or coffee. When it is bought by the gallon it should be all bottled immediately, well corked, and the bottles be kept laid down. To make wine cost still less, it may be diluted, at time of using, with half water. All beginners, and especially children, should take their wine only in this way. If the wine-maker could do so, he would gladly save you that trouble; but you must know that if water were mixed with wine before ready for use, the wine would spoil and turn into vinegar.

Wine should only be used at lunch and dinner. This should be either white or red wine, according to taste, but should be dry and not sweet wine. Port, Sherry, Angelica, Madeira, and such sweet wines admit of no water, but being more alcoholic than the dry wines should be used in small dainty glasses with cake or dessert, and in the place of "teas" in the afternoon social gatherings, in small quantities. To show you how little as yet the American people know about the use of

wine, I will inform you that in the prohibition State of Maine and the other Eastern States the people consume 95 barrels of sweet wines, which contain 24 per cent alcohol, against 5 barrels of dry table wines, which contain only from 10 to 12 per cent alcohol. The reverse is the case among the educated wine-drinkers.

People who have never drunk wine frequently say, "I don't like it." How do you know that you don't if you do not drink it properly. First just put a little wine in a glass of water when you feel thirsty, and you will see how good it tastes. Increase the quantity of wine and reduce the quantity of water gradually, and you will see how pleasantly you will get used to it, to the benefit of your health.

Hotel and restaurant keepers should encourage the use of wine by having the waiters ask their customers, "What will you have to drink, tea, coffee, or wine?" The price should be reasonable, and not like in some hotels where they charge more for a pint bottle of wine than they do for the meal itself. Those who sell wine, marking their wine list down at a reasonable price, will add to their profits by the large increase of wine that they will sell and satisfy their customers.

Now, in order that we may achieve something tangible from the result of this important meeting of California fruit-growers, and that our State and the Nation may be benefited by our labor, I propose the adoption of the following resolution:

WHEREAS, It has been clearly demonstrated that the State of California can now produce as fine a quality of wine, and, when the demand will justify it, put forth as large a quantity, as the greatest wine-producing countries of the world, and thus be the means of improving many thousands of acres of land which are now unproductive, which could make pleasant homes for thousands of people in the viticultural industry of this State; and,

WHEREAS, It is a well-known fact that in the wine-producing and wine-consuming countries of Europe intoxication is almost unknown, whilst where wine is not produced drunkenness prevails to an alarming extent; and,

WHEREAS, We consider that, for the above reasons, the use of wine should be encouraged in California, separated from the saloons, and be permitted to be sold freely everywhere, as is now sold coffee, tea, or milk; therefore, be it

Resolved, By this California Fruit-Growers' Convention, that we recommend to the next Legislature the passage of such laws as may be necessary in order that wine shall be permitted to be freely distributed to the people in this State, free from the payment of license, and not affected by the prohibition laws of any town, city, or county of California.

PRESIDENT COOPER. Is the resolution you have just read seconded?

The resolution was seconded.

PRESIDENT COOPER. It will be referred to the Committee on Resolutions.

MR. J. W. WEBB. Is it in order to move an amendment to a resolution?

PRESIDENT COOPER. Yes.

MR. WEBB. I know time is short, and I will speak right to the point. I suppose probably I am the only man in the room who is wearing the badge of those deluded women who asked for and obtained the abolishment of the canteen, and in chivalry I feel I must sustain their course. After a few remarks to the members of the Convention I will move an amendment.

Mr. Sbarboro spoke freely, and I am glad he did; but when he says that prohibition does not prohibit, I think we have memories long enough to know that when they prohibited altogether wines, whiskies, and beers in San Francisco, the police were pretty nearly out of a job. (Applause.) And the refugee mothers and sisters and daughters walked the streets without fear. But since they have unloosed some two thousand saloons, I guess gas pipes have gone up to a premium, and murder and rapine and other things have been exceedingly prevalent.

Now, about the canteen; as that was spoken of, I want to say the women were right. They gave, for the freedom of Cuba and for other patriotic causes, their boys, going from Christian homes, from temperance homes. They did not expect that Uncle Sam would put a drinking place, call it saloon or canteen, under the Stars and Stripes, and then induce and tempt and snare their boys into drinking; for the boy who was invited to take a drink of beer at the canteen and said, "No, my mother taught me never to go into a saloon; I fear it would break her heart to be drinking wine or beer here," would be sneered at. "Of course, you won't pay a dime for it, but you will take the profits to put better things on our table." Isn't Uncle Sam able to give our soldiers the proper diet without having our good boys go into the liquor business?

About France. If I am not mistaken the public prints have said that the wine habit was one of her foremost evils. And the President of the Medical Society has himself signed the total abstinence pledge from wine and all intoxicants; and a great number of the physicians of France have done the same, as an example for total abstinence from all intoxicants, including wine.

If I am rightly informed, and I have seen the fac-similes of them in print, the French government has put up large placards at the railway stations warning the people against alcohol. It is not the juice of the grape; it is the deadly alcohol, whether it is wine, or beer, or whisky, that we are afraid of. I would not be afraid to take a vote of the mothers of this town, whether they think it is safe to give their babies and their boys and girls wine in order to save them from drunkenness. Their mother hearts and their fears would rebel against it.

In the island of Australia, where they make good wines, my Christian mother gave me wine, and so did my uncle, who was a judge of the Supreme Court, but I signed the pledge after I had almost gone over to the damning maelstrom of drunkenness.

Now, the amendment I propose, Mr. Chairman, is that this society believes with a celebrated writer of ancient times that we should not look on wine when it is red, when it giveth its color in the cup, when it goes down smoothly, as the Revised Version says, because at the last it bites like a serpent and stings like an adder, and that it is good neither to eat flesh nor to drink wine or anything whereby thy brother stumbles and is made weak. I move that as an amendment.

MR. S. H. TAFT. I second the motion.

After further discussion the Chairman declared the question closed and referred the resolutions to the Committee on Resolutions.

THE FRUIT-GROWER'S AIM.

By HOWARD C. ROWLEY, OF SACRAMENTO.

It may jar the sensibilities of some to state the facts just as they are; but, aside from a small class, very, very few in number, represented by such shining examples as Luther Burbank, the fruit-grower has but a single aim. This may be set down in the one word—price. Public spirit and curiosity in experimentation at times play a small part, but resolving the matter down to the basis which you all know is at the foundation, the aim of the fruit-grower is to get the best possible price for his product. Of course, he at the same time wants to get an improved quantity and improved quality in production, but this is merely a means to an end in 999 cases out of every 1,000, and has as its ultimate object—more money. It would seem, therefore, that the consideration of means looking toward this end is of prime importance, and in publishing "California Fruit-Grower" it has been my object to specialize as particularly as possible on the commercial side of fruit-growing, not, however, overlooking the matter of improvement in quality and methods of production, which are of vital import to the fruit-grower in the accomplishment of his aim. There are several cardinal points, as I see it, in obtaining the best possible price for your products:

Produce the best possible article for the class and character of trade you intend catering to.

Keep as thoroughly posted on selling conditions in your line as is practicable.

Another point is honesty; honesty with those with whom you are dealing and honesty with yourself. You must turn out an honest product—just what it purports to be—and you must keep strictly to the letter of your obligations in all dealings, and insist on others doing the same, and if they do not, look around for somebody else to deal with. There is a great deal of antagonism and dissatisfaction, not to

use any stronger term, existing between the fruit-growers and buyers and packers who handle their product. Both sides are responsible for this, and I believe that a great deal of the hard usage and bad treatment that growers get at the hands of packers and buyers is owing to lack of discrimination and judgment in picking out the people with whom to deal. If you have had good treatment and honest dealings from a packer with whom you have been doing business for perhaps a number of years, and some other fellow comes along that you don't know anything about and offers you a fraction better value for your goods and you sell them to him and get caught one way or another, who is to blame?

It must be remembered, of course, that the grower is not the only individual in the world who is after a living and the best possible price. Every one else connected with the fruit business, or any other, is in the same boat; we are all looking for the highest price when we have anything to sell and the cheapest price when we have anything to buy. It is a natural proposition that a fruit buyer wants to get his stuff at the very lowest price at which he can buy, but this fact should not lead to prejudice. Again, in this matter of honesty, a contract is just as binding on one party as on another, and if not lived up to will, in the long run, work the downfall of the transgressor. Right here in your own district this present season there have been unholy alliances between unscrupulous packers and unscrupulous growers. Growers who have made contracts to deliver their goods at an agreed upon price to packers have jumped their bargains and delivered their goods to others for a consideration. By far the largest loss through such dealings will accrue to the packers themselves in the course of time; but a grower's contract is, both in statutory and moral law, as binding as any one else's. You expect the man with whom you bargain to live up to his word, whether he wins or loses, and you should certainly do the same. This class of growers in such a community as California must, however, be small in number.

In the matter of selling your goods, I have no patience with the theorists who get up and argue by the year that this or that particular method is the only way that any product of the soil can be sold to advantage. I do not think there is any one way. I believe there are a great many methods of selling or handling your goods, each of which is to the best advantage under certain circumstances and to certain individuals. With a state as large as the State of California and individuals' interests as diverse as they always must be in this State, it is sheer nonsense to talk about selling all the fruit, all the vast production of our orchards, in various lines, under any one system, no matter how theoretically perfect it may seem to be. There are always going to be different methods of selling just as surely as no two people think

exactly alike on all subjects. Coöperation, so far as uniformity of action on anything like a unanimous scale is concerned, has proved an absolute failure; not in theory, the theory of it is perfect, but in practice. In the matter of selling your products, nearly every case is different in some particular, and for this reason one method is the most advantageous in one case and another in another. There is no one royal road to the highest price for fruit.

In an effort to get the best possible price for your product, you must, of course, keep posted on general conditions and tendencies. Generally speaking, it pays best to produce a less quantity of a first-class product handled in a first-class way. The fixed expenses of interest on your land investment, most of the expenses of care for and handling the product, and all the expense of transportation, are the same, whether your product brings the bare cost of getting it to market or a substantial profit to you. It is the great mass of low-grade stuff on the markets generally that keeps prices down and discourages consumption. Of course, there are certain conditions that require a certain class of product, and where a producer is catering to a particular trade, he wants the goods that that trade demands; but make them the best that they can be for the particular conditions that are being catered to. The principle is the same.

A matter which is very largely overlooked by fruit-growers in disposing of cured fruit is the matter of carrying expenses. I do not advocate jumping at the first offer that comes your way; but there is a large class of fruit-growers who argue along these lines, "If Mr. Buyer can afford to pay the price he is offering me, my goods must certainly be worth more money, because he expects to make something, so I had better keep them myself and I shall get more later on." Whether or not a product should be held depends entirely on circumstances over which the grower himself has very little control. Growers, however, should take into consideration more generally the carrying expenses; loss of interest, insurance and shrinkage. Now this matter of shrinkage is one of more importance than many think. If the grower holds his product, he is going to lose by shrinkage, and it is very material in most cases, amounting to a very noteworthy percentage, and the grower in deciding to hold must take this into consideration.

There is one more point that I have left for the last because I want to make an effort to impress on you my ideas on this subject as strongly as possible: Futures. The wrecks that fill up history in fruit-trade circles are responsible in large part to future selling. As a rule growers do not indulge so largely in the gamble in futures as do the commercial packers, but a large number of the evils of the business and the general hard feeling between growers and buyers is directly or indirectly due to dealing in futures. It may be set down here that it is not only improb-

able, but exceedingly unlikely, that the time will ever come when the speculator and dealer in futures will cease to exist. In the first place, the human race has an inborn instinct to gamble, which, so far as my experience goes, is general in one form or another. It may not be draw poker and it may not even be a slot machine for cigars, but the individuals in whom the gambling tendency does not manifest itself one way or another are exceedingly few and far between. Hence, of course, we are always going to have speculation, and the speculator must naturally take a chance on the future. But of all the practices which experience has shown to be prejudicial to peace, harmony, and financial success in the fruit business, dealing in distant futures takes front rank in the grand stand.

This is not a packers' meeting, so there is no call to discuss the subject from that point of view. It may be said, however, in passing, that the packer is between two fires in this matter, being liable to get in trouble either way, buying or selling, but the effect on the market to the grower is usually detrimental. It is safe to say that, one year with another in the long run, the less gamble the grower takes with his product, the better he will come out. Wait until you have something to sell; then when you know what you have to sell, both in quantity and quality, take the best price, coupled with reasonable conditions, that offers at the time buyers want to buy, and perhaps you will not get the very top of the market, but at the same time if you are dealing with honest people, and I can not impress this latter point too strongly on you, you will get the best average that your particular field of activity warrants. When conditions seem in your judgment to indicate better prices later on, of course, by all means wait. But in this connection there is an analogy with the stock market in that there are but few who are fortunate enough—luck more than judgment entering into the matter—to obtain the very highest ruling price during a season, because a market must be on the move one way or the other most of the time. When it stops going up it begins to come down, and it does not take much illustration to have a fruit-grower see that it is vastly easier to sell on a rising market than a falling one.

Produce the very best fruit your particular case warrants. Keep posted on general conditions and local tendencies. Speculate as little as possible. Be honest yourself, and see to it that you only do business with those who are. I think that sums up the requirements in approaching the aim of the fruit-grower.

PRESIDENT COOPER. The vice-presidents appointed are F. W. Power and W. A. Long. The next on the program is "Growing the Eucalyptus," by Dr. W. H. Miller.

As Dr. Miller could not be present at this session, his paper was read by the Secretary.

THE GROWING AND USES OF EUCALYPTUS.

By DR. W. H. MILLER.

The word "eucalyptus" is from the Greek, and means "well concealed," referring to the pods of the tree containing the seeds.

The eucalyptus, commonly called gum tree, belongs to the natural order *Myrtaceæ*, growing natively in Australia and adjacent islands, but now grown exotically in most civilized countries whose climates permit. There are more than one hundred and fifty species, which differ greatly in growth and quality of timber. Many are dwarfs or shrubs, while others rank among the largest and tallest trees in the world, very closely crowding, if not exceeding, our own great sequoias in magnitude. Baron von Müller, of Australia, speaks of recorded heights of over 400 feet and diameters of 35 feet. One tree furnished a log 220 feet to the first limb, 12 feet in diameter at the top and 30 feet at the base; but the growth of these trees does not warrant the opinion that they will reach such dimensions elsewhere. The native wood of all eucalypti belongs to the hardwood family, but considerable differences occur in the species as to the degree of hardness and strength—the iron barks being usually much heavier and harder than the other division, known as stringy barks. This title is given them because they shed their bark in long fibrous or stringy bands. Iron barks do not shed their bark, or do so in flakes or scales.

In answer to the most common question one hears, "What are you going to do with them?" People seem to forget that a large forest tree has its uses. If one would think a moment he will see that one can scarcely enumerate its uses. Some of them are these: this timber when sawn makes flooring equal to maple, and maple floors are worth something; when made into shingles they resemble slate and are almost as durable; the finest quality of hardwood furniture, including all kinds of inside hardwood finish; all parts of the woodwork for wagons and agricultural implements, and for building railroad coaches, and in the construction of ships.

These trees furnish also superior poles for telegraph, telephone, and electric light wires; timber for the building of bridges; piles for wharves, and railroad ties. Any railroad company will buy all you have to sell for this purpose, and farmers may use them for fence posts. Wood also is becoming higher from scarcity, and these trees make splendid wood. Every farmer should have a timber lot and raise his own wood. In fact, wherever hickory or oak is required, eucalyptus can take its place.

As a source of honey, their bloom is of great value, producing a splendid quality of honey and protecting bee men against the loss of

their broods from drought, since they are in bloom every month in the year.

As a source of oil, the leaves and twigs of the blue gum are rich. This oil in its purified form is becoming more widely used as a household remedy, as it cures many common complaints and is far safer and better than patent medicines for sores and the healing of wounds. Its antiseptic properties are excellent, being non-poisonous. The crude oil is used in steam boilers to prevent incrustations from taking place. The oils from some species are sweetly fragrant and are used for perfuming soaps.

There is no tree on the globe that gives beauty and grandeur to a county equal to these stately trees, ever green and ever aspiring. Scattered and neglected in the haphazard planting of this State as they are, to remove them would sadly blemish her beauty. It would no longer appear the comely and charming California. Go through the districts of meager forestation and judge for yourself. So, as an ornamental and shade tree; for the sheltering and protection of stock against storms and winds; it is needed for windbreaks to orchards and vineyards. It is of great value for the foresting of barren mountainsides; and in the relief from blistering suns and the modifying of climate it has no peer, marvelous and diversified as its uses are.

The most distinctive characteristic of this genus is its rapidity of growth, averaging, under favorable conditions, about 12 feet per year of wood, whose tensile strength equals the best hickory, and producing a tree in twenty years equal to an oak that required more than two hundred years to grow.

Of the seventy-five or more varieties growing in the United States, two species only have been planted in quantities for commercial purposes, and these to no great extent. They are the blue gum, or *globulus*, and the red gum, or *rostrata*. The other varieties are little known. The State and the United States governments are carrying out experiments to determine desirable varieties for recommendation, but individuals and private corporations are lending great help in this regard, and very soon proper kinds can be selected with safety, so when planting is done on an extensive scale trees suitable for climate and lumber can be secured without danger of failure. It costs to plant trees and later on to learn that the wood is not desirable or that they will not endure the climate.

The varieties we have found that will not stand the frost or heat of Kings County (and this, perhaps, means the San Joaquin Valley) are *diversicolor*, *punctata*, *cornuta*, *salubris*, *citriodora*, *maculata*, and *corynocalyx* or sugar gum. There are perhaps many more, but they have not been tried by us. Of those tried by us that have shown hardness of growth in this climate are the following (named in the order of their sturdi-

ness, common names given also when they have any): *rudis*, *robusta*, *viminialis*, *rostrata* or red gum, *tereticornis* or gray gum, *globulus* or blue gum, *crebra* or narrow-leaf iron bark, *siderophloia*, *resinifera*, and *stuartiana*.

The *rudis* has been planted somewhat extensively in this section as an avenue and shade tree, and it certainly commends itself as a shapely and hardy tree. What little investigation we have made of its wood indicates that it is most excellent, close-grained and hard, taking a fine polish. Its rate of growth seems good. It is claimed, however, that it does not maintain its early fast growth very long.

The *rostrata*, or red gum, is a grand tree. No one can make a mistake in planting it.

These two varieties for ordinary use are the best at present to plant in the San Joaquin Valley, making first-class timber, proof against frost and a delight in sunshine, can withstand drought, and thrive well in alkali soil.

The *tereticornis* we hope will prove better than either of these, growing more rapidly and much straighter than the *rostrata*, with better grain and with equal strength. The *rostrata* has a bad fault of wanting to grow crooked. This can be corrected by cutting off at the ground level when one year old, then a shoot will grow up straight and with very little loss in time. This cutting process holds good for almost all varieties. The great majority of eucalypts when cut at any age send up shoots very rapidly, reproducing themselves in much less time than was required to grow at first. So, when a plantation is once established, crop after crop may be harvested indefinitely without replanting. Young seedlings for planting in the field should be about fifteen to twenty inches high and it is best to plant not later than April. February is the best time for planting, in order that a full season's growth may be had. It enables them to withstand the severe frost that we usually have. When planted, water should be poured around them to settle well the dirt, and by irrigating them during the summer a much better growth can be obtained, although they do well in this section without watering after planting.

The *viminialis* is a hardy tree, grows rapidly and stands the climate. An example of this tree may be seen on the old Kanawyer place in Grangeville. Two years ago this tree was measured and found to be 126 feet in height, with a circumference of perhaps 20 feet. The wood, however, of this species is not of the best, nor is the wood of blue gum equal to other varieties, and this tree when young is likely to be killed by frost.

The pioneer eucalyptus man of California is the Hon. Ellwood Cooper of Santa Barbara, who is at this meeting. To him belongs the credit of delivering the first lectures and writing the first book upon eucalypt-

tus in this country, also systematically planting about two hundred acres of the different species of this tree, and I am told that it has been for a long time a source of a handsome income, although his planting was upon land not well adapted to other purposes, being mostly hill-sides and ravines. If the efforts of Mr. Cooper are taken up and continued by interested and able men, the permanent benefits to California and the Southwest will be incalculable. If the San Joaquin Valley from Tracy to Tehachapi wasavenued and blocked off with these trees, what a delightful trip it would be through it, besides yielding an income of \$2,000 per acre every six years. Indeed, how charming.

To those who may wish to plant, it is perhaps cheaper to buy the young plants from some reliable nurseryman than to undertake to grow from the seed, as it is difficult and requires special care and training to successfully grow from the seed.

PRESIDENT COOPER. The business, as laid down in the program for this afternoon, is completed. If any one has any suggestion or any remarks to make, or any discussion on any of the essays that have been read, he is now in order.

REMARKS ON COOPERATION.

MR. A. R. SPRAGUE. As there appears to be an abundance of time, I beg to say a word in connection with Mr. Rowley's paper.

I did not say anything at the time, because Mr. Rowley was very guarded in what he said about coöperation being a failure in California. Coöperation in California has had its successes, which have been continuous, and its failures, which have been almost as continuous. It would be just as ridiculous for us, having been unwise in purchasing a particular kind of engine, for instance, to therefore say that all gasoline engines are failures and we will use none henceforth and forever, as to say, after having chosen a bad method and bad piece of machinery with which to attempt to effect coöperation, and having found that it has failed, that coöperation is therefore a failure.

Now, my friends, coöperation is a success. It is not a theory. It is something which is capable of demonstration, and is being demonstrated every day in the year. The reason why we have had so many failures is because we have so many times tried to do it wrong.

MR. ROWLEY. I was not speaking of coöperation as applied to particular communities, but only as to coöperation which would include the entire coast.

MR. A. N. JUDD. I would like to hear from Mr. Newell, of the State Board of Horticulture, in Oregon.

MR. W. K. NEWELL. Mr. President, ladies and gentlemen of the California Fruit-Growers' Convention: I have been very much inter-

ested in the discussion of this question of coöperation. It is one of the most important we have confronting us now. I am surprised to hear any one question that coöperation, properly carried on, is not a success. It is true we have failed in our coöperative societies, but it generally had been because we tried to start at the top instead of at the bottom. We prune-growers in Oregon, like you in California, tried to organize the whole State at once, and could not do it. Coöperation wants to begin at the bottom instead of at the top. After we failed in that way we began at the other end of the proposition, and now we have a number of small coöperative societies in Oregon that are making a shining success. The Hood River Apple-Growers' Union is the best of any of them. It is the most widely known, and being a pioneer in that line will serve as a type. The apple-growers in the Hood River Valley found the first thing they wanted to do in coöperative marketing was to produce the apple wanted, and the marketing question was almost entirely solved. To show their great success we have got to go back and show how they grow their fruit. Every apple-grower on Hood River believes, and firmly believes, that Hood River Valley can grow the finest apples in the world. We know they can't grow any better in the United States. They preach that from the housetops and they make everybody believe it. They are now the highest-priced apples in the world. Their good work begins in the orchards. As soon as the fruit sets in the spring of the year and they find that the trees are overloaded, as they generally are, every grower goes into his orchard and begins to cut them out. They grow to full size, and we allow no codling-moth to grow between two apples and creep into both of them. That same thing is kept up, and in the latter part of August, when they are sure of the crop they will have, just how many boxes can be estimated of the different varieties and different sizes, the Hood River Union, through its manager, sends out word to every fruit dealer in the United States, every commission man or buyer of any kind in the United States, England, and Germany that they can reach, and they have a complete list of every one of them. The manager tells them what they are going to have for market this year, and then asks for bids. They formerly tried consigning them and all that sort of thing, but this year and the last two years they have called for competitive bids, and the buyers have fallen all over themselves and come from all over the United States to submit bids for that crop of apples. Their crop this year amounts to three hundred thousand boxes. This year they sold their best apples at \$3.15 a box, and prices on down, being an average of something like \$1.25 a box for the entire crop produced in the valley. The biggest dealers in the United States were bidding against each other for those apples. Those dealers know from the record of the Hood River men that every box they buy is just as good as any other, and every box

in a car is just as good as every other box. They know the apples will be of the same size and that the rows of different standards, and the number that go into a box, will be the same. Every apple is counted; every box of apples is counted. It contains so many apples according to the size, and the number of apples is stamped on the outside of the box, and there are never any mistakes about the number of apples. They allow no man to pack his own fruit. They have found, while any apple-grower on Hood River can tell when his neighbor has a poor apple, he is not quite so sure about his own. So the union hires its own packers, who are not growers, and no box of apples with the Hood River Union label on is allowed to be packed by anybody but those union packers. Every packer must put his own number on the box, so the manager of the union may know who packed that box. If any complaint is made about the packing, if the complaint comes in the second time, that packer is reprimanded, and if the third complaint comes in, he is "fired" and not allowed longer to pack.

The reason that coöperation so generally fails is when we start in to coöperate we begin to look at the market end of it and think we have got to do the whole thing—that we have got to supplant the commission men. And there is where the mistake is made. Coöperation wants to include the commission man. We can't exclude him. We can't do it all. Let the commission man know we have the fruit to sell, and ask his warmest coöperation to help us sell. The Hood River Union has no warmer friends anywhere than the commission men of the United States. They are willing to trust absolutely to their honesty in putting up the goods, and are glad in every way to coöperate with them in selling. They have no trouble any longer in selling. The only trouble is to get enough of it to supply the demand. I thank you for your attention. (Applause.)

(At this time an adjournment was taken until Wednesday, December 5, 1906, at 9:30 A. M.)

PROCEEDINGS OF SECOND DAY.

WEDNESDAY, December 5, 1906.

The Convention was called to order at 10 o'clock A. M.

PRESIDENT COOPER. The first on the list this morning is an address by F. W. Power. I introduce to you Mr. F. W. Power.

ADDRESS BY F. W. POWER, OF CHICO.

Members of the Pacific Coast Association of Nurserymen, Fruit-Growers, and Horticultural Commissioners:

It is customary to fill the President's chair with men able to entertain with either their oratory or their wit. We have listened to hearty welcomes and able addresses. I will only express my thanks for the honor you have shown me; the hearty support and coöperation of members during the past six months; and the courtesy and active aid given by the officers of the Fruit-Growers' Convention, and especially Mr. Isaac, the Secretary, who has assisted materially in making this a joint convention of all the fruit-growing interests. I further ask support during this, our fifth Nurserymen's Convention, and pardon any mistakes that I may make.

When the excuses for not attending this Convention commenced coming in from California nurserymen, in answer to various circulars and letters sent them, stating they were too busy, etc., and we all are at this time of the year if we do any business at all, I felt like giving the answer received by a politician, which you have doubtless all read. He was to speak at a meeting on a certain night, but just before the day of the meeting a heavy storm destroyed the railroad bridges. He telegraphed to a friend, "Washout on line. Can't come." He was very much surprised a little later to receive a reply, "Borrow a shirt and come anyway."

As Mr. Cooper, the Commissioner of Horticulture, has called attention to the matters needing the attention of the fruit-growers, I will confine my suggestions more especially to the nursery interests and inspection.

The past season has so far been most prosperous, and promises even better for the balance of the season, and from the present outlook there will be but little salable stock to carry over. We all come here with

friendly feelings, not only to each other, but to the Commissioners of Horticulture and fruit-growers as well. All are working along different lines to the one great end of making the Pacific Coast the greatest and best fruit-growing section in the United States.

Although up to the present we do not have written reports from all our committees, they have done much and worked cheerfully.

I have called upon several nurserymen to assist in increasing the membership and making the meeting a success, and in nearly every case they have responded cheerfully, and I am pleased to say that our membership has increased by ninety per cent since the first of July. This was not accomplished without much work, by both officers and members, and in some instances my zeal for the Association was so great that I almost, if not quite, tried the patience of some of my friends.

While this meeting is held at the most inconvenient time for nurserymen to leave their business, there is a good attendance.

We have introduced at this session the badges for members and badge book. This I am certain you will find very convenient for finding members with whom you are not acquainted. We hope to make the badge book a complete nurserymen's directory of the Pacific Coast.

The legislative committee is doing a good work. Mr. Eckert, of the Washington committee, is attempting to secure a joint conference with a like committee of the fruit-growers of that State, looking toward a revision of their law at the coming session of the Legislature. Mr. McGill, of the Oregon committee, is also busily engaged, along with others in the various states. The legislative committee should be thoroughly organized, so that all members in each State would work in harmony, and by having a good active member in each State to watch new legislation much can be done toward a more uniform inspection law. If the members of the legislative committee of each State would make it a point to meet a like committee of fruit-growers and inspectors and discuss proposed legislation, all could work in harmony when the bill was finally introduced.

The transportation committee has done little during the past six months. I have called upon one of the General Freight Agents of the Southern Pacific Company and secured data concerning carload rates. As most of you know, in the "Western Classification" the following class B rates are listed:

Car 36 feet 6 inches or less, 16,000 pounds minimum.

Car over 36 feet 6 inches and not over 45 feet 6 inches, 20,000 pounds minimum.

Car over 45 feet 6 inches, 24,000 pounds minimum.

The Southern Pacific Company makes an exception to this, making 20,000 pounds the minimum without regard to size, but allowing class C a lower rate, and in many instances 20,000 pounds class C is less than

16,000 pounds class B. The following table is prepared showing comparative carload rates:

Class B	16,000 pounds.
Class C	20,000 pounds.

From several points showing exact difference. The point selected usually being one where a nursery is located or a common point.

If the freight committee will get acquainted with the railroad officials and have facts and figures to present, they will find them, at least, open to conviction; but you must know what you want and be able to tell why you want it, and how it will benefit the railroad, and if a lower rate is asked we must be able to tell approximately how much would be shipped.

At the present time every nurseryman wanting to ship a carload over the Southern Pacific system orders the largest sized furniture car, as he must pay 20,000 pounds minimum, and I am certain that if the Southern Pacific Company would grant a 16,000 pounds minimum on small cars they would be actual gainer in amount received as carloads. Furniture cars are scarce and hard to get, while 36-foot cars can be had at nearly all times.

We can get a 16,000 pounds class B minimum on 36-foot cars if we want it, and ask for it as an Association through some officer or special committee, but could not get a promise of a 16,000 pounds minimum at class C rates. They want to know, however, that it is the wish of the Association and not of one company.

The secretary is required to do much work with no compensation, and I trust the time will soon come when our membership will be large enough to warrant our paying a small salary for this.

Representation at national associations is of great interest to our work, such as the American Association of Nurserymen (and every member of the Pacific Coast Association of Nurserymen should also join the American Association of Nurserymen); and we should also be represented at the National Association of Entomologists and Nursery Inspectors, either by a representative of our Association or through the American Association of Nurserymen.

More can be done toward uniform laws in this Association than any other, for it is there that the various State laws are discussed.

While we have never been able to agree upon a uniform method of grading stock, we should continue to work along that line, as different methods of grading are sure to cause confusion.

In the appointment of committees I would suggest that the by-laws be changed so that the president appoint the chairman of each committee, or, in one like the legislative committee, a chairman for each State, and that the chairman select the other members, as often the committee is so scattered that they can not do good work.

Like one of our most prominent horticultural writers, I "look upon the nursery business as the foundation of our fruit-growing. All trees come from the nursery and the variety of fruit planted depends very largely upon what the nursery can supply." "Fruit-growing is one of the most profitable and pleasant rural occupations," and the time should come when nurserymen, inspectors, and fruit-growers should all work in harmony. Much more good can be accomplished by all meeting together, discussing various grievances and deciding upon a method of joint coöperation, than by each of the three interests working at cross purposes, and I trust that great good may be done by this joint meeting.

PRESIDENT COOPER. Mr. W. K. Newell is the president of the Horticultural Commission of the State of Oregon, and I will ask Mr. Newell to come forward and take a seat on the platform. The vice-presidents appointed for this Convention to assist, are F. W. Power, whom you have just heard, and W. A. Long. Mr. Power will preside at the Convention this morning, and perhaps this afternoon, so I introduce to you as chairman of this Convention Mr. F. W. Power.

VICE-PRESIDENT POWER. The next paper is by Mr. S. A. Miller, of Milton, Oregon.

BENEFITS TO BE DERIVED FROM THE PACIFIC COAST NURSERYMEN'S ASSOCIATION AND THE AMERICAN NURSERYMEN'S ASSOCIATION.

BY S. A. MILLER, OF MILTON, OREGON.

Men have been, and always will be, benefited by proper intercourse, socially and commercially. No one is independent. We are all dependent each upon the other. The early history of the original thirteen states furnishes a good example of what has been accomplished by united effort. Before a compact was made and a union formed, they were all in a state of disorder; a prey to their foes at home and abroad, and without financial resources with which to carry on their own governments and prosecute a successful warfare for liberty and peace. However, after they decided to unite, a proper executive was appointed, with his necessary associates, laws formed for their government, and order established out of their confused condition. They gained the respect of their foes, and secured everlasting peace for themselves, their children, and generations which followed them. We, here to-day, enjoy the fruits of their coöperation and concert of action. We are the greatest and grandest nation on the earth to-day, because its foundation was laid upon this principle. So we, here assembled, may well seek to secure to ourselves the lasting benefits to be derived from the united effort from east to west, and up and down our coast, of every man who

is engaged in the nursery business. Our association makes it possible to organize in detail, and adopt a policy by which we shall be governed and our growth promoted. The benefits to be derived from our Pacific Coast Nurserymen's Association have hardly been realized; we are scarcely beyond the formative period in our work, and our work is large. It is well that we can have these occasions, where we can mingle together and exchange our plans and ideas. We have small need to recall the past to convince ourselves of the tasks to which we must set ourselves with determination, the accomplishment of which will secure to ourselves greater returns in our chosen calling.

The American Nurserymen's Association has entered upon certain lines of work, and some very satisfactory results are already seen. While we would prefer to be originators, not imitators, yet the work undertaken by the American Association is well worth our careful study and imitation. By the efforts of its officers and special committees, gratifying reductions have been secured in freight rates; the minimum of car lots lowered; burdensome classifications have been removed, and other concessions from the railroads secured, by having their attention called to the nurserymen's business with its needs. At their last meeting a committee was appointed to consider the advisability and ways and means of employing a commercial agent to look after the interests of the Association in the line of reductions in freight rates, lower classifications, and other matters that would affect the pockets of the members of the Association. The committee was unanimous in their decision that such a man could be profitably employed by the Association, but unfortunately the Association was without funds to pay his salary and expenses. An increase in the membership dues was made, but this will not make up the deficit. However, that this plan may be carried out, members who were present at the meeting pledged themselves to make up the deficiency. It was the belief that the burden of this deficiency should not be wholly borne by the few members who were at the meeting, but that all who will be benefited by the work that will be accomplished by the employment of a commercial agent will wish to bear a part of the expense. This work is in the right direction and will result in untold good to us all, I am sure, if it is pushed to a successful finish, and the money will be well spent. I believe this Association and its members will receive large returns from this, and we should take some action as a body, and individually, in reference to it. The work of the American Association does not as yet fully cover our field of operations, only reaching to the Rocky Mountains. This territory west of the mountains is in charge of the Transcontinental Freight Bureau, and we should take up the work with them, and secure the same concessions from it, if possible. This would relieve

us of many burdens, and be of great assistance to our work. If we can secure prompter delivery of freight shipments, avoiding vexatious and costly delays thereby, this Association will have rendered valuable assistance to its members. We can not secure this individually, but unitedly I believe we can, if it is undertaken in the proper manner and spirit.

Much benefit would accrue to our business if we would make a systematic effort looking toward more uniform legislation touching our work. Every legislative measure which has a bearing on our work should be watched. Proper action should be taken to secure such changes in existing laws as may be necessary to relieve us of burdens and losses. Your attention will be called to the need of more uniform inspection laws. We should throw our influence with the American Association, and work for a national inspection law which would remove many hindrances and costs.

The uniform grading of nursery stock would prove of great value to us. Scarcely a season passes but what some one, or all of us, find ourselves long or short on some varieties. With a proper system of grading we will be enabled to get from each other just the kind and size of stock we need, thus avoiding disappointments in shipments, and to our customers. Individually it would be slow work to bring this about, but as an association we can do it with but little effort. I do not believe this will or should lead to unifying of prices. We must work under varying conditions and circumstances. Such matters as prices must be left largely to individuals; but as we mingle here together and at our gatherings, these matters are bound to receive more or less attention, and a molding influence will be exerted in right lines. And so it will be with other matters. The exchange of experiences and ideas will be helpful. Reports as to crop conditions will enable us to relieve our wants as well as those of others, early in the season. Every man has a method and system of doing his work, and by comparison we can adopt improvements and discard cumbersome and antiquated methods. Improvement is the order of the day, and we can secure it here. It has seemed to me that a good fellowship and feeling have sprung up and been strengthened as we mingle together from time to time, and as we meet our fellow workers; if we should happen to have any differences, often a word of explanation will remove them all when we meet face to face.

This organization affords a means of mutual protection. Occasionally circumstances arise that were they to confront us as individuals we would be quite overwhelmed, but by having this Association to help fight our battles we are largely relieved of the distress and worry. The strength and backing we can give unitedly to this Association will

secure respect and consideration of our rights. Therefore, we should support it with our influence and means as needed.

This organization may aid the patron, as well as its members, by suppressing unscrupulous persons who may engage in this work. It is a duty we owe to our patrons as well as to ourselves to drive out every unfair and unprincipled man engaged in this business, either as a grower or as a dealer. Let us raise the standard, and not let it be seen among the dishonest and greedy.

A good and beneficial work could be done by having proper committees who would seek out and classify our fruits as to their adaptability commercially to the different sections; also prevent fraud and loss by testing new varieties of fruits as they are brought out, and recommend them or reject them according to their merits. Similar or worthless varieties should be weeded out and their multiplication discouraged.

Many times it seems there is little in common between the nurseryman and his patron, and much unjust criticism is aimed at us by those who are not acquainted with our work. Much uncalled-for annoyance might be avoided if we could get our patrons to keep in touch with the growth of horticultural work, and I believe we can secure their coöperation by lending our influence and support to every legitimate means which will disseminate horticultural knowledge.

The social benefits derived from our Association must not be overlooked. If we remain to ourselves, engrossed with our cares, from year to year, we soon forget there is any one else in the race but ourselves, and the selfishness we possess by nature will again control; but as we mingle together, lay our plans for mutual good and advancement, our minds are broadened, and our work takes on new aspects. We should seek enjoyment with our work, because all work and no play makes Jack a dull boy, as we all know, and doubtless have felt some time in our lives. But the rest of the adage must not be forgotten, that no work and all play makes Jack a mere toy. I do not think this has been done. I am glad for the good and substantial meetings in the past, and for this one that is, and others that are to come. However, we can not expect the full measure of good can be accomplished or wrought out during these few hours we have allotted to this work. These meetings afford opportunities to render reports and summaries of our work, which has been, or ought to be, done between times. The real work should be carried on when we go to our homes. Carry this Association and its needs around with you wherever you go, and this will make it a success, and pay larger and oftener dividends than anything else.

So in closing I will say again that the benefits we will derive from our Association will depend and be measured by the effort we put forth in its behalf; the degree in which we coöperate with and for each other, for the accomplishment of one common purpose.

VICE-PRESIDENT POWER. The next paper is by Mr. Leonard Coates, of Morgan Hill.

MR. COATES. Mr. President, Ladies and Gentlemen: The subject that has been given to me, of course, takes a more narrow and more local view than that of the speaker who has preceded me, and the more I think of it, the more appalling, almost, are the multitude of subjects which ought to be presented before a Pacific Coast Association of Nurserymen—particularly so because this is the first time we have met together. Our interests as a coast association are identical in many ways. At the same time, our conditions—physical conditions—in California are so different, particularly in this great central valley and the southern part of the State, that many subjects would have to be more or less localized. I shall only make a few remarks and they will be generally local, as will be indicated by the subject.

THE NURSERY BUSINESS IN CALIFORNIA; ITS PRESENT NEEDS AND FUTURE POSSIBILITIES.

BY LEONARD COATES, OF MORGAN HILL.

In speaking briefly on this subject, I am strongly tempted to indulge in retrospection, for, while the "present needs" is a difficult phase to treat of, and one on which there would be many opinions, the "future possibilities," while almost limitless, are also largely imaginary. It becomes almost necessary, in fact, to allude to the past, that a more comprehensive view of the whole may be obtained. By this I do not mean to inflict upon the members of the Association a sketch of the early nursery ventures in California, although I have abundant data therefor, having had occasion, some years ago, to search all known records. These data now, in view of the destruction of the San Francisco libraries by fire, have, however, an added value.

All of the earliest nurseries were located near the Bay of San Francisco, or its branches, or along river banks near to tide water. It did not seem possible that elsewhere trees or plants could be grown, in a climate where no rain fell for six months at a time. Perhaps I may select four names as typical of our California pioneer nurserymen without detracting from the honored memory of others equally deserving: B. S. Fox, John Lewelling, James Shinn, John Rock. The work of these men lives on, and, as an instance of their enterprise, it is worthy of mention that in 1859 B. S. Fox had in his nursery in Santa Clara County 263 varieties of apple, 324 of pear, 89 of peach, 71 of cherry, 56 of plum, 14 of nectarine, 18 of apricot, 21 of currant, 86 of gooseberry, 12 of raspberry, 122 of foreign grapes, 21 of fig, etc.

In 1858 W. C. Walker of San Francisco exhibited 264 varieties of ornamental plants in pots, and about the same time A. B. Smith of Smith's gardens, Sacramento, was propagating fruit trees on a large scale, and also demonstrating the profit in growing fruit in those days, the crop from two of his peach trees netting him in one year \$326.50.

It is well to look backward, occasionally; our own achievements are sometimes dwarfed by comparison with those of others who have preceded us, and whose work has been accomplished under so-much greater difficulty. These early pioneers in the nursery business in California attained success without the aid of railroads or any regular hired labor. California was then a wilderness, being gradually peopled by adventurers drawn here by the gold excitement of '49 and '50.

We have learned—or might have learned—many lessons from the experiences of the pioneers, and still we know but little.

PRESENT NEEDS.

The nursery business in California needs, first, and more than anything else, just such men as those I have named. We want not only men who are skilled horticulturists, but shrewd men of business, who ought to be able to see something of what the future has in store. Compared with nurseries in the Western, Southwestern, and Eastern states, our largest concerns here are but pygmies. It may be said that demand alone will create the supply. In a sense this is true; but supply also, and the naturally accompanying advertising, creates demand. There are many ways by which the nursery business in California might be augmented. Why is it that Eastern firms can do such an enormous mail-order trade, and we can not do it here? We grow the seeds here, wholesale them East, and let the California public buy them of the Eastern houses, to plant near where they were grown. The retail market of the United States is ours, or a good share of it, for seeds, and also, in time, for bulbs. These latter are being grown successfully, and it only requires a knowledge of the necessary conditions, and an application of that knowledge, to insure success with all branches of commercial bulb culture in California.

Must we "look backward" again, some fifty years, to be reminded of the "incredible anomalies" of the California climate? In 1857 Dr. Horace Bushnell in *The New Englander* said: "Whoever wishes, for health's sake, or for any other reason, to change the scenery or the objects and associations of his life, should set off, not for Europe, but for California. * * * It can not be said of California, as of New England, or of the Middle States, that it has a climate. On the contrary, it has a great multitude of them, curiously pitched together, at short distances, one from another, defying, too, not seldom, our

most accepted notions of the effects of latitude and altitude and the defenses of mountain ranges. * * * All the varieties of climate, distinct as they become, are made by variations wrought in the rates of motion, the courses, the temperature, and the dryness of a single wind, namely, the trade wind of the summer months, which blows directly inward all the time, only with much greater power during that part of the day when the rarefaction of the great central valley comes to its aid, that is, from ten o'clock in the morning till the setting of the sun. * * * When this is fully comprehended, the California climate, or climates, will be understood with general accuracy. We now return to the middle strip of the great valley, where the engine, or rather boiler power, that operates the coast wind in a great part of its velocity, is located. Here the heat, reverberated as in a forge or oven—whence *Cali-fornia* (*Caleo* and *fornan*)—becomes, even in the early spring, so much raised that the ground is no longer able, by any remaining cold there is in it, to condense the clouds, and rain ceases. * * * So, crossing the Sonoma Valley, he would come out into it from the west, through a cold, windy gorge, to find orange trees growing in General Vallejo's garden, close under the eastern valley wall, as finely as in Cuba. In multitudes of places, too, on the eastern slopes of the mountains, he will notice that the trees, which have all their growth, in the coast-wind season have their tops thrown over like cocks' tails turned away from the wind. This cold trade wind, being once lifted or drawn over the sea-wall mountains, and being specifically heavier than the atmosphere into which it is going, no sooner reaches the summit than it pitches down as a cold cataract, with the uniformly accelerated motion of falling bodies. * * * The winter climate is the trade wind reversed."

These "climates" of California constitute our most valuable asset. It is because of this that it is no idle statement that nowhere else in the world, in the same area, can be successfully grown so great a variety of crops as in the State of California.

Many carloads of trees are shipped into California, but when did we hear of a carload being shipped out of the State? "California" is the name which sells fruits all over the length and breadth of the land. Why is it not likely that thousands of planters would like California-grown trees if they could get them? New Jersey and New York nurserymen grow hundreds of thousands of roses annually in California for their Eastern trade, because in eight months they can get a better plant than they can there in two years. For more than half a century seed and bulb collectors from Europe and the Eastern states have been searching California for new species, and supplying nursery firms and seedsmen all over the world. Why can not these

native seeds and bulbs be cataloged and advertised extensively in the United States and abroad in order to work up a direct trade with the planter? Or why can not these native plants, shrubs, and trees be grown extensively for retailing outside of our State? You will, to-day, find in the parks and private grounds of people of refinement in Europe more specimens and a larger variety of California trees and shrubs than can be found at home.

We need a more fraternal spirit, and the calling of this meeting of the Pacific Coast Nurserymen's Association is, I hope, a means to this end. Not only is there ample room for all now engaged in the business, but room for many more, of the right kind. We must sink all petty jealousies and suspicions, let our views be broadened, and let us be ready to "live and let live." There are many other "present needs," general and local. Of the latter, a wholesale nursery for the growing of apple, pear, cherry, and plum seedlings is badly wanted; we are still in that extravagant spendthrift stage when we continue to send money away for what we can produce at home.

I would prefer to deal with hard facts rather than to plunge into the realm of prophecy and let the imagination run riot in an attempt to portray the "future possibilities" of the nursery business in California.

And yet they have already been hinted. Give us more men of enterprise and horticultural ability, give us better transportation facilities, give us a parcels post, and there is practically no limit to the growth of the nursery business in California.

VICE-PRESIDENT POWER. The next paper is "European Methods," by Mr. J. R. Pilkington. Mr. Pilkington is not present, and I believe has not sent his paper. We will, therefore, pass over to the paper on "Fruit Varieties," by Prof. E. J. Wickson.

FRUIT VARIETIES MOST POPULAR ON THE PACIFIC SLOPE.

BY PROF. E. J. WICKSON, OF BERKELEY.

It was my privilege to prepare a paper for the Convention of the American Nurserymen's Association held in Texas, in June, 1906, on the "Specific Requirements of New Varieties in California Fruit-Growing." In order to ascertain what changes in the characters of varieties would, in the opinion of the growers, be desirable, it seemed advisable to ascertain first which of the existing varieties are most satisfactory to them and what specific modifications would enhance their value from a grower's point of view. For this reason I requested my correspondents to name their best varieties of the different fruits and to use them as standards in describing desirable variations. One

result of this inquiry was a fuller designation of the most popular old varieties than had been secured hitherto. When I received the invitation to prepare something for your meeting, it occurred to me that I could compare the growers' conclusions as to the varieties best for planting with the nurseryman's conclusions as to varieties which he considered best to propagate for sale, and in this way approach the popularity of variety from two points of view. To accomplish this I mailed letters of inquiry to Pacific Coast nurserymen so far as I could secure their addresses, stating to them the varieties of each fruit which had been approved by California planters, and asking them to mark them in the order in which they ranked in their trade and to add others which deserved mention. I received very gratifying response to this request, and the tables I present herewith show the result of a very voluminous correspondence. When the reports were taken up it clearly appeared that it would be of little use to consider the Pacific Coast as a whole, but to make lists for the different states, because varieties had such limited range in some cases. Of course the lists should not be made for states which are merely geographical divisions without regard for regional characteristics, but the attempt to group in regions of similar climatic conditions was impossible without taking more time than was available. It is also obvious that many nurserymen sell stock in all these regions and, therefore, a subsequent inquiry as to regional adaptations and demand is desirable. I hope to pursue that at another time.

The present showing is, therefore, valuable only in a general way and chiefly for the light it throws upon the trade in trees, although it will be found to have clear indications of important pomological inquiries to be subsequently taken up as to why certain varieties are high in one place and low in another. Some cases of this kind are easily explained, such as the precedence of American grapes over the vinifera varieties in the northern portions of the coast, but even these vinifera varieties have a place, because some localities favor them. A more puzzling proposition is the popularity of the Moorpark apricot at the north. This variety stands even lower in California than the tables indicate, because of shy bearing, but in some interior regions at the north it is said to be more trustworthy, which may be explained by climatic conditions which give it more definite periods of dormancy and growth. This is a matter which is as yet purely conjectural and needs to be inquired into. There are many other similar studies to be made of the behavior of varieties of all fruits, both from cultural and commercial points of view. All that I can do now is to thank the nurserymen who generously gave their time to the inquiry I undertook, and to present to them the preliminary results thereof which the tables embody.

APPLES.

<i>California Growers.</i>	<i>California Nurseries.</i>	<i>Oregon.</i>	<i>Washington</i>	<i>Utah and Idaho.</i>
Newtown Pippin	Newtown Pippin	Newtown Pippin	E. Spitzenberg	Gano
Bellefleur	Bellefleur	Jonathan	Newtown Pippin	Jonathan
W. W. Pearmain	Red Astracan	Gravenstein	Gravenstein	Rome Beauty
Gravenstein	W. W. Pearmain	E. Spitzenberg	Baldwin	Yel. Transparent
R. Astracan	Gravenstein	W. W. Pearmain	Jonathan	Ben Davis
R. I. Greening	R. I. Greening	Red Astracan	King	Winesap
E. Spitzenberg	Red June	Arkansas Black	Rome Beauty	W. W. Pearmain
Missouri Pippin	Jonathan	Rome Beauty	Oldenberg	Newtown Pippin
W. Astracan	E. Spitzenberg	Winesap	Yel. Transparent	Arkansas Black
Red June	Ben Davis	Wagner	Wealthy	Wealthy

APRICOTS.

Royal	Royal	Royal	Royal	Moorpark
Blenheim	Blenheim	Moorpark	Moorpark	Royal
Moorpark	Hemskirke	Tilton	Blenheim	Blenheim
Hemskirke	Tilton	Blenheim	Hemskirke	Hemskirke
Peach	Moorpark	Peach		Peach
Newcastle	Newcastle	Hemskirke		Acme
Tilton	Peach	Newcastle		

CHERRIES.

Royal Ann	Black Tartarian	Bing	Royal Ann	Royal Ann
Black Tartarian	Royal Ann	Lambert	Bing	May Duke
Black Republican	Bing	Royal Ann	Lambert	Early Richmond
Rockport	Black Republican	Purple Guigné	Black Tartarian	Black Tartarian
Bing	Early Richmond	May Duke	Black Republican	Black Republican
Chapman	Chapman	Black Tartarian	May Duke	Bing
Purple Guigné	Governor Wood	Black Republican	Early Richmond	Lambert
May Duke	Rockport	Governor Wood	Centennial	English Morello
Centennial	May Duke	Centennial	English Morello	Windsor
Black Bigarreau	Lambert	Chapman	Late Duke	Montmorency
Lambert	Knight's Early	Knight's Early	Governor Wood	Governor Wood

GRAPES.

Muscat	Muscat	Concord	Niagara	Concord
Tokay	Tokay	Delaware	Concord	Muscat
Cornichon	Cornichon	Niagara	Delaware	Tokay
Thompson	Emperor	Muscat	Moore's Early	Black Prince
Emperor	Malaga	Tokay	Muscat	Niagara
Malaga	Rose of Peru	Black Hamburg	Tokay	Black Hamburg
Rose of Peru	Sultana	Black Morocco	Malaga	Rose of Peru
Zinfandel	Zinfandel	Isabella	Rose of Peru	Sweet Water
Black Morocco	Mission	Campbell's Early	Sweet Water	Black Ferrara
Sweet Water	Thompson	Rose of Peru	Campbell's Early	Campbell's Early
Verdal	Black Morocco	Worden	Agawam	Delaware
Carignane	Mataro	Moore's Diamond	Black Hamburg	Rogers
Black Prince	Black Hamburg	Moore's Early	Moore's Diamond	Moore's Early
Alicante	Sweet Water	Agawam		Worden
Sultana	Black Prince	Black Prince		

PEARS.

Bartlett	Bartlett	Bartlett	Bartlett	Bartlett
Winter Nelis	Winter Nelis	D'Anjou	Winter Nelis	Seckel
Seckel	Seckel	Winter Nelis	Clapp's Favorite	Barry
Easter	Winter Bartlett	Flemish	B. Hardy	D'Anjou
Du Comice	Easter	Du Comice	Winter Bartlett	Winter Nelis
Coyenne D'Ete	Barry	Seckel	Seckel	Keiffer
Clapp's Favorite	Du Comice	Easter	Easter	Flemish
Glout Moreau	B. Hardy	Clapp's Favorite	Clairgeau	Easter
Barry	Madeline	Winter Bartlett	Flemish	Du Comice
Comet	Clapp's Favorite	Clairgeau	Keiffer	Clapp's Favorite

PEACHES.

California Growers. California Nurseries. Oregon.

Muir	Muir
Phillips	Phillips
Salway	Tuskana
Lovell	Lovell
Early Crawford	Elberta
Tuskana	Foster
Foster	Early Crawford
Elberta	Salway
Late Crawford	Orange Cling
Orange Cling	Late Crawford
Susquehanna	Heath
Nichols	Alexander
Sellers	Sellers
Lemon	Hales
St. Johns	Susquehanna
Henrietta	Nichols
Mary's Choice	St. Johns
Hales	Triumph
Alexander	Wheatland
Heath	Strawberry

Elberta
Muir
Salway
Early Crawford
Late Crawford
Foster
Alexander
Triumph
Susquehanna
Phillips
Mary's Choice
Heath
Wheatland
Lovell
Orange Cling
Lemon Cling
California Cling
Globe
Tuskana
St. Johns

Washington.

Elberta
Early Crawford
Muir
Phillips
Alexander
Hales
Triumph
Foster
Tuskana
Late Crawford
Susquehanna
Sellers
Heath
California Cling
Briggs's May
Charlotte

Utah and Idaho.

Elberta
Foster
Early Crawford
Late Crawford
Orange Cling
Triumph
Utah Orange
Globe
Alexander
Muir
Salway
Sellers
St. Johns
Hale's Early
Heath
Wheatland
Chair's Choice
Carman
Willett
China Cling

PLUMS.

Wickson
Hungarian
Kelsey
Yellow Egg
Tragedy
Washington
Satsuma
Burbank
Jefferson
Climax
Grand Duke
Clyman

Wickson
Burbank
Hungarian
Kelsey
Climax
Green Gage
Yellow Egg
Satsuma
Tragedy
Blue Damson
Jefferson
Washington

Peach
Bradshaw
Green Gage
Cherry
Yellow Egg
Burbank
Coe's Golden
Blue Damson
Hungarian
Wickson
Maynard
Washington

Bradshaw
Peach
Hungarian
Yellow Egg
Washington
Coe's Golden
Burbank
Green Gage
Columbia
Climax
Duane

Hungarian
Yellow Egg
Satsuma
Peach
Bradshaw
Burbank
Wickson
Jefferson
Grand Duke
Coe's Golden
Blue Damson
Green Gage

PRUNES.

French
Imperial
Sugar
Giant
Robe de Sergent
Silver
German
Silver
Splendor

French
Sugar
Imperial
Robe de Sergent
Silver
German
Italian
Giant

Italian
French
Sugar
Silver
Imperial
Giant
German
Splendor

Italian
French
Sugar
Silver
Imperial
Giant
German
Tennant

Italian
German
Silver
French
Sugar
Giant

VICE-PRESIDENT POWER. Up to the present address, we have not had any discussion, because the papers are of a strictly nursery proposition, and we intend to have a side meeting to-morrow where we can discuss our troubles; but this paper is of interest to all, both fruit-growers and nurserymen, and if there are any remarks or any questions, we would be pleased to have them now. If there are no questions, we will proceed with the next paper, "Introductions at the Plant Introduction Garden of Possible Interest to Nurserymen," by Prof. P. H. Dorsett. It gives me great pleasure to introduce Professor Dorsett to the audience.

INTRODUCTIONS AT THE PLANT INTRODUCTION GARDEN OF POSSIBLE INTEREST TO NURSERYMEN.

By PROF. P. H. DORSETT, OF CHICO.

Since the location of the United States Plant Introduction Garden at Chico, California, in April, 1904, a vast amount of material in the form of seeds, bulbs, plants, scions, buds, and cuttings from this and other countries has been received and cared for. Quite a few of these, even in so short a time, give promise of commercial value. In the limited time that I am supposed to occupy with this paper I can but briefly discuss some of the more promising introductions that are of possible interest to nurserymen.

The Pistache.—Since the distribution last season of something over 16,000 seedlings, embracing varieties from Smyrna, Algeria, Sicily, Sahara, Syria, northern Syria, and southern France, we, as well as the officials at Washington, have received numerous inquiries concerning the trees, their fruit and their possibilities. Last spring we received scions and seeds of *Pistacia sinensis* from our explorer, Mr. Frank N. Meyer, which were collected by him in the Wei Tsan mountains near Peking, China. We will distribute this season between 16,000 and 20,000 young trees of the following varieties: *Pistacia vera*, *P. atlantica*, *P. mutica*, *P. terebinthus*, and *P. sinensis*. There are several other varieties that the officials at Washington are making every effort to secure and we hope to add these to our list by the end of another season. The distributions that have and will be made are being used in an experimental way by the Department officials as feelers, to determine the possible range of their successful growth. When this has been accomplished, the Department will assist those whose trees show promise of success in securing scions and buds of the best commercial varieties for budding and grafting on the young trees already established. Two and one half acres at the garden will be planted to varieties of pistache now on hand. This will be added to from time to time as other varieties are received. This planting will form a basis for scientific experimental work. Prof. S. C. Mason, formerly Horticulturist at the Kansas College and State Experiment Station, who is now with the Bureau of Plant Industry, will have immediate charge of this work, acting under instructions from Dr. Walter T. Swingle, in charge of Plant Life History. Dr. Swingle has devoted the greater part of six to eight years in studying the conditions of this industry abroad. He has now in course of preparation a bulletin dealing with this subject. In a recent conference with him in Washington relative to the success of this work at the garden, and its possibilities to the country, he spoke with enthusi-

asm and with the greatest confidence in the Department being able to establish this industry in the United States. (Samples of seed and a photograph shown.)

The Fig (Ficus Species in Variety).—This, though by no means a new introduction or industry, is receiving considerable attention at the hands of the Department officials. Our permanent plantings, after this season's work has been completed, will result in our having in the collection 127 named varieties, which will be added to from time to time. Efforts are now being made to secure specimens of a number of other varieties known to exist in far distant lands. Such a collection, under Government control and utilized by trained scientists, with no other object in view than the accumulation of knowledge and the improvement and production of varieties having commercial value, should result in great good to the industry. To-day fig culture is one of the infant industries of California, and our present knowledge relative thereto is more or less limited. This, however, surely can not long continue with a fruit so well adapted to the numerous wants of man. It is therefore reasonable to expect that, within a comparatively few years, this will be one of the most important horticultural industries of the State.

The Tung Shu (Aleurites Sp.), or Wood Oil Tree.—The wood oil tree, from the nuts of which the nut or wood oil of commerce is made, is a native of China, where, on account of its stately appearance, green smooth bark, large leaves, and spreading branches, it is styled the "National Tree of China." The seed from which the trees we have at the garden were grown, was sent us by Mr. L. S. Wilcox, at that time Consul-General at Hankow, China. The tree has a wide distribution in China, and will possibly succeed in sections of this country where there is sufficient moisture and the temperature does not go below 20° F. There appears to be several varieties of this tree. However, it is from the nuts of the Tung Shu that the greater portion of the exported oil is produced. In good soil with sufficient moisture the tree is reported to make ten feet of growth in a single season. Some of our trees made fully eight feet of growth the past season.

The trees are reported to begin bearing in from three to six years, and to continue in bearing for about ten years. The average yield of nuts is given as 20 to 50 pounds per tree, depending somewhat upon the location and treatment. The yield of oil is about forty per cent. The importations into the United States are annually increasing. "A good many thousands of barrels of this oil are annually being used by the varnish-makers of this country, and its consumption is on the increase."

The price ranges from 6½ to 10 cents a pound f. o. b. New York. The oil runs about 8 pounds to the gallon. The following letter from the O'Brien Varnish Company, of South Bend, Ind., bearing date of June 1, 1906, is of interest in this connection:

We have your esteemed favor of the 26th ult. enclosing photograph of the wood oil trees that have progressed with you, and we are certainly pleased to have this photograph. We have not yet heard from our friend Mr. Clawson, in Cuba, as to how his plants did during the winter months, but we have no doubt that they went through as well as yours.

We are interested to learn now if any one is figuring on growing these plants. We are prepared here to separate the oil from the nut, and should there be any one experimenting along these lines we should be glad to give him the benefit of our experience, or if you will allow yours to grow enough to produce nuts we will be glad to have some of these and will press some of the oil from them.

Yours truly,

THE O'BRIEN VARNISH CO.

It would seem that there is a possibility that this may develop into an American industry. (Photograph of seedling trees and samples of nuts shown.)

The Carob, or St. John's Bread (Ceratonia siliqua).—While this is by no means of recent introduction, it is a tree worthy of more careful thought and consideration, besides being one of our most handsome evergreen ornamentals. Its fruit is of considerable commercial importance as a stock food. The following extract from a letter of recent date, from Blanchford's Calf Meal Factory, located at Waukegan, Ill., addressed to Mr. David Fairchild, Agricultural Explorer in charge of Foreign Explorations, U. S. Department of Agriculture, is not only interesting, but illustrates to a certain extent the commercial possibilities of this as an industry:

With reference to the commercial value of the pods, they are very fine for cattle feeding and for calf feeding, being very sweet and nutritious and much liked by all domestic animals. We can pay \$40 per ton for the carob beans, f. o. b. Waukegan, Ill., in 50 or 100 ton lots. In this connection I would say that we shall have to establish a factory for our products on the Pacific Coast, as the freight rates there have been very high, although they have been slightly reduced lately, in which case, of course, there would not be very much freight from the grower to the factory, which most likely would be located at Portland, Seattle, or Tacoma, and they could come up there by boat from Los Angeles, San Diego, or Santa Barbara.

Dr. Franceschi, of Santa Barbara, states that the carob tree was introduced into southern California many years ago, and that specimens are to be seen in many places growing much more rapidly than in their native habitat, and that some of them are bearing very profusely. (Sample of carob meal shown.)

The Yang Taw (Actinidia Sp.).—These plants, referred to and discussed to some extent in my paper read at the thirtieth annual meeting of the California Fruit-Growers' Association, December, 1904, have

made a fine growth and appear to be at home with us at Chico. However, the plants have not yet flowered and set fruit. We hope for these results the coming season. In addition to their possible value for producing a new commercial fruit, they give promise of being a fine ornamental vine. We have several hundred young plants on hand for distribution this season. (Samples of fruit and pot plant shown.)

The Olive.—We must all admit that the olive industry is not what it should be or what we should like to see in California. That mistakes in many of our earlier planted orchards were made, both in not planting suitable varieties to produce the desired results, and in planting in unsuitable locations, possibly can not be questioned. I feel, and I believe that the officials at Washington concur with me in this feeling, that there is a bright future ahead for the olive industry in California. We are now assembling at the garden specimen plants of the best varieties, preparatory to placing a specialist in charge of the work, to determine not only the best pickling and oil sorts, but also their adaptability to our soil and climatic conditions and, if necessary, secure new varieties by breeding and selection that will give us the desired results. One of the varieties recently received at the garden, and of which we are now engaged in getting up a stock of plants, deserves special mention. It is the *Chemlali* olive, "an old variety extensively grown around Sfax on the coast of southern Tunis, and is interesting as being probably the variety that is grown under the most arid conditions of any in the world." The trees are planted 80 feet apart, and after being established, are never irrigated, although the normal rainfall is only 6 to 10 inches. "This is the most conspicuous example of dry land agriculture applied to a tree crop of which we have any knowledge." The trees are reported to bear heavy crops of small fruit that is extremely rich in oil. (Photograph of orchard shown.)

The Original Peach (Persica Sp.).—Seed secured from a tree about 40 feet high in the German Legation grounds, at Peking, China, reported to be a beautiful ornamental. The seedling trees have done well with us, and in addition to its value as an ornamental, it may make a valuable stock. It might be used to advantage in breeding.

Sweet Kerneled Apricot, or So-called Chinese Almond (Prunus Sp.).—This is considered a fine little nut by the Chinese. They eat them salted, after soaking to remove the skin. The nut may have a commercial value with us and the seedling trees, which appear to be well adapted to our conditions at Chico, may prove valuable for stocks. (Kernels shown.)

The Bitter Kerneled Variety, or What is Known as the Second Quality.—This is said to be a special strain of apricot, only grown for its seed. Kernels of this importation were recently sent to Dr. R. H. True,

Physiologist in Charge of Drug and Poisonous Plant Investigations, to be tested. In his reply to Mr. David Fairchild, bearing date of November 15, 1906, he says:

Mr. Rabak, of this laboratory, has determined the prussic acid content of the apricot seeds; S. P. I. 17845, collected by Mr. Meyer in China. The crushed seeds were distilled into potassium hydrate or caustic potash solution as long as there was evidence that hydrocyanic acid was passing over. The test, made in duplicate, showed the presence of 5.509 per cent hydrocyanic acid. The bitter almonds yield about 0.25 per cent of hydrocyanic acid with one per cent of volatile oil. Although the use of apricot kernels as a source of hydrocyanic acid is a matter of current knowledge, still I find no citation of the per cent of this substance present in the literature available.

It is to be noted that these seed yielded 5.25+ per cent more hydrocyanic acid than the bitter almond. There is also a possibility that it may even exceed that of the commercial apricot pits, which within the past few years have come to be quite a source of revenue to the growers. Further experiments are necessary to determine the value of these introductions. (Kernels shown.)

Apple Scions (Pyrus Sp.).—These were secured at Shanghai, China. Mr. Meyer speaks of this introduction as "a greenish, white apple. The tree has an utterly different look from any apple I saw. May be a different species." These trees are too young to note any striking peculiarities at this time.

The White-barked Pine (Pinus Sp.).—Seed of this pine was received from Mr. Meyer, who secured them in the Wei Tsan mountains, near Peking, China. The tree is spoken of as a most beautiful pine, with silvery white bark, a slow grower, but extremely striking when old. The bark peels off in patches like the sycamore. The foliage is not as dense as in other pines. A fine tree for cemeteries and for dignified places. (Photograph shown.)

Thysanolaena agrostis.—This is an ornamental flowering cane, seed of which was secured in the garden of Poonah, India, by Mr. Barber Lathrop. This plant has done well with us and may prove a valuable addition to our list of ornamentals for the warmer parts of the United States. (Photograph shown.)

Globular-Headed Willow from China (Salix Sp.).—This is described as a remarkable willow, which forms naturally a dense, flat, globular head. "Extremely well fit to be planted as solitary specimens or in clumps in large grounds, where they can be observed from a distance, for at close range they are somewhat stiff in outline." These have made a good growth at the garden the past season. A nurseryman visiting the garden was attracted by the long slender limb growth of this, and suggested that with proper treatment it possibly would make a valuable tying willow. (Photographs of old trees shown.)

Time will not permit of my mentioning hundreds of other valuable introductions that we are growing at Chico. To-morrow Mr. Roland McKee will address the Fruit-Growers' Convention upon the immediate value of the Plant Introduction Garden to the State of California. Mr. McKee will deal more in detail with the work at the garden in general, our aims and desires. We are here, if possible, to aid and not to hinder legitimate private or public enterprises. We need and want your support and coöperation, and we extend to you one and all a most hearty invitation to visit the garden at any time to inspect our methods and the material we have on hand.

RESOLUTION RELATIVE TO PARIS GREEN.

PROF. C. W. WOODWORTH offered the following resolution referring to paris green, which was referred to the Committee on Resolutions:

WHEREAS, The present law relative to paris green has resulted in a great improvement of the quality of this insecticide on the market in California, to the advantage of the fruit-growers of the State; and

WHEREAS, This substance is becoming less important and the markets are being filled with lead arsenate and many other insecticides, for the control of which the present law makes no provision; and

WHEREAS, The general fertilizer control law has proven very useful and acceptable to both grower and manufacturer; therefore, be it

Resolved, That this joint convention of horticulturists, nurserymen and horticultural commissioners urge upon our Legislature the enactment of a general insecticide control law similar to that now operating for fertilizers, and in addition that they make provision for the scientific study of the nature and operation of the various insecticidal substances.

REPORT OF COMMITTEE ON GOVERNOR'S ADDRESS.

The committee having under consideration the Governor's address, here introduced the following report:

We, your committee to whom was referred the Governor's able address in presenting the plan of taxation as approved by the Commission on Revenue and Taxation, do hereby make the following report:

Resolved, That this State Convention of Fruit-Growers do hereby indorse the plan of taxation proposed by the Commission on Revenue and Taxation created by the last State Legislature, and we do hereby request the next State Legislature to take the necessary steps to put said plan in operation.

JOHN TUOHY.
JOHN MARKLEY.
A. SBARBORO.

A MEMBER. I move the Convention accept the report of the Committee on Governor's Address, and pass the resolution.

MR. JOHN DORE. I wish to second that motion. The Governor has outlined a broad plan for a most radical change in the revenue laws of our State, and has given us the result of his study and investigation during his term of office.

Among the states he investigated was my former home, Wisconsin, which stands among the foremost. There they made an abstract of the revenue laws of the State and of other States, and they were able to tell us in an instant how much revenue was derived from the sale of beer; how much from the street railroads, and a few other things which I will not enumerate. This information was all systematized and tabulated so that in a moment the committee could give us the information as to the different States. The Governor had these things from which to draw his conclusions.

One word in regard to Wisconsin. In that State for many years there has been no tax upon the assessed property of the State for the purposes of State revenue. The entire expense of the Legislature and all departments of the State government and all the State institutions is collected largely from the public-service corporations. Not only this, but under the incessant and never-ending and tireless work of that matchless man, the Governor of that State, they have gone beyond the returns, so to speak, and have investigated the reports of the railway companies and insurance companies and other organizations that, under the law, were compelled to make sworn statements of their incomes, upon which they base their pro rata of tax or license for the support of the State government. They have found that those reports for a series of years were in truth much less than they should have been. They have gone back and collected large sums of money, reaching up to the millions, from the corporations in that country. And what else? They have in process of construction, or reconstruction, a new State capitol which will cost several millions of dollars, without one cent of tax upon the property of that State—the assessed property of that State—for that purpose. (Applause.) Not only this, but in the last campaign both the Republican and Democratic parties had in their platforms what they were going to do with the surplus money that was coming in from that source in that State. They decided that it should be used for the building of roads in the different counties of the State, and that the State would contribute some of this surplus money it had after doing all these things, after supporting the State institutions, and after the completion of the capitol, and after doing this work, for that purpose.

Now, the State platforms in that State mean something to-day. And why? Because they have a direct primary law, and under that law the members of the State Legislature, the candidates for the State Legislature and for the State offices, after they have been nominated through the direct primary, come together and form a convention, and that convention of that party, and of each party, makes the platform for that campaign and for that year in that State. Then they have to make good if they are elected. And both parties in their platforms this

year have pledged to the people of that State an expenditure of a portion of this unexpended and unneeded money for the construction of highways.

I only mention these things to show what is being accomplished in one State under a state of finance similar to that which the Governor has recommended. The work of the commission for the last two years has been patterned on that system, and I say to you that the farmers and the fruit-growers and all the citizens of California will have a wondrous change in their system of taxation that will be very agreeable to us all if we will adopt this resolution. And not only that, but now and ever, until we get it, work for the reform outlined.

MR. JOHN TUOHY. As one of this committee, I thank Mr. Dore for his very forcible address. I think the matter should not go without discussion. If there is anything to be said upon the subject, I would like to hear it before this intelligent assembly. But the Governor, and the other members of the commission, have given it such careful consideration, and they have come to such reasonable conclusions, that we believe this Convention of Fruit-Growers, as it is entirely in their interests, is in duty bound to favor the new plan of taxation. I believe we can not pass it without some expression of our approval. I believe it will be a great mistake to do so. The commission has presented to California the means of adopting the most advanced revenue law in the United States. I indorse everything Mr. Dore has said. (Applause.)

MR. ARTHUR BRIGGS. I want also to second the motion, but I would like the gentleman who framed that to go a little farther with it. I don't like to make any amendment to it, but I think it should go farther. This paper presented by Governor Pardee is one full of information and should be used for education. (Applause.) I would like to have the framer of the resolution, or the one who offered the motion, to accompany it with a statement that this address of the Governor shall be put in pamphlet form so that every member of this Convention shall be able to draw on the Secretary of the Horticultural Commission for the number of copies that he would like to distribute throughout the State. I make that suggestion. (Applause.)

MR. JOHN MARKLEY. Mr. Chairman, I would like to state that the Commission on Revenue and Taxation is now publishing their plan. It will be published in pamphlet form by the State, and anybody that wants a copy of it can get it. That is one reason why we did not include in the resolution that it should be published. It would simply be making a second publication of the same thing.

SECRETARY ISAAC. Mr. Chairman, I will explain, for Mr. Briggs's edification, that the entire proceedings of this Convention will be published in book form immediately after the Convention, and

everybody who is present will receive a copy of it, including the Governor's address.

MR. BRIGGS. I am perfectly aware of that; but that will be a cumbersome document, and to send out 10,000 of those through the State is not only cumbersome but expensive, and therefore I suggested that this be put in pamphlet form so that we could send them freely and generously whenever we were so disposed. I still hope that my suggestion will have weight, because I believe these should be distributed very much more generally than they will be distributed if we wait for the pamphlet published, as it has been suggested by the Secretary.

MR. JOHN MARKLEY. It will be published in a few days by the commission and ready for distribution—very much earlier than any pamphlet could be. The publication will cover all the ground.

MR. DORE. As a member of the committee, I most heartily approve of the suggestion that the Governor's address be published for the benefit of the fruit-growers of California. If it is in a pamphlet, it can be placed in the hands of the people of this State, and that may incline some of them to seek this larger document and graduate in this revenue system. But first we want them to take the condensed statement that the Governor gives. We want it placed in the hands of the voters of California to let them understand the question. Both parties are pledged to a direct primary law in California. If we get that, we have got the law, and we will be able to vote for the things we want.

MR. TALENT. I second the motion made by this gentleman to publish the Governor's address. I would be glad to see that go in as an amendment.

VICE-PRESIDENT POWER. I would like to know if that can be adopted in the report, or is an amendment necessary?

MR. BRIGGS. I have not made any amendment or motion.

MR. JOHN MARKLEY. Do you agree, Mr. Tuohy, that the Governor's address can be published?

MR. TUOHY. I do, for the reason that the report published by the commission would be voluminous. It would not be handy to distribute in the way Mr. Briggs desires to have it distributed, and I would like to see the address published by itself and distributed in that way. The State Board of Trade, of which Mr. Briggs is the President, should receive a large number, and I should like to see a large number of them in every part of the State.

MR. MARKLEY. It is agreed, then, that the report may be amended so that the Governor's address may be put before the people.

The motion was put on the adoption of the report of the committee, as amended, and was unanimously carried by a rising vote.

(At this time a recess was taken until 1:30 P. M.)

AFTERNOON SESSION—SECOND DAY.

WEDNESDAY, December 5, 1906.

The Convention was called to order at 1:30 o'clock P. M.

Vice-President Power in the chair.

VICE-PRESIDENT POWER. The program this afternoon has been changed a little by request. Mr. Roeding's paper, instead of coming second, will come at the end of the meeting, and I understand Mr. Kellogg and Mr. Stabler have neither of them sent their papers, and if we have time we may have Mr. Pease's paper this afternoon in place of this evening.

SECRETARY ISAAC. I have a telegram from Mr. Stabler, who is on the program, and he says he wishes to send his regrets, as it is impossible for him to attend the Convention at Hanford this week.

VICE-PRESIDENT POWER. The first paper we will have this afternoon is "The Relation of the Nurseryman to the Grower," by A. N. Judd, of Watsonville.

RELATION OF THE NURSERYMAN TO THE GROWER.

BY A. N. JUDD, OF WATSONVILLE.

Probably no two interests should be so interwoven and friendly as fruit-growing and the nursery business, yet, strange to say, the intercourse between the orchardist and the nurseryman is of but a few days and of a perfunctory nature. The embryo orchardist is usually an enterprising and progressive farmer, who has no knowledge whatever of pomology, but who remembers something of the taste he had, when a boy, for the Greening, the Newtown Pippin, and the Blue Damson. His interrogatories put to the nurseryman regarding best varieties to plant, considering the climate and market, disclose the fact that he has no positive knowledge on the subject. In looking through the nurseryman's stock, which seems to be on dress parade, so even in height and straight are the rows, the purchaser will see little white boards, partitioning off the plot or field, with supposed names of varieties, in plain and legible letters, standing as a guarantee that what is bought is true to name. He will see men cutting off a few of the lower limbs of each young tree, these cuttings to be placed in damp sand to be used as stocks for root grafts, which reproduce like variety; if, later, they are used for budding, the results are the same. The

buyer may often notice on roots of young trees that have been dug preparatory to heeling in, or for a customer, a white or moldy substance, and on some of the limbs a pimply effect. But the prospective orchardist is not an entomologist, so he waits awhile, a few years perhaps, before he begins to take notice that his young trees are uneven, both in thrift and size; with some there seems to be swelling at the ground, and the excrescence is covered with what seems to be mildew. He then consults his neighbor, who knows as little, or perhaps less, about entomology than he does. After considerable discussion they decide it is due to lice of some kind, and those Newtown Pippins that are doing so poorly, that are making no growth, and actually going back, are voted by the nurseryman as not suitable to the climate or soil. In digging them out you notice, when the limbs are cut, that they are dry, and under the bark they have a streaky, red look; and yet what puzzles him greatly is that a few of the trees of the same variety do exceedingly well; in fact, you will find this condition over all your orchard on those trees that have none of the ailments mentioned. This is often accounted for by the nurseryman as your own fault, the result of improper cultivation or pruning. You reason that he ought to know, and I ask right here, should he not? When I look over the live-stock field I see a struggle for the best strains of the best breeds which make the best crosses, and no price too high and no distance too great to accomplish the result aimed at, which is to get the very best of each—strong, and fertile, and above all unmixed. But did you ever see a nurseryman around any orchards, during fruiting season, noting or marking trees of special strength or merit with a view to securing scions from the best types of true varieties, for the purpose of improving his stock? Do the nurserymen agree even on the names of varieties and what they are? To illustrate: A buyer in the community in which I live had a lawsuit to recover the price of a car of Winesaps in California, but which were not the Winesaps the purchaser had known when he lived in the East. Now, as I have two varieties of Winesaps, and at least two varieties of Newtown Pippins, the question arises which is which? And like conditions exist with other varieties, causing no end of trouble in the market. It seems to me that each State university should establish a chair in pomology, and, where possible, there should be State nurseries, or at least a strict supervision of the plant industry, so that the responsibility for filling up the land with all kinds of rubbish, pests, and diseases could be placed, and damages recovered. No stock-breeder dare sell you stock with anthrax, tuberculosis, glanders, or with any other contagious disease; yet many nurserymen can, and do, sell you, every year, wholly or partially diseased trees. Such trees are taken from ground that is often alive with woolly-aphis and other pests; the trees often come to hand dead or in

a dying condition, caused by the use of deadly gases to partially destroy the pests, leaving only sufficient life to permit the trees to eke out a miserable existence, at great loss to the grower. I would enact a law which places a fine for selling unclean trees or those not true to name; this fine I would make equal to the cost of the tree sold, the cost of cultivation, the rent of land, damage to the land for like product (as no apple will grow where one grew before), and the loss of profit that should accrue during the time before the discovery of the criminal mistake was made. It seems to me that the longer the average nurseryman is in the business the less interest he takes in the betterment of our fruits, and the more certain he is to combat discoveries, or I might say rediscoveries, which the energetic orchardist makes by reading up or by experiment. However, there was a time when he had pride in the betterment of fruits and was looked up to as an encyclopedia on all subjects pertaining to horticulture; but I am sorry to say that now, with few exceptions, we refer to books of fifty or more years ago on that all-absorbing question of fruit-growing. I notice, so far as I have read, that these works are specific on the subject of where on the trees you should select your grafts, their proper condition, and in what stock you should put them, but in no instance are the methods of our nurserymen recommended; in fact, the more you read these works the greater is your surprise and shame, for, with the exception of a few minor details where new pests are concerned, we have actually gone back, apparently forgetting (if we ever knew) that the horticultural knowledge of the old Greeks, Romans, Frenchmen, and Germans, as well as of our own Downing, was not hereditary. It is true we have our Burbank, our Coates, and our Roeding, not in the same class, however, but each in his way has done things, and in these days of selfish commercialism their acts stand out as a star, giving some light in that dark corner of horticulture, the nursery business.

VICE-PRESIDENT POWER. You have heard the reading of this paper. Is there any discussion or questions?

MR. DARGET. I am an orchardist at present, and I would like to emphasize some points of this paper, and emphasize them not alone for the protection of the orchardist, but for the protection of the nurseryman as well. In order that this may be fairly seen, I want to give an illustration of what occurred in an orchard which I bought a few years ago. At that time I knew absolutely nothing about horticulture. In a tract of eight hundred acres which I purchased, most of it was in very good condition and true to name; but there was one particular block of six acres of peaches which looked to me like a good thrifty orchard. I will say that I cut the orchard up into ten-acre lots and sold a good deal of it before the crop matured. When the crop matured on this

six acres, I found a great surprise in store, both for myself and for the man who purchased it. Upon investigation, I learned that Mr. Richard Adams, who is my superintendent, and who was there and planted that orchard seventeen years ago, with the superintendent for W. R. Strong Nursery Co., from Sacramento, had ordered a carload of early Foster peaches from an Eastern nursery to plant this six acres. The car came and they planted the trees, and the remarkable thing about it is, perhaps, that there was not an early Foster tree in the whole carload. Not only that, but there are growing on that six acres to-day, as the result of that planting, seventeen different kinds of peaches, ripening anywhere from the early Alexanders, the 8th or 10th of June, to the Salways, the latter part of October. For commercial purposes that block of ground is practically useless. If a man lived on that ten acres and could take care of the work himself, he would not need to hire anybody to help him take care of those peaches, because he could take care of them and have time left to visit his neighbors; but as a commercial proposition, handled with a large block of orchard, it would occupy too much time and keep the superintendent watching that orchard to know just when to send somebody to pick the peaches, to make any possible profit from it.

MR. B. E. HUTCHINSON. I would like to ask a question of these nurserymen, and I would like to get an answer to it. I have many times had to reset some trees, and have bought the same kind, sometimes of the same nurseryman, to plant in place of the others. For twenty years now I have planted a few trees every year to replace those that were lost, and I have never yet got a tree to replant that was the variety that I ordered. If I ordered Bermudas, I would get Crawfords, and if I wanted Crawfords, I would get some kind of cling peaches. Now, I want to know if that is the way they intend to treat us? And how could it happen that for over ten years I have replanted trees, and I have never yet got one that was of the same variety that I ordered? I want to know if you keep a batch outside there to give a fellow after he has had the misfortune to lose his trees, and say, "Why, it is all dead loss to us anyway," and pass them over? I have always been willing to pay for my trees. Sometimes I have done it and sometimes I have not. Through carelessness on their part, I have said no, and I have a case now where I have refused to pay for trees and I am not going to pay for them.

MR. BOWERS. I have taken a great deal of interest in the growth of trees, especially prunes. Prunes are my hobby, and I will stay by the prune industry through thick and thin. My first work was budding in a nursery, and at that time they had a gentleman who had charge of the nursery who I thought knew very little about his business. Of course, I said something about some things, and I was told I had

better attend to my own business. The point I wish to bring out is this: that superintendent had cut the wood off the branches of his young trees, and during the six years that I was on that ranch there were trees growing in that nursery probably eight or ten generations removed from the original parent tree. Now, all over the State wherever I have visited and talked to the prune men, I found this condition. In any orchard there will be four or five trees that will bear large prunes, and then you will come to a tree with small ones. I think the parent being so far removed from the bearing tree has a great deal to do with it. When I was quite a boy, we had an orchard with, I think, thirty trees in it. Whenever they commenced to bear, the one that bore the largest fruit was the one we grafted from. We grafted one third of them one year, one third the next year, and the other third the third year. Those trees developed into fine trees, and I think it was because they were grafted from the trees that bore the best fruit.

MR. A. J. JEFFRIES. All my early life was spent in the nursery business back in Illinois, although for twenty years I have not had anything to do with the business. Now, being one of the Horticultural Commissioners of the State, and supposedly in opposition to the nurserymen, I would not like the impression to go out from what these gentlemen say here that that is the condition all over the State. I know one section of trees in southern California where I believe every tree in that section is true to name. I know an apple orchard within five or ten minutes' ride of the City of Los Angeles where every tree is true to name, and it is not fair to our nurserymen to take up individual samples, which no doubt are true, and make a principle from them. I have a great deal to criticise in relation to the nursery business, but I don't like that impression to go out as an expression of this meeting. There are thousands of acres where every tree is true to name. We have within half a mile of where I live navel orange orchards fifteen years of age, where every tree is true to name, and if you get a navel orange tree true to name, you know the nurseryman is all right.

MR. CASH BLOWERS. I wish I could second the remarks of the last gentleman, but I can not. I have bought of different nurserymen; I have bought of home nurseries, and I have bought of nurseries abroad; and I have come to the conclusion it don't make any difference where you buy, you get mixed trees anyway. I have bought trees for thirty years, and I have got my first lot of trees to buy that were all true to name. I have bought some that were much better than others, but I believe that the nurserymen with whom I have had the misfortune to deal, were, as a general thing, careless. I don't believe they do those things intentionally, as a general thing. I believe one year they did it intentionally. That is the year the trees came from the East. I bought about three varieties of trees, as I supposed, and I got fifteen

or twenty. There is one thing very peculiar about it. I got three varieties, and out of those I got some of what purported to be the variety, but in each case they were not just the same peach as we grow in California. There was enough difference so that you could see it. The Orange Cling was different, and the Salway was different; also another variety that I have. I discarded it once, but it was different from a California peach.

MR. THISSELL. I have had a limited experience in the fruit business and also in the nursery line. The trouble does not lie altogether with the nurserymen. There are a great many honest nurserymen. I don't like to see them criticised too heavily. The trouble lies with the growers—the men who raise the fruit. There are a great many nurserymen who send out to men who have had long experience in the fruit business to get their scions to graft and their buds. The orchardists are careless in giving this stock to the nurserymen. They often order a Chinaman or a Jap to go out and cut these scions. These men cut them from the first tree, regardless of what the conditions of that tree are. The nurseryman sends to good, reliable men and he grafts the trees from the stock he gets from them. He puts them on the market, and the consequence is when they are grown up they are not what he got them for. There is where the trouble lies with the nurserymen.

MR. HUTCHINSON. I will answer that by saying that we never do that work for the nurserymen. The nurserymen come and cut their own. I have some trees on my place, about four thousand, Lovells, Elbertas, and the Phillips Cling, and many of the nurserymen come there to get their buds. I have said to them that I bought these trees of a certain nurseryman and I know they are all right; but to my horror last year when they began to bear I found in the Phillips Cling that some of them were Orange Clings. We never sell buds or scions there. The nurserymen come there and cut them themselves. The nurserymen of our county have got down on their books the different trees that I have on my place and where they can get them, and where they are mixed they are marked out.

MR. NEWELL. I will not take up much time. There is always two sides to a question. I am an honorary member of the Nurserymen's Association. I have never sold a tree in my life and never expect to, but I am connected with the State Board of Horticulture of Oregon. I want to say in justice to the nurserymen that I do not believe we have a better class of business men in the State of Oregon—who take more pains to deliver good goods than they. If you buy goods from a groceryman, every once in awhile you will get what you do not order. You will get things from the manufacturer that are not true to name. Do not be any harder on the nurserymen than on other

people. Consider that they have the hardest business in the world to deliver goods absolutely true to name. California fruit-growers, don't you believe the nurseryman is dealing just as honestly by you as you are by the public when you ship green oranges to market or green grapes? Let us be charitable to the nurserymen and have justice on both sides. (Applause.)

MR. JUDD. Evidently there has been a wrong construction put on that paper. There is not a line in that paper that sets up any dishonesty on the part of any nurseryman, but it is simply a matter of carelessness, a matter of actual lack of knowledge of their business. It is not criminal. It may be dishonest, but not in the sense that we look at criminality or dishonesty. Allow me to say right here that the prime object of that paper was to get unanimity on the subject of variety. I suggested that we have a chair of pomology in the universities. I do not want the impression to go out that I accuse the nurserymen of dishonesty.

MR. ROEDING. The nurserymen expect to cut buds as far as possible from bearing trees, and in most cases we do it. My friend, Mr. Hutchinson, spoke about not being in condition to get fruit true to name. I think I have heard Mr. Hutchinson on many occasions say he had been treated well by the nurserymen. In spite of all the caution nurserymen use, there are chances of making a mistake. I want to make an illustration of Mr. Hutchinson. Probably his trees have been untrue to name. I don't think there is a nurseryman in the United States who has not sold trees untrue to name. I have gone to Mr. Hutchinson to cut buds, and he has told me that such and such trees were true, that there was not a mixture in them; but nevertheless there was. It is very rarely that a nurseryman can take the word of an orchardist as to his trees being true to name, because orchardists do not go into these things as thoroughly as nurserymen do. In my experience with Mr. Hutchinson, we have gone through his orchard, and although some trees would be untrue, we found trees here and there that were not untrue. There are times when mistakes will happen in spite of all caution, but I think, as a rule, nurserymen find their stock is true. When you bear in mind the number of men employed in nurseries, and the readiness with which mistakes are made, you will not wonder that these things do happen. If you have a man in your employ in charge of a certain variety, that man may have it in for you. He mixes up the varieties. How is the nurseryman going to discover it? A nurseryman sells trees that he thinks are true, and some of them are untrue in spite of all the caution he can take.

MR. MCGILL. There is one point to which I would like to draw attention, and that is, if they would be willing to pay the nurseryman a sufficient price for his trees so he could employ enough capable men to look after

the details for him, they probably would get better results; but if John Smith is selling trees for 10 cents, and Mr. Roeding is selling a much better tree and he asks 3 or 4 cents more for it, they will go to John Smith every time—nine out of ten would, anyway. That is our experience.

MR. SPRAGUE. I have been listening to this discussion with much interest, because I expect to buy some trees before long and I am pretty badly scared now. But I want to know if the least we should ask from the nurserymen is, that they should go to the trees when they are bearing and mark those trees from which they expect to get their scions, and in that way be sure of accurate information in the first place? That is one thing we should ask them to do—not hire men, but go themselves and mark those trees and keep them straight as far as possible. There is a chance, I can see, for things going wrong; but because they are so overwhelmingly wrong, it seems to me we can not let up one bit of the pressure on our friends, the nurserymen, in demanding the greatest possible care so there will be no mistake.

MR. HUTCHINSON. There is one thing I want to say. When the nurserymen come to their buds, they should know they are right. Some nurserymen are very careless, I know. I showed one nurseryman years ago an orchard where he could get some buds such as he wanted. He wanted Crawfords. I told him to go ten rows to the east and all of them were Crawfords, and I thought that would be best for him. When I came up at noon, or about noon, he was cutting straight through on two rows of trees, and he had gone through five rows of Salways, five rows of Lemon Clings, and into a mixture of nectarines. I told him that his buds were worthless and that he had better throw them away. He didn't throw them away; and I have never bought anything of that man since. Since that, there have been a good many buds cut on my place that are going to make some trouble, because I had all the confidence in the world that they were true to name, and I sent the nurserymen in there to cut; and to my horror, when they came to bear last year, I found there were fifty trees in that lot that were not true to name, and any one who cuts buds there will have trouble, the same as I have had. I will say that I went through and tied a half-inch rope on every one of those trees that I could find, and I told every nurseryman that came there not to cut from those trees.

VICE-PRESIDENT POWER. Ladies and gentlemen, I don't wish to cut off discussion, but there are several other important papers and we have spent over an hour on this. There are other papers which must be read this afternoon, because the entire program is long. We will now pass to "The Need of a National Inspection Law," by A. Eckert.

THE NEED OF A NATIONAL INSPECTION LAW, AND HOW TO SECURE IT.

BY A. ECKERT, OF DETROIT, WASH.

Mr. President and Gentlemen: When our worthy secretary requested me to prepare a paper on this subject I was sure he had made a bad selection, and, as I wrote him, I would sit on the fence until able to decide which way to jump. The question seemed so great; had been written upon by our greatest experts, men thoroughly familiar with its every detail, urging the necessity of such a law. Also the long labors of the committee on law and legislation of the American Association of Nurserymen, ending in failure and, I fear, disgust at the selfishness of some, the indifference of others, and the opposition of many.

The need of such a measure is self-evident to the most casual observer or one but little familiar with the conditions surrounding, not only the nurserymen, but the fruit-grower, farmer, market gardener, and even the lumberman, as many injurious insects seriously affecting one or the other are all distributed by the same process. But the ones most interested and whose interests are identical are the nurserymen and the horticulturists or fruit-growers, and strangely enough these two seldom work in harmony with each other. Yet most nurserymen are, in a manner, also fruit-growers, and are or should be familiar with the stand taken by the general fruit-grower against the nurserymen.

The fruit-grower wants the trees he buys free from insect pests and disease and blames the nurserymen if they are not; at the same time but few make any attempt to clean their orchards or prevent the spread of pests and diseases. The nurseryman, in his effort to supply the fruit-grower with the clean, healthy trees demanded, insists that the fruit-grower should be compelled to take proper precaution to keep his orchard clean and healthy, as orchard and nursery are often in close proximity, to enable him to have his nursery in condition to supply the quality of goods demanded.

Then again, the fruit-grower objects to any law prohibiting him from selling his wormy fruit in any city or State, as evidenced by a horticultural writer in a paper read last January before the Washington State Horticultural Association claiming that every orchard in the two counties mentioned was infested with the codling-moth. (He does not travel much in those counties or he would not make that statement.) Again, a conscientious inspector in one of Washington's counties is sued for damages because he prevented the shipment of a car of wormy apples to another State. Under national inspection no such attempt would be made. Now, as for the nurseryman who does an interstate business, and nearly all come under that head, what are his difficulties?

Just a small notice in many catalogs explains this; it reads, "*We have complied with all inspection laws and have all official tags and licenses and ship in every state and territory.*" Well, if he has, he has done wonders; he has got his different colored tags and paid licenses from \$2.50 to \$25 per annum, as well as paying the licenses of every salesman he employs.

Not only are there State laws, but counties as well that try their hand at regulating the nursery business, all of which adds greatly to the happiness (?) of the nurserymen. In our own experience with the county inspectors we have found them conscientious and gentlemanly, endeavoring to do their work to the best of their ability, but as State officials they do not command the respect or compel the observance of the law as they would if their power originated in the Agricultural Department at Washington, D. C.

Had our Government taken precautions to prevent the introduction of dangerous insect pests, very little if any State legislation would have been done. Nearly all of the most dangerous pests we are afflicted with are imported. Had there been a trained entomologist at the custom house at San Francisco to detect and prevent the introduction of the San José scale, State laws and regulations would be rare, if any. The spread of this one insect, though hundreds of other kinds had been imported before it, was so rapid and its devastation so great, causing the greatest alarm in nearly every fruit-growing State, that State after State passed laws, good and bad, causing the greatest confusion to the nurserymen. When the cotton-growing states passed too stringent and unreasonable laws against the State of Texas on account of the boll weevil, the Government took a hand in the matter and by its advice and action brought the states to reason. May we not hope for the same in our behalf?

The greatest objection to a national law has been the invasion of State rights. I want to say right here that many of you will live to see that question put rightfully to sleep. Ours is a nation; no longer a confederation of states. Uncle Sam has arrived at that age where he is entitled to wear trousers that come to his shoes. Those states that formerly proclaimed State rights as a cardinal doctrine are at present praying and petitioning the Government to assume control of their maritime hospitals and many other matters.

The Government has demonstrated its authority in the matter of horse and cattle inspection, prohibiting their movement, not only from one State to another, but from one county to another in the same State; making regulations for the inspection and certification of cattle from infected districts and cleaning and disinfecting cars.

It is working harmoniously in coöperation with the states under a national game law known as the Lacey Act. Under the Lacey Act the

Agricultural Department has men at the custom houses for the inspection of birds and mammals which can only be admitted by special permit from the Secretary of Agriculture. This should be taken advantage of: as we now have national inspection of birds and mammals, why not one for the protection of the lumber interests, the agriculturist, and the horticulturist? Prof. T. S. Palmer, of the Agricultural Department, says of the Lacey Act: "When the law went into effect it was thought by some that it would be impossible to enforce its provisions, that the requirements of permits would cause serious delays, loss and endless criticism, that the placing of the work under two departments would result in friction (the customs being in charge of the Treasury Department and the inspection under the Agricultural Department) and prevent the accomplishment of the desired object." Experience has proven such fears were groundless; permits are obtained in advance, or upon arrival a telegraphic request for inspection or release usually secures such an order.

To show what has been done: In the Year Book for 1897, Prof. L. O. Howard presents the danger of importing insect pests in a strong manner. Quoting from his article: "In the spring of 1897 a convention of the representatives of the horticultural and agricultural societies of many states was held at Washington, D. C. This convention was called to consider the desirability of National and State legislation with a view to preventing the introduction and spread of injurious insect pests and fungous diseases. This fact is mentioned as indicating that at last the persons most interested understand the situation and are seeking a remedy. We need only look at the already long list of injurious insects to become at once aware of the fact that had a national quarantine been established long ago its saving to the country would have been enormous. Japan has a number of injurious insects which have not yet reached us and against which we must be on our guard. Fortunately Japan is one of the most enterprising of nations and has encouraged the study of entomology. The pests are brought to us as unnoticed or ignored passengers on or in their natural food such as nursery stock, plants, fresh and dried fruits, clothes, lumber, animals, and straw or packing material. The commerce in nursery stock and living plants is rapidly increasing; the Government entomologists are familiar with nearly every injurious insect in all nations and would know at once what to look for in any importation from any country."

That our country occupies first rank in applied economic entomology is conceded. In 1896 the French authority, Dr. Paul Marechal, writing on the subject of applied entomology, began his paper with the words, "There exists nowhere an organization dealing with applied entomology capable of rivaling that of the United States." While the State of Cali-

foria has long been alive to this question, maintaining a quarantine system which has been very effective as against insects occurring upon importations consigned to persons within the State, she has not been able to protect the country at large or to take action upon any importations at her ports when consigned to persons of another State.

Mexico has many pests that have not yet gained a foothold in our country, but with the rapidly increasing travel and the importations of fruits and merchandise, it can be but a short time before we shall have them wherever the climate is congenial. The same with China, Japan, or any other country. Australia has several very destructive insects, unlike anything in the United States, which, if imported, would prove disastrous to certain fruit-growing interests. One of these, the apple-beetle, attacks the apple and bids fair, in portions of Australia, to rival the codling-moth in its damage.

Quoting further from Professor Howard, he says: "It has been shown that the majority of our most injurious insects have been imported; it has also been shown that there are many other injurious insects in foreign countries which are noted enemies of cultivated crops and are liable to be brought over under our present lack of inspection laws." Laws must be passed establishing a system of inspection of dangerous classes of merchandise, just as has already been done in the case of live stock.

I wish, also, to call your attention to a most interesting and able article on this subject, appearing in the May number of the *Popular Science Monthly*, by Prof. E. Dwight Sanderson of the New Hampshire College.

I have quoted freely from Professor Howard to show you that the national Department of Agriculture is fully alive to our present needs; that something must be done to protect the country from the injurious insect not yet with us and to bring order out of the chaos now existing as a result of the many different and oftentimes unreasonable State laws. I believe that if the nurserymen, acting in coöperation with the National Pomological Society and the Agricultural Department at Washington, could agree upon some line of action it would not be a difficult matter to get the desired relief from Congress.

STATE AGRICULTURAL EXPERIMENT STATION,
PULLMAN, WASH., August 13, 1906.

MR. ECKERT, *Detroit, Wash.*

MY DEAR MR. ECKERT: Replying to your favor of August 8th allow me to say that I think that a national inspection law for nursery stock is not only practicable but desirable. The recent movement in national affairs is to enlarge the powers of the Government so far as inspection and oversight are concerned. The Acts of the recent Congress show that this is fully recognized; the meat inspection law is a good illustration. As nursery stock is largely shipped from one State to another, it is possible to include such an inspection under the duties of the Interstate Commerce Commission. Of course such inspection will only affect stock that can be shipped from one State to another. I do not think that the matter has ever been taken up in Congress, and I suspect that it

would meet with determined opposition from many sources. It would not benefit a local producer, but it would certainly give great protection to the buyers of nursery stock. I think it would be easy to enlist the support of the various State Horticultural Associations and think that the matter should be handled through these agencies.

I thank you very much for the suggestion and believe it would be well to bring the matter up before our next horticultural meeting.

Very truly yours,

E. E. ELLIOTT.

OREGON STATE BOARD OF HORTICULTURE,
GASTON, OR., August 15, 1906.

MR. A. ECKERT, *Detroit, Wash.*

DEAR SIR: Yes, I think a national law for inspection of stock practical. It should of course provide uniform regulations for every one, and I believe the vital point of that will be to require all nursery stock, whether injured or not, to be dipped in a solution of lime, sulphur and salt, before placing on the market. This will be better than the gas treatment and will be visible. An inspector will know then that the stock has been treated, and such treatment will be beneficial to any stock and injurious to none. The root troubles would of course escape, as they do now; but I find very few trees that have any serious root trouble that do not show it in their general appearance in the nursery. I think that part could be left safely to local inspection.

Very truly yours,

W. K. NEWELL.

IOWA STATE AGRICULTURAL AND INDUSTRIAL LEAGUE,
DES MOINES, September 10, 1906.

A. ECKERT, *Detroit, Wash.*

DEAR SIR: Your favor of the 8th to our Professor Beach has been by him placed in my hands, because since the first discussion relative to Federal inspection I have been chairman of the legislative committee of the American Association of Nurserymen, which has had the whole matter in charge.

The present condition of the attempt to secure Federal legislation is that several of the states refuse to go forward further with the work, saying they had good enough State laws and would prefer not to have a Federal law. The trouble about the matter is that while the Federal Constitution provides that Congress may make all needful rules and regulations relating to interstate commerce, it does not take from the states what are known as police powers, and under these police powers the State may examine anything coming into its borders from another State, if there is reasonable ground to fear that the import may be dangerous to the life, health, or property of its citizens. The authority of Congress to say what may not go out of any State or Territory into national commerce is unlimited, but when it comes to say what may go into a State it is restricted to those articles which, as found in commerce, are not dangerous to the people or their property. Whisky has been held to be merchantable because while barreled up or in any original package it never demoralizes any one. Nursery stock with disease or insect pests might possibly spread infection even from a box or bale; wherefore, a State may examine it.

Just what we shall be able to do in the future I am sorry that I can not say, for nobody knows. If we can all agree upon what we desire, then the next thing to do is to draft an act embodying our desires, and send a committee to Congress, presenting our case to the Committee on Agriculture. If that committee thinks about it as we do, there would be a good prospect of getting the bill enacted into a law.

Very truly yours,

C. L. WATROUS.

UNITED STATES DEPARTMENT OF AGRICULTURE, BUREAU OF PLANT INDUSTRY,
WASHINGTON, D. C., September 17, 1906.

MR. A. ECKERT, *Detroit, Wash.*

DEAR SIR: Noting again your favor of August 8th, the receipt of which I acknowledged from Enid, Okla., on August 21st, I would say, further, that the National Association of Nurserymen has been making efforts for several years, through a committee

appointed for the purpose, in the direction of a Federal inspection law for nursery stock. The gentlemen whose names I mentioned, I believe, in my letter of August 21st, Col. C. L. Watrous, Des Moines, Iowa, and Mr. Silas Wilson, Atlantic, Iowa, are members of this committee and they have been here in Washington several times in the interests of a Federal inspection law. Just how far the matter has been carried I am not able to learn. I am under the impression, however, that the nurserymen, viewing the matter from one standpoint, and the fruit-growers and horticultural inspectors, looking at it from still other points of view, have never been able to agree sufficiently well upon the requirements of such a law, hence you can readily understand some of the obstacles which must be overcome before any satisfactory legislation is possible. This, in a measure, answers several of your questions so far as it is possible for me to answer them.

Then again, conditions in the different parts of the country, both in regard to the nursery interests and to the fruit-growers' interests, are so diverse that it is almost a question in my mind if it is possible to formulate any law which will be flexible enough to meet all those conditions and still not be so flexible that it will be of no real value. On the other hand, the laws now applying to the sale and transportation of nursery stocks are so different in the different states that annoyance, delay, and losses frequently occur, or have in the past.

As to what the provisions of a Federal law relative to the handling of nursery stock should be, I do not feel capable of expressing an opinion, and for that matter, am not lawyer enough to know where State rights leave off and Federal authority would begin in such a case. Hence it will be better for me not to attempt to define what provisions should be made in the terms of such a law.

If any Federal law is ever passed, it seems to me probable that it will come as the result of joint action of the fruit-growers and the nurserymen. As above stated, the National Association of Nurserymen has been considering the matter for several years. The American Pomological Society is probably as representative a body of fruit-growers as there is, and though this society has not usually attempted to influence matters of legislation, it would seem to me to be, logically, the proper body of fruit-growers to take up this matter. I am not sure what the attitude of the Horticultural Inspectors' Organization is in regard to this matter. I would suggest, if you wish to take it up, that you write to Mr. G. G. Atwood, Capitol Building, Albany, N. Y., for information. I do not know if he is an officer in the Inspectors' Association, but am quite sure he could give you full information.

To learn definitely just what has been done and how matters now stand, you can not do better than write to either Col. Watrous or Mr. Wilson—or perhaps to both—who, I am sure, can give you more information than any one else whom I know.

I very much regret that so long a delay has occurred in my final answer to your letter, but I returned to Washington only a day or two ago and this is my first opportunity to attend to it. I hope the delay has not been a matter of serious consequence.

Very truly yours,

H. P. GOULD,
Assistant Pomologist.

MR. ECKERT. I want to say that yesterday I had the pleasure of meeting your State Quarantine Officer. I was convinced that he was a man whose heart was so full of the true Western spirit that if he met a man who was unfortunate he could not help doing all he could to assist him. He cited two instances: one, nine hundred boxes of lemons which came to the coast, and he would not permit them to enter, though out of sympathy for the man he told him to enter them at Portland. The man said he could not. "Go to Vancouver." "No use; can't get in there." "Go to Seattle." "No use; can't get in there." "Well," he says, "send them to Chicago." He sent them to Chicago and sold them. Now, that is very much like carefully guarding your front.

door, but if you step around to the back door it is wide open. What are you going to do there? You have got six or eight trans-continental roads running to the coast, trains running in sections, bringing thousands of people. Suppose they bring some of those lemons here, how are you going to protect them? They consume the lemons and throw them out of the car window, and how are you going to stop it? If you have got a national inspector, or if your quarantine officer had his appointment from the National Government in connection with the State Government, it would be better. We don't ask for any modification of your State laws, but if he could take that fruit and condemn it and destroy it and not give it a chance to get into your back door, then you might be reasonably safe.

Another case cited is a lot of peach trees which came in bearing the certificate of the State Inspector. When he got hold of them he found they were infested with root-borer. If that inspector had his appointment from the Government, you would be reasonably safe.

VICE-PRESIDENT POWER. You have heard the reading of the paper. It is now open for discussion.

MR. EHRHORN. As I am the party who condemned those nine hundred boxes of lemons, I want it understood that there was nothing sympathetic on my part that helped that fellow out. I just looked up the law of the State, and those lemons were shipped out of California. It is unfortunate that our law does not protect us a little better in certain ways. Our appropriation is so small that we can not station inspectors on the boundary lines between other states. Some day probably we will do so, but these lemons arriving at San Francisco by steamer, and being infested, naturally could not land in California. They had to be returned to the shipper or shipped outside of California, and I simply insisted on those lemons going out of the State, and they went out of the State. He says, "What can I do?" I says, "Send them to Portland." He says, "I can't do anything there." I says, "Send them to British Columbia." He says, "No, we can't do anything there." I says, "Do you mean to tell me that if you can't land them where they don't raise citrus fruit you expect to land them in our country where we have the industry?" He was dumfounded. He thought we would let them go to California. They went to Chicago, and I think they stayed there, because I don't think anybody would bring lemons from Chicago to California.

MR. R. P. CUNDIFF. I think in a convention a number of years ago, a bill was prepared and presented to Congress. I think it was something like four years ago: That bill has each time been persistently fought by the American Association of Nurserymen. For what reason, I do not know. I had considerable to do with it in the first place—in getting up the bill—as we had a member of Congress from our

town who was very much interested in getting that enacted into a law; but the contention of the American Association of Nurserymen was that if the Government took up the matter of inspection, our entomologist at Washington would delegate somebody in our country to inspect the importations of the American Association of Nurserymen, largely ornamental stock, coming from France; while some one should be delegated in European countries, satisfactory to our chief entomologist, to pass the stock in; and that we should not be allowed, under any circumstances, at the port of entry in the United States, to break open or interfere with a package if it came in labeled all right from such a foreign entomologist. Of course we would not consider such a law, and the amendment was defeated.

VICE-PRESIDENT POWER. Is there any further discussion on this subject? It is important, both from the nurseryman's standpoint and from the inspector's.

MR. JEFFRIES. There is one point in this matter of national inspection that is very important. About a year ago the State Quarantine Office established a quarantine against the shipment of any plants into California from Florida. We were able, in Los Angeles County, to intercept anything that came by express or freight, or any other way, except by mail. We have an arrangement in that county, as the commissioners in other counties have, whereby no trees or plants can leave the depot or express office without permission from the Horticultural Commissioners' office; nor can the plants go out from those express offices or freight offices without shipping tags, which are really certificates. We found there were plants coming in from Florida through the mails. So we went to the postoffice inspector and told him we would like to examine those plants coming in by mail. In some of the department stores in Los Angeles they have sub-postoffices, as they call them. One of these department store proprietors was also a planter and had a fine home. We found they were coming in that way. Finally we went to the inspector and told him we would like to see those plants before they were delivered: "You will notify us by 'phone whenever there is a package coming in from Florida." He did so, and for three, or four, or five weeks we had free access and examined every plant that came in from Florida or anywhere else. Finally the postmaster himself heard about it and he wrote to Washington about it, and they told him not to do it. The postmaster said to us, "You can not do it." Now, we have the plants held up in this way. Whenever a package comes from Florida, the postmaster will notify us that it will be delivered at a certain time. We are there either to inspect it or to follow it up in the hands of the deliveryman. There is the lameness in the law. It should be remedied.

VICE-PRESIDENT POWER. The next paper on the program is "Inspection Laws of California," by George C. Roeding.

NURSERY INSPECTION LAWS OF CALIFORNIA.

By GEORGE C. ROEDING, OF FRESNO.

That the development of the horticultural interests of California is primarily dependent on the nurserymen of the State, is, I think, a fact which will be conceded by any one desiring to engage in the business of fruit-growing. It is reasonable to suppose that the men who raise the trees and vines, unless they receive proper encouragement in their business, can not expand as they would where they are surrounded by restrictions which prevent them from disposing of their stock when ready for market. It is not my desire in this article to tell all the woes of a nurseryman, for it is only fair to say that, in no matter what business one engages, there are obstacles, and it is the energy and perseverance which encourage us to pursue a certain defined course which finally leads on to success. Conditions in California are so different from any other section of the United States, that the men engaged in the business are dependent almost entirely for the sale of their stock to the confines of their own State. It is not necessary for me to make more than a few passing remarks about the prominent position California occupies horticulturally. That she leads all other states in the Union has been admitted for years. It is largely due to her great variety of soils and climatic conditions that her horticultural interests have been conducted along such broad lines. Those who have watched the wonderful strides she has made are fully aware that fruit-growing is still in its infancy and that there are thousands upon thousands of acres still open for development. Many of the new fruits which are being introduced by our United States Department of Agriculture will find their home in California, and probably this will be the only State which will have the monopoly of the many new industries which are sure to take their inception here. The introduction of these new fruits is necessarily dependent on the nurserymen of California, and unless they receive the proper financial support, it is hardly to be expected that they will be in the position to make the many expensive experiments in the propagating of new lines of stock with which they have had no previous experience. As I have previously stated, the nurserymen of California are dependent almost entirely for the sale of their stock in this State. This condition of affairs has been largely brought about by the fact that the varieties of nursery stock grown here are not in demand in other states, so that our business is very much restricted. Furthermore, our climatic conditions, due largely to our long, dry summers, make the growing of nursery stock very much more expensive than in many of the Eastern and Middle West states. With this condition of affairs confronting us, no large nursery can expect to exist

unless it is allowed to carry on its business throughout the length and breadth of the State. The large Eastern nurseries have a wide field at their command, and much of their stock is sold at wholesale, to dealers and smaller nurserymen, who are the mediums through whom the stock is distributed to the planter. In California, the nurseryman, whether he be a small or large grower, sells most of his stock direct to the planter, with the only difference that the former has very little business outside of his own county, while the latter, on account of growing a larger variety, must necessarily have an outlet in other counties or his business can not exist. It will be readily understood that a man who has been engaged in the business a number of years, and who through close application has acquired an extensive trade, chafes under the many local restrictions under which he is placed in selling his own stock.

Strange as it may seem, nevertheless it is a fact, that under the present condition of affairs there are less difficulties in bringing stock into California from outside states, than there are in shipping nursery stock from one county to another. We have already enough pests without taking the chances of introducing new ones from outside sources. I do not wish to be understood as intimating in any way that nursery stock from other sections is diseased, neither do I wish to go on record as objecting to the importing of trees from outside sources, as long as we have a reasonable assurance that such trees are from a district where no contagious diseases exist. As an illustration of how much more easily it is to ship trees in from outside sources, I will merely refer to last season, where thousands of peach trees were imported into California from the Eastern and Middle states and were admitted in most cases without restrictions, provided they were found to be free of pests. Peach yellows, peach rosette, and other dangerous contagious diseases are liable to be introduced by allowing such stock to come into California, simply because it is impossible to trace its origin. Is it right or just, when stock from outside sources is brought in without any apparent restriction, to enforce ordinances which arbitrarily prohibit the introduction of stock without inspection? This comparison is made for the purpose of showing how much more difficult it is for a nurseryman to conduct business in his own State than it is for those whose interests are not so closely united. As a class, nurserymen have much to contend with, and although it is difficult to enact laws, except for the purpose of doing the most good for the greatest number, it should always be borne in mind that the nursery business is a legitimate calling and it should be regarded as such by our inspectors.

The State horticultural laws of California, in my opinion, cover the entire ground, and they give our horticultural commissioners all the power they require to protect the interests of the State, without having

special ordinances passed restricting trade between the counties. To prevent the introduction of a certain class of stock without inspection, because an insect pest has been found in the district from which a nurseryman desires to ship this stock, places a power in the hands of our horticultural commissioners, which is, to say the least, very dangerous. If a contagious fungous disease is known to exist in a district where inspection can not determine whether the stock is infested or not, no possible objection can be made to the condemnation of such stock. Where this is not the case, however, I believe that any judge will decide that where the condition of stock can be determined by careful inspection, for Boards of Supervisors to pass peremptory ordinances, absolutely prohibiting the shipping of stock from one county to another, is not only unconstitutional, but is in every sense of the word illegal. To illustrate how unjustly these special ordinances operate, I will take up the matter of grapevines going from one county to another. No better example of this condition of affairs can be found than exists between Fresno and Tulare counties at this time. To show how unjustly the law operates, I will quote the following paragraph from the Tulare County ordinance:

That no person or persons, corporations or association of persons, shall import, bring, convey, ship, haul, transport, or in anywise deliver into Tulare County, or any part or portion thereof, any limb, bud, or cuttings, or any grapevines of any species or variety whatsoever from any portion of the State of California south of the north line of San Luis Obispo, Kern and San Bernardino counties, and from no district within the State of California north of the north boundary line of Alameda, San Joaquin, Calaveras and Alpine counties, with the exception of Sonoma and Napa counties.

This same ordinance, however, permits the importation of grapevine cuttings without any apparent restrictions, so that nurserymen just over the border line between Fresno and Tulare counties can make cuttings in the former county and sell their rooted vines the following season without any obstacles being placed in their path.

Any body of fair-minded men will agree with me that this is a very unfair discrimination, and it is only just and fair to the nurseryman who makes and grows his vines in Fresno County that he be allowed the same privileges as the man who makes his cuttings in one county and who roots them in another. According to my views of the matter, the State horticultural law empowers the county commissioners to effectively prevent the introduction of dangerous pests without adding new difficulties to the life of a nurseryman. Most of these county ordinances seem to be directed against the nurserymen of Fresno county, and if any more of these drastic measures are enforced in neighboring counties Fresno will be inclosed within such a legal wall that our nurserymen must ultimately conclude that they have engaged in a calling which infringes on the rights of others, and will be compelled to retire from business.

A series of questions pertaining to our horticultural laws, and particularly to the authority of the County Board of Supervisors in passing special ordinances relative to the inspection and condemnation of nursery stock, were presented to Mr. U. S. Webb, Attorney-General, last winter, and the following opinion, among the several answers given by him, indicates very clearly his views relative to some of the drastic features in our county ordinances:

Your fourth question is as follows: "If County Boards of Supervisors have authority to pass a horticultural quarantine law, can they pass a general ordinance declaring any or all nursery stock or grapevines brought into their county from any part of the world a nuisance, without any inspection of the stock?"

It is my opinion that ordinances so sweeping in their nature as you describe would be held by the courts to be unreasonable and void, as arbitrarily declaring that to be a nuisance which was not in fact a nuisance. To make an occupation indispensable to the health and comfort of the civilized man, and the use of the property necessary to carry it on, a nuisance by a mere arbitrary declaration in a county ordinance and suppress it as such, is simply to confiscate the property and deprive its owner of it without due process of law.

Let us look at the matter from a standpoint of fairness to planter and nurseryman alike. Above all things, what does a planter expect of a nurseryman? He wants his stock true to name. The whole foundation of a nursery business hinges on this one point. To carry this into effect it must be obvious to any one that it is absolutely necessary to cut buds, scions, or cuttings from bearing trees and vines. As a further protection to the customer, approved methods of treating these cuttings and buds must be followed, in order to prevent the introduction of pests into the nursery. Having exercised every due precaution approved of in modern horticultural practice, is it right to take summary measures, as enforced in certain counties, of condemning stock without inspection?

It is not my desire at this time, or at any other, to intimate that the various county horticultural commissioners are prompted by a purpose of doing anything more than to do their duty in protecting the fruit interests of their respective counties. I am of the opinion that much more good would be accomplished if the commissioners were under the control of our State horticultural officials and their position was not dependent on the political complexion of every new Board of Supervisors. In the selection of men to fill the position of horticultural commissioners, their peculiar fitness for the position should be given careful consideration, and after they have shown the proper application and aptitude for the position they should be retained in office, regardless of their political affiliations. If their positions were made dependent on the recommendation of our State officials, much more would be accomplished in the eradication of pests than at present, where the office is largely a political one. It is very rarely that a pest, dangerous to our fruit interests, starts in a nursery, and a strict enforcement of the law to destroy pests in our orchards and vineyards will indirectly

help the nurseryman in his vocation. It is the pests which are found in his particular county which are the cause of the passing of the ordinances so seriously affecting the upbuilding of his business interests in many sections of the State.

While on this subject, I wish to say a few words in commendation of our State quarantine officers. It gives me great pleasure to say that they have always been free from political influence; that they have fulfilled their duties in a manner creditable to themselves and to the State. Every encouragement should be given them in the prosecution of their work. When it is borne in mind that our horticultural interests are worth over \$50,000,000 a year, the necessity of having competent men at the helm must be appreciated. Through their untiring efforts, many valuable predaceous insects, which have been worth millions to the State, have been introduced, and we have them to thank for their vigilance in preventing the introduction of pests from Australia, China, Japan, and Mexico, which would have wiped our fruit interests out of existence. If these men were empowered to enforce special regulations when necessary, to protect one section of the State against another, much good would be accomplished and the friction which now exists between nurserymen and county horticultural commissioners would be eliminated. A nurseryman should be given just as much consideration by the horticultural commissioners as they would accord a fruit-grower. Could they only realize the many difficulties under which nurserymen operate, they, I am quite sure, would be more considerate and would strew our paths with roses instead of thorns.

MR. LEONARD COATES. Mr. Chairman, Ladies and Gentlemen: I would like to supplement by a word or two what Mr. Roeding has just said, by saying that any one who will take the earliest reports (I think they are reported in one volume) of the different county ordinances from the far north of California to San Diego, and read them carefully, he will find them so full of inconsistencies, absurdities, and contradictions that there could be only one opinion on the matter. You will find that various counties are so hedged about and legislated for or against without any sense or reason. You can begin in the far north of the State and go all the way down, and you will find yourself chased from Siskiyou to San Diego and over the borders. You won't find a resting place in California. A stranger might take that book of ordinances and he certainly would come to the conclusion that there was no healthy climate, no soil, in California which could raise healthy fruit or trees or anything else in an agricultural way. There is no spot exempt, all depending upon the perhaps well-intended but misguided judgment of the various Boards of Supervisors.

I wish I had the volume here to read from, but I remember in reference to pear blight certain localities in certain counties are so

described and mentioned that one is led to the conclusion that a surveyor's chain absolutely and arbitrarily prevents the introduction or the dissemination of pear blight, on one side rich with disease, on the other side such a high, imaginary wall built up that no winds could carry the microbes or bacteria over it.

There is one portion of the State which every pear-grower knows is full of pear blight, and that part is not legislated against; and so we find those inconsistencies and absurdities. It only shows us, as Mr. Roeding has pointed out, the need for a different legislation, one emanating from and controlled by the horticultural commissioners at headquarters. Supervisors may mean well enough, but their object is to please their constituents. They want to go on record as saying something very nice about their particular locality, a few miles here and there, a few spots which are exempt from all disease. And therefore they pass these ordinances merely to please and flatter a few of their constituents without knowledge or real regard for the conditions. That is the way I look at it, and the way any one would look at it reading those ordinances and taking them up one by one—that there would be no healthy spot and no healthy tree grown.

MR. H. W. BYRON. Mr. Roeding complimented the quarantine officers on doing their duty. What do they have to do? To keep foreign pests out. Why is it we pass our county ordinances? It is not to make friends with Tom, Dick, or Harry at all. It is a noted fact that Fresno County has disease and Kings County hasn't got it. We haven't got it in Kings County, and we don't intend to have it, if possible.

MR. JUDD. I rise to discuss this question without any very great knowledge except of various localities. In Santa Cruz County we have an ordinance, and it is a sweeping one, and it was not gotten up just for puff; it was gotten up for the purpose of saving at least 15,000 acres of apple trees, and maybe 1,500 or 2,000 acres of pear trees. It is sweeping in this sense, that it says that there shall be no trees enter the county of Santa Cruz from any section where the pear blight is known to exist. We don't put a surveyor's chain on and pick out any particular locality, but they can't come from anywhere. That is the law with us, and it was for the sole purpose of protecting the industry of the Pajaro Valley and Santa Cruz County against the pear blight.

MR. P. D. FOWLER. I simply desire to mention Mr. Roeding's statement in reference to the ordinance of Tulare County against the importation of grapevines. The part he read excluding rooted grapevines is correct; but he went on to say the ordinance made no provision for cuttings, that we allowed them to come in and be distributed regardless of disease. Our ordinance expressly provides that cuttings anywhere outside of Tulare County must be fumigated. We don't believe

that rooted vines can be fumigated without killing the vines. It can be done on cuttings, and for that reason we fumigate the cuttings. I don't know that it is necessary to defend that ordinance. It has been discussed in all its phases, and, as he says, has been turned down by one judge in the valley. That does not settle the question at all, and it will not be settled until it is carried through all the courts. But whether that ordinance is legal or not legal, we contend it is just, and we are willing to stand on the justice of it until the court decides against us.

MR. JEFFRIES. I think Mr. Roeding and Mr. Coates have made a mountain out of a molehill. Los Angeles County and many of the other counties have no ordinance against anything. When a man comes into my office and wants to know where he can get peach trees or apple trees, or what-not, I tell him. He says, "He is sold out." That is the way Mr. Roeding is suffering. I don't see what you are going to do about it.

MR. PEASE. Our ordinance is after the ordinance of Los Angeles County. We don't prohibit any stock shipped into our county from Roeding's nursery with the exception of grapevines. The reason we are careful about that is because it is so difficult to see phylloxera on the vine. I have shown it to a great many men and they have looked at it and said they did not see anything. So you can see how a competent nurseryman might pass over the same thing. It is the difficulty of trying to pass grapevines infested with phylloxera that has caused us to pass this ordinance.

MR. FOWLER. After all the talk about barring out pear blight, Tulare County has never barred anything from any place except grapevines.

MR. PEASE. If we can't find anything on them, we let them go in.

RESOLUTION RELATIVE TO AMENDING THE CHINESE EXCLUSION ACT.

VICE-PRESIDENT POWER. There was a resolution introduced this morning, which was out of order at the time on account of other business taking place. That resolution is now in order and I will ask Secretary Isaac to read it.

The Secretary then read the following resolution:

WHEREAS, Farm labor is becoming increasingly difficult to obtain, and in California especially the great fruit and wine industries are therefore threatened with disaster; therefore, be it

Resolved, That the fruit-growers of California in convention assembled favor such amendment of the Chinese Exclusion Act as will permit the enactment of laws making possible a restricted immigration of laborers, irrespective of nationality.

And that the Secretary of this Convention furnish copies of the above resolution to our representatives in Congress.

MR. JUDD. I move the rules be suspended and the Convention deliberate on its adoption at the present time. If the Convention will suspend those rules, we can discuss the proposition at this time.

MR. COATES. I second the motion.

MR. SPRAGUE. I think it is unwise to do this sort of thing almost any time, particularly at present. There is a resolution that is being carefully considered by the Committee on Resolutions. Now, we have a practice of referring resolutions to the Committee on Resolutions, and the reason for it is to prevent such conflict as I have just referred to. It seems to me it would be much better to let this take its usual course.

MR. JUDD. I would like to hear from the chairman of the committee.

JUDGE AIKEN. It should be referred to the committee, for we have had that subject under discussion and will be able to report soon. If there is any resolution that should be referred to the Committee on Resolutions that is the one.

VICE-PRESIDENT POWER. The motion was made to suspend the rules. That matter is in your hands. If the gentleman will withdraw the motion, I will be pleased to refer it to the committee.

MR. JUDD. I withdraw the motion, and the Committee on Resolutions can meet in three minutes and we will report it back, and we will report it back just as it is.

VICE-PRESIDENT POWER. Does the party who seconded the motion wish to withdraw it?

MR. COATES. I believe I seconded it. I will withdraw my second.

MR. DORE. I want to see a resolution embodying the substance of this resolution adopted by this Convention. I would like to have the unanimous support of the Committee on Resolutions. We will discuss it, and if its language is not entirely satisfactory, let us modify it until it is. I believe that the time must come when we must voice our wishes for a modification of this Act. At the time when this matter was before the fruit-growers in San Francisco, there was a sort of hoodoo. A very complete discussion was had. The resolution was adopted by a good, fair majority; and yet I do not remember that a single San Francisco paper published that part of the proceedings of the Convention. We have to meet that sort of influence, and we will have it to meet while politicians manipulate the newspapers of the city.

Now, I say that we ought to have our committee consider this matter and take it up in a harmonious way. We are all of us eager to take whatever action will be most judicious, so that we can stand before the people of this State, and stand firmly upon our feet, demanding what is in the interest of all of us.

VICE-PRESIDENT POWER. The maker of the motion and also the second ask to withdraw it, so that it can be turned back to the Committee on Resolutions and by them returned to the Convention at the earliest possible moment. This will be done if there is no objection. Is there anything further to come before the Convention?

RESOLUTION RELATIVE TO THE DISTRIBUTION OF SEEDS.

PROF. WICKSON. May I offer a resolution and ask that it be referred to the committee? I will ask for the reading by the Secretary.

Secretary Isaac then read the following resolution referring to the appropriation made by Congress for the distribution of seeds:

WHEREAS, Congress appropriates annually \$242,000 for free seeds, and the Postoffice Department expends annually about \$250,000 in the distribution of the same; and

WHEREAS, These seeds being mostly of common varieties easily obtainable in the market; be it

Resolved, That it is the sense of the fruit-growers and nurserymen of California, in joint convention assembled, that much more good would result if this money were used to aid the Department of Agriculture and the State Experiment Stations in the securing, growing, and distributing of rare and valuable seeds and plants which might prove of economic and commercial value to the people of the United States.

VICE-PRESIDENT POWER. If there is no objection, it will be referred to the Committee on Resolutions. If there is nothing further to come before the Convention we will take a recess until 7:30 o'clock this evening.

EVENING SESSION—SECOND DAY.

WEDNESDAY, December 5, 1906.

The Convention was called to order at 7:30 o'clock. President Cooper in the chair.

PRESIDENT COOPER. The first on the program this evening is "Pear Blight Conditions," by Prof. M. B. Waite. I suppose you all know why he is in this country. He has made several trips across the continent, and has instituted a very vigorous fight against the pear blight, and he will be here most of the winter. After his essay on the pear blight, he will take up peach blight this evening, and also by special request of many of the members he will again take up peach blight on Friday morning. It will be the first thing Friday morning, and I would make a request now that the members try to get here as near 9:30 o'clock as possible, because there will be considerable discussion on this question, it being of much importance. I introduce to you Prof. M. B. Waite. Mr. Power will preside this evening.

PROGRESS OF PEAR BLIGHT CONTROL IN CALIFORNIA.

By PROF. M. B. WAITE,

Pathologist in Charge of Diseases of Fruits, U. S. Department of Agriculture.

At the last annual meeting of this Convention at Santa Rosa the writer gave a paper on pear blight work and its control in California, and Prof. Ralph E. Smith, of the State Experiment Station at Berkeley, read a paper entitled "Pear Blight Work in California." These two papers, which were afterwards printed in the annual report of the State Horticultural Commission and were extensively distributed in pamphlet form, gave a pretty full account of the conditions in regard to pear blight in this State up to December, 1905, and render unnecessary any elaborate description of the disease, its cause and the life history of the germ which produces it, methods of control, and factors governing infection and spread of the blight. The coöperative work carried on by the Bureau of Plant Industry, the California Experiment Station, and the State and County Horticultural Commissioners was explained fully in these papers, making further explanation unnecessary. Presumably, therefore, I am called upon to give a progress report describing the work and results since the Santa Rosa meeting.

Treatment of the Disease.—At the risk of repetition it may be advisable to give briefly an outline of the treatment of pear blight. This treatment depends on a careful investigation of the cause of the disease, a study of the life history of the microbe which produces it, and of the various influences or factors which control its infection and development in the tree. The preliminary treatment or main method of control consists in thorough eradication of all the hold-over blight when the tree is in a dormant or semi-dormant condition. To carry out this method fully requires very careful inspection of the trees, and thorough and skilled work in the eradication. Frequently it demands the entire destruction of badly infected trees when the blight has run down to the body or girdled the tree at the soil line, or has spread out into the roots. In pruning, a disinfectant has to be used, preferably corrosive sublimate, to keep the tools and cut surface free from contamination with the virus of the blight.

The secondary methods, often more or less successful and of varying practicability, consist of spraying the bodies of the trees or whitewashing them with lime-sulphur-salt, or other disinfectant washes, for sealing up the hold-over blight which had been overlooked and for keeping away flies and other insects which may carry the disease.

Summer cutting is also a valuable secondary method in fighting the disease. Summer cutting is of variable success. Invisible or new

infections may develop* after the most thorough cutting out, and even when great care is used the blight germs during the active growing season may extend considerably below the discolored part.

The removal of water sprouts and fruit spurs low down on the main branches and bodies of the trees is also of value.

The style of pruning and the severity of pruning of the trees also have their effects. Low-spreading, vase-form trees are of the most desirable shape, and moderate pruning is advantageous while fighting blight in the pear orchards.

The question of resistant varieties and stocks was also discussed as a means of partially avoiding the losses due to blight on the bodies and collars and below the soil line.

Moderation in cultivation and manuring and in irrigation is helpful.

Work in the Spring of 1906.—Upon reporting to Dr. B. T. Galloway and Dr. A. F. Woods, Chief and Assistant Chief of the Bureau of Plant Industry, that additional men were needed in this work, they promptly endeavored to supply the need. Fortunately, Mr. W. A. Beard, Secretary of the Sacramento Valley Development Association, was in Washington at the time, and when we were about to fail on account of the expense money, he secured, through the influences of Mr. Diggs, President of that Association, and Lieutenant-Governor Anderson, the means by which these men were placed in the field in addition to Mr. W. M. Scott. The Southern Pacific Company very generously supplied transportation west of Chicago and New Orleans to all our men. Accordingly, Messrs. Shear, Miles, Swingle, Spaulding, and Gilbert were put to work in the orchards. These men worked in close coöperation with the State Experiment Station men in the inspection and instruction work, often forming a part of the same crew. This additional force came rather late in January and was scarcely well started before the first of February. The work was necessarily somewhat hurried in order to cover the ground, and then many orchards were never even visited. The plan was to give every pear orchardist in the State an opportunity to become familiar with the methods of blight eradication, and the attempt was also made to give a tree-to-tree inspection. On account of shortness of time this was only partially carried out. Furthermore, the best time to do this work is in the fall of the year. In fact, the month of November may be considered the most desirable month for fighting pear blight.

Through the interest of the County Horticultural Commissioners a number of inspectors were set at work in several of the pear-growing counties. These inspectors were instructed by the Department and State pathologists, and often formed a part of the same inspecting force. In spite of this effort to assist the orchardists it became more than ever apparent that the brunt of the work in the orchard has to be done by

the orchardist or by his trained help. Some orchards were certainly very well worked, though probably perfection—that is, complete eradication—can hardly have been accomplished, or at least only in a limited number of orchards. Fairly good work was done in many orchards here and there in the pear district, but as a rule the proportion of well-worked orchards was, I regret to say, rather small. In some striking instances trees with the blight running down into the bodies and into the roots, which were plainly and admittedly beyond saving, even though they may have been marked or condemned by the inspectors, were left until after the blooming period, and infected the blight far and wide in their vicinity.

- Meetings and discussions with pear-growers were held, but especially field demonstrations, which had been started in the spring before, were given in many of the important pear districts.

It takes a lot of instruction and demonstration work to get the growers actually interested in the control of the blight and to properly instruct them in the methods of doing the work. It is also hard to get them convinced of their own power and ability of controlling this tiny microbe.

Results in 1906.—In March, 1906, when the pear blossoms began to open, the eradication work may be said to have been only fairly started, with the notable exception above indicated. Many trees were pulled out and large quantities of fresh blight were found on the roots, especially while the trees were in the bloom; many other condemned trees were still in the ground. It may be safely said, therefore, that while the amount of hold-over blight had been reduced in a few orchards that had been well worked, great quantities of it remained in the pear districts. Several of the Experiment Station men remained in the field to observe results, and Mr. Deane B. Swingle, of the Bureau of Plant Industry, remained until June.

As to the amount of blossom blight, which is the direct result from infection from the hold-over, it is plainly evident that in the spring of 1906 it had been reduced materially in all of the better worked sections. This spring probably was not especially favorable for the distribution of blossom blight. One peculiarity, however, developed in the way the blossom blight had scattered. Blossom infection, instead of being clustered in colonies around the hold-over cases, appears to be scattered lightly and widely throughout the orchards. Had the spring been dry and the rains stopped earlier in April, as has often been the case in this State, the blossom infection would doubtless have resulted in but little damage and it could have been easily removed by summer cutting. Unfortunately rains continued through April and May and even into June, and the infection periods were so intense that a very unusual amount of twig blight resulted. This often happens in the Eastern

States, where our rainy summer prevails, but was scarcely expected in California. The same conditions undoubtedly caused a great many infections on the water sprouts and sprouts which come from the French stock on the base of the trees and from the roots, and possibly also favored infection in the fleshy bark on the trunks of young trees or the tender bark at the soil line on larger trees. The conditions were very similar to those in the spring of 1905.

In visiting the orchards this fall it is apparent, therefore, that the blight has made great progress in its destructive course. During the last season many orchards only slightly attacked in 1905 have gone down badly and even been destroyed beyond recovery during the last season's outbreak. This is particularly true of many vigorous young orchards north of Sacramento in the Sacramento Valley. It is also true of very young orchards which I have visited in the lower Sacramento River district below Sacramento and in fine orchards of Yolo and Solano counties.

Present Conditions.—In Sacramento County in the strip of orchards along the river many instructive lessons can be learned from the behavior of the blight. In a large orchard near Walnut Grove, where efforts were made to secure eradication and where the trees affected below the ground line had been carefully marked by three hacks in the bark, these trees were not dug up and still remain, at least in part, to this day. The result was exactly what might be expected. The blight was already bad in the orchard, but now the orchard is a wreck and ruined beyond recovery. Probably over seventy per cent of the trees have the blight running down into the roots, many have their tops nearly totally destroyed, and all have many blighted limbs. On Steamboat Slough there are a number of very fine young orchards whose proprietors probably intended to eradicate the blight, but the work was not done early enough to finish, resulting in very great losses.

A number of other orchards, notably those in the vicinity of Courtland, stand out in marked contrast. I can refer particularly to the orchard of Mr. Ernest Gammon, near Courtland. This was the first orchard which I visited on beginning this work in February, 1905. Mr. Gammon started the work at that time, but was unable to secure very complete eradication that year. Last winter, after more experience and with better help, his work greatly improved, and while considerable blight occurred during the past season it has not been unreasonably severe; and standing the other day in the part which at first had been most affected it became evident that while losses had been sustained the fight had been victorious in the main. Mr. Barry, Mr. McCollough, and several other orchardists in the vicinity of Courtland can point to similar results. I can not say that these gentlemen have not been discouraged at times and still feel uncertain as to the outcome;

however, many of the Sacramento River growers now begin to realize that with careful, painstaking work, continued over a large area, the blight can be controlled. Mr. Hayward Reed, in his orchard opposite the city of Sacramento, has been particularly successful in fighting the blight. On the Pierce ranch, near Suisun, of which Mr. George Reed is superintendent, very excellent work has been done, and the orchard stands to-day in fine condition as a splendid example of the possibilities of blight eradication.

At Marysville and Yuba City a number of affected orchards have been very badly attacked during the past season and the owners in several instances have given up the fight; however, the orchard of Mr. Howard Reed is a splendid example of the results of the thorough carrying out of eradication methods. I may say, however, that the results have not in all cases over the State followed exactly as expected. Some badly blighted orchards that have been poorly worked have had less blight than anticipated; on the other hand, some of those little affected or carefully worked have had a bad outbreak during this year. These exceptions to the rule are, of course, to be looked for. There are so many variable factors concerned in the spread of blight that it is by no means possible to keep track of them all.

In the upper Sacramento Valley, in Butte, Tehama, and Sutter counties, many fine orchards have been destroyed during the past season. It is certain, however, that in most of these abundant hold-over blight was left either in the particular block or in the community. The fine orchard on the Cone ranch at Red Bluff is in a very good condition. Considerable blight attacked the orchard this year, but undoubtedly some hold-over blight was left at the base of the trees last season. At any rate, the infection in this orchard could be accounted for through the numerous cases of hold-over left in the vicinity, even though it was clean when spring opened. Instead of being discouraged at the outcome, however, Mr. Ramsay, the able superintendent, is now at work with a crew of men doing more and better eradication work than ever before. A few trees will be dug up, certainly only a small percentage however, but the blight, at least what can be found by the most careful work, will be removed.

In the foothill orchards of Placer County which center around Newcastle the blight has made only moderate progress during the past season. With a very few exceptions the orchards are all standing in good shape, although infection is quite general. As the pear blight methods become better known, more thorough eradication will probably be carried out in this district.

At Vacaville and Winters the condition is still rather bad. The blight has increased to a marked extent in many orchards, some of which were already damaged beyond recovery.

The loss of so many fine orchards in Solano and Yolo counties, and especially the severe losses in the upper Sacramento Valley, are certainly to be regretted, especially as it seems to me an unnecessary loss. If the growers would take up the work enthusiastically and thoroughly it is believed these orchards might have been saved. As it is now, more than half of the blocks of pear trees north of Sacramento, at least those which I have seen, are injured beyond saving. This, however, should not be discouraging to the skillful grower, because it renders pear-growing more profitable to those who succeed. It may cost more money to maintain an orchard and fight out the blight, but high prices will doubtless increase rather than decrease the profits in the business.

Blight has spread very badly on the apples in Northern California and has even attacked scattering orchards far into the Sierras. During the last year the writer found the California holly attacked by the blight at Vacaville. This is a member of the pome family and a relative of the pear and apple. After repeated examinations it was finally found attacked. It is evidently not a very good host of the pear-blight germ, however, but can harbor it under favorable conditions. It seems to me that on the whole, while the possibility of complete eradication seems to be rather remote, the behavior of the blight in the well-worked orchards gives more and more encouragement to those who will take the necessary pains in eradicating this disease.

Work During the Present Winter.—The Bureau of Plant Industry is giving more attention this winter than ever before in aiding the pear-growers in this fight. Instead of having the men here at the close of the fighting season, a number of competent pathologists were put in the field early in November to continue through until the blossoms open. The total number of Department men engaged in the work during the winter will be seven. Besides the writer, Mr. W. M. Scott, who was here last season, will be on the ground and in charge of the work during a portion of the time. Mr. P. J. O'Gara will be located at Newcastle and will look after the foothill orchards. Mr. W. F. Farot will be located at Suisun and will work in Solano and Yolo counties. Mr. George F. Miles will be located at Courtland and will spend his time in Sacramento County. Mr. James Burch Rorer is at present at Courtland, but will spend part of his time in the orchards around San Francisco Bay and the lower San Joaquin Valley. Mr. W. S. Ballard is at Vina and will devote his efforts to the upper Sacramento Valley.

It is our aim to give every horticultural commissioner or his inspectors an opportunity of getting instruction in the best possible methods of controlling this disease. Our men act as instructors or advisers to the orchardists in their fight against the blight. Some orchards we can actually inspect, or even in a few cases do the work on certain trees ourselves, but as a rule the real work must fall on the

grower. Therefore, the future of the California pear industry depends upon the skill and success of the California growers in carrying out these methods.

California Pear-Growers' Association.—During the past summer a new and powerful element has come into the campaign against pear blight. Stimulated by the Sacramento Valley Development Association, and encouraged by favorable opinions of many leading horticulturists in the State, this Association issued a call for a meeting of pear-growers in August in the city of Sacramento. As a result, the California Pear-Growers' Association was formed. The main object of this Association is to advance the interests of the pear-growers, and especially to assist by unity of action in the fight against the blight. Its expressed purpose is to encourage and work in coöperation with the Government and Experiment Station experts and the State and County Horticultural Commissioners. Lieutenant-Governor Alden Anderson was elected president and Mr. W. A. Beard secretary. Subsequently Mr. O. H. Miller assumed the duties of secretary as acting secretary.

It is a great help to the cause to have the aid of this powerful organization. Branch organizations have been formed in several counties, and already have materially aided in pushing this work forward. The Association officers realize that an important phase of the work consists in cultivating public sentiment in favor of thorough eradication; in other words, a great deal of our hardest work, up to the present time, has been in dealing with men rather than with pear trees and microbes. This work the Association, through its influential officers and branches, is much better prepared to undertake than the bacteriological experts.

REMARKS ON PEACH BLIGHT.

By PROF. M. B. WAITE.

Now, let us turn from this rather difficult, and perhaps rather gloomy subject, to one that is comparatively easy, to one in which the outlook is very promising, very rosy, while, nevertheless, the disease is a serious one, and, just at present, is particularly annoying to the California peach-growers. I refer to the peach-gumming fungus, or the California peach blight. It is also discussed under the name of the "shothole disease," or "shothole fungus."

This appears to be one of the easiest of all plant diseases to prevent. It stands in marked contrast with pear blight in many ways. Instead of being a disease which can be handled only by the eradication method, and which requires an enormous amount of strong and unanimous action over large communities, in which one man is dependent on many other men, it is a disease in which one single orchard can be treated,

one single row of trees, or even a single tree, or perhaps a single twig can be treated and thoroughly prevented from having this disease.

On my first trip to California, early in February, 1905, when I visited Mr. Cooper's office in the Capitol at Sacramento, Mr. John Isaac, secretary of this commission, handed me a bundle of twigs of this peach fungus, which he said was particularly troublesome in California—in fact, was almost, if not quite, as bad as the pear blight as a disease annoying the California fruit-growers. Fortunately there was microscopical equipment there, and after a few moments of examination I was able to tell Mr. Isaac that the disease was caused by a microscopic fungus with a very jaw-breaking name. I don't know whether it will hurt or not if I remember it here. It is named after a Swedish botanist by the name of Beyerink, and the Latin name is *Coryneum beyerinkii*. It is a tiny brown fungus with smoky-brown spores. It grows very rapidly; in fact, the spores can hardly wait until they are developed until they begin to sprout and germinate.

A few days later, when visiting the orchards at Suisun in company with Professor Ralph Smith, of the California Experiment Station at Berkeley, the full importance of this disease was shown to me for the first time. In studying the pear blight at Suisun with a number of Suisun growers, they took me into the peach orchards and showed me the destructive character of this disease. The trees were certainly in very bad condition. The annual twig growth was covered with little brown spots which were eating through the bark, even into the wood, and on many of the trees ninety, on some even ninety-five per cent of the buds had been evidently attacked and killed. In many cases gum was issuing from the spots. Later on, when the rains came on, there were very copious exudations of gum from these brown spots.

When I saw the serious character of the disease, I was also asked for treatment, and I replied at once that it was of a nature which could be prevented by the Bordeaux mixture. In other words, it looked like a typical fungous disease of the character usually prevented by spraying. I asked the Suisun growers if they had tried the Bordeaux mixture. They said they had, and that it had failed. Upon questioning them closely, and being shown a sprayed orchard, I was informed that the trees had been sprayed about the first of February, only about a week or ten days ahead of my visit there; but the spots were plainly three weeks to a month old; at least they had evidently grown before the Bordeaux mixture was applied, and the Bordeaux mixture was resting on top of a good many of the bad spots. The suggestion was then made that spraying must be done well ahead of the first infection.

Upon discussing this matter with George Reed, J. S. Brown, and J. R. Chadbourne, they promptly agreed to try this early spraying. The suggestion was made that early winter or fall spraying would be the

thing to try as a remedy for this disease. And that proved to be the key to the whole situation.

During the fall, Mr. Reed, Mr. Brown, Mr. Chadbourne, and some others made a test of Bordeaux mixture against this disease.

On the William Pierce ranch, at Suisun (Mr. George Reed, superintendent), they began spraying their peaches December 6, 1905, and sprayed a number of trees with strong Bordeaux mixture. The formula used there was fifteen pounds of bluestone, twenty pounds of lime, and a hundred gallons of water, making a very strong Bordeaux mixture. We do not consider the exact formula particularly important, as I will show later. Part of the trees were sprayed again when the buds were swelling, about February 1st, and at that time what we call a 5-5-50 Bordeaux was used—the ordinary standard Bordeaux. Through the courtesy of Lieutenant-Governor Anderson, who is connected with this orchard, the facts about the fruiting of that orchard were mailed to me at Washington later in the season.

Mr. J. S. Brown, of Suisun, sprayed the last week in December, and used the same strength of Bordeaux, or about the same. He made only one treatment of his trees, but they were not as badly affected as the orchard on the Pierce ranch.

Mr. J. R. Chadbourne sprayed a little later, early in January, using a single treatment.

When I visited these orchards in February, 1906, about a year after the first time I saw them, the effect of the spraying was very apparent. Wherever the trees were well sprayed (and most of these were very well sprayed), the bark was smooth and bright and scarcely a spot to be found. The buds were all intact, and by going to adjoining trees, or in many cases, by merely climbing the fence and visiting the adjoining orchards, very bad conditions, similar to those obtaining the year before, were apparent.

This beneficial result continued through the season. On the Pierce ranch, as I said before, they sprayed part of the trees a second time just as the buds were opening. These trees had been very badly affected, had produced little fruit for two or three years, and if we may judge by the behavior of similar trees in the immediate neighborhood, would have produced very little fruit during the past year. The results showed slightly in favor of the double spraying; that is, of an additional spraying at the time the buds were swelling, on February 1st.

I will give you some of the yield from this orchard, as it was given to me by the owners. In this block of sprayed trees, 402 trees of the Wager peach yielded just 100 tons of peaches; 180 trees of Lovells yielded 42 tons of peaches. Similar results were obtained in the other blocks; that is, very high yields,—so high, in fact, that Mr. Reed told me the other day that few people were willing to believe the figures which

they had got from their peach crop this year, on account of the universal failure in the neighborhood.

Mr. J. S. Brown, with his single treatment on Muir and Phillips Cling, had fine results, splendid yields, and a very good quality of fruit.

Mr. J. R. Chadbourne had about the same results.

The orchard of Mr. J. R. Davidson, near at hand, was treated under the direction of Mr. George Reed, but spraying was not begun until some time in January. The earliest spraying was partially successful.

This is a point to bear in mind: that even after the first of January very good, but not completely successful, results were secured; but the late January spraying was practically a failure. I saw that result, and examined these trees myself when they were in blossom. Part of the trees, even though they were somewhat peppered with Bordeaux mixture, had a lot of peach blight on them, and a lot of the blossoms failed to open, because the buds were killed, and some of the blossoms were shriveling on the trees.

Fortunately, therefore, the California peach-grower has for the coming season more than theory or a suggestion, which was all we were able to give a year ago. He has a demonstrated fact that Bordeaux mixture is a specific for this disease.

The only questions that remain to be determined are the incidental ones in regard to this treatment: How early must we begin, to be safe? Was last year a normal season? It was a very dry fall. Possibly with a warm, early fall infection may take place earlier than December 15th, and, therefore, spraying on the first of January or the last week in December will not be so successful. Furthermore, in the treatment of the fungus in the Eastern states, the people use what we call the standard Bordeaux mixture, 6-4-50, or the new standard mixture, 5-5-50; that is, five pounds of bluestone, five pounds of lime, and fifty gallons of water. That has given just as good results when thoroughly applied as when more copper was used. Copper is particularly scarce in California just at present, so that any saving in this is worth while. We believe that the 5-5-50 formula will do just as good work as the stronger mixture, if it is thoroughly applied. In other words, the results will depend on thoroughly coating the twigs rather than on the strength of the mixture. Bordeaux mixture is not a matter of strength so much as a matter of getting the copper on the trees. You can overspray, and double spray with a dilute mixture, and get just as much copper on as you get with a strong mixture poorly sprayed, and the mixture must be on the particular spot to produce results. Some men, in their efforts to fight this disease, are inclined to overspray and waste a lot of material—to spray more than is necessary down on the bodies of the trees and down on the ground. Yet I am rather afraid to caution on that line for fear you will do as some others do, spray too

lightly. It is not necessary to waste any amount of copper; it is not necessary to spray heavily on the limbs and branches. Do your work on top, and much of the spray will fall down anyhow. By the time you have got the top sprayed, you have partially sprayed the lower part; and then follow down to the base of the tree. The trees have to be sprayed on all sides. It does not require the thick, heavy coating that you are used to applying with the lime, sulphur, and salt, but it requires a continuous coating which will very thoroughly pepper with the Bordeaux mixture.

Now, as an ordinary, safe treatment, we should say, with present knowledge of this disease, that the spraying should all be finished by December 1st. The first treatment may be made late in November or very early in December. A second treatment may be made just about the time the buds are beginning to swell, from January 15th to February 1st. Perhaps it may be necessary in an ordinary rainy fall, which we sometimes have in California, to begin this spraying early in the autumn, just as quick as the leaves are off; or it may possibly be desirable to spray with a solution of bluestone without any lime—just spray bluestone early in November and cut the leaves off, because a few days later they fall to the ground—say a solution of four pounds of bluestone to fifty gallons of water; and then come around after the leaves have fallen and spray with standard Bordeaux mixture. That is to say, we might not be willing to wait for the leaves to fall before we begin to spray the twigs, but the leaves have to be off before we can do a real thorough job of spraying the twigs for this disease.

We are also carrying on a series of experiments, testing different materials, different strengths of Bordeaux mixture, and the possibility of using lime, sulphur, and salt. We are also going to try the Oregon wash, which consists of lime, sulphur, and salt, to which bluestone has been added. We may be able to kill the scale and fungus at the same time. We are also trying to increase the sticking power of the Bordeaux mixture. The plain Bordeaux mixture can be improved by the addition of soap and other materials which we are testing. The more of these experiments, the better the information will be next year for the California peach-growers. Furthermore, the peach orchards are being very widely sprayed over the State, especially up the Sacramento Valley, and the orchardist himself is going to have lots of experience in fighting this disease. It may be that we can use other mixtures as well as the Bordeaux mixture. One thing is certain, that we have an absolutely safe specific for this disease, and it is only a question of work to prevent it.

VICE-PRESIDENT POWER. The next on the program is "Recent Work in Entomology," by Prof. C. W. Woodworth.

RECENT WORK IN ENTOMOLOGY.

By PROF. C. W. WOODWORTH, OF BERKELEY.

It was at first my intention to treat this subject in the broadest possible manner, reviewing the progress now being made in practical control work against insects in all parts of the world and pointing out the lines along which the best progress has been made, especially by the most recent studies, with the object in view of indicating the most promising questions for future study. A great deal of data was brought together for this purpose and some progress made in the preparation of this paper when the report of the Office of Experiment Stations of the U. S. Department of Agriculture for 1905 came to hand containing an elaborate discussion of the same subject by Dr. Wilcox of that office, limited however to the work of the American Experiment Stations along this line. So well did he arrange the data that what I will have to say may be considered in some ways a commentary from a Pacific Coast point of view of that more extensive article. The fact that the author of that publication limited himself to the work of the Experiment Stations of the United States does not materially narrow the point of view, since a comparison of the data he presents with that gathered together by myself for this paper made the fact evident that the contributions to the methods of practical insect control work of a noteworthy character have of late years been almost exclusively the work of these Experiment Stations. The economic entomologists of other countries are far behind our own workers, as a rule, though a few of them are doing very good work; in every case, however, problems of significance to us here have been handled by American entomologists in a manner at least as satisfactory as by foreign workers. In this respect the passing generation has seen a great change. In the earlier writings of that greatest of economic entomologists, our own honored and lamented Prof. C. V. Riley, there were many references to the backward condition of entomological science in America. He did more than any one else to place American entomology well in the front rank. The magnificent work of Rotzeburg in Germany, of Curtis and Miss Ormerod in England, and a host of brilliant workers on the phylloxera problem in France are all of the past. The American Experiment Station workers have taken up the work where Riley had placed it and have maintained the preëminence he so clearly won. This paper would fail of doing justice if a tribute was not paid to three institutions antedating the active work of Riley himself. I refer to the Division of Entomology of the U. S. Department of Agriculture and the office of State Entomologist of New York and of Illinois. These three offices are the only ones that are making

large and notable contributions to this subject in America outside of the work of the Experiment Stations. The U. S. Division of Entomology was practically created by Riley and is by far the best equipped and supported entomological department in the world. The U. S. Entomologist controls a body of assistants nearly as great in number as all the Station entomologists combined, and spends an annual appropriation almost or quite as large as the combined sum available for salaries and expenses of the Station workers. Each of the two State Entomologists mentioned have also more men and means than the entomological department of any Experiment Station. Several other states have entomological departments supported as well or better than the average Station entomologist, but either the quality or quantity of the work produced has not been such as to attract much attention, though in justice perhaps a few of them should be mentioned here.

The Experiment Stations of the country have easily produced the best and largest results, in proportion to the cost, of any existing agency for the study of the problem of insect control. The quantity of the work produced by the Stations may be appreciated from the fact that nearly 4,000 publications devoted exclusively to entomology have been issued by the Stations.

The recent progress in this subject is of particular interest to California growers. In the article above cited the author, Dr. Wilcox, selected 106 publications for review, or about $2\frac{1}{2}$ per cent of these publications; these contained, according to his conception, the most noteworthy contributions. Ninety of these are of immediate interest to the Pacific Coast, and eleven were studies made by the California Station. It is a matter of considerable personal gratification to note that Dr. Wilcox has selected a considerably larger number of publications from this Station than from those of any other existing entomological department.

In the following remarks I will limit myself to this $2\frac{1}{2}$ per cent of the Experiment Station's entomological publications selected as the more important contributions by Dr. Wilcox, and will choose therefrom those studies most pertinent to our California problems.

Foremost among the results obtained has been the thorough testing out of the lime, sulphur, and salt wash. In Bulletin No. 166 of this Station is given an account of the first discovery of the value of this wash. Its practical use in this State for many years had long ago established its place in the opinion of our growers. Now through the careful, scientific studies of the Station entomologists of a dozen states, we have knowledge of its efficiency under a great number of climatic conditions and with a great variety of methods of compounding it, as well as much data upon the time and method of its application. In

the past here locally in California this mixture has been used and its good qualities appreciated by many, but without definite knowledge as to its limitations or range of availability. Venders of insecticides of all sorts have been able to throw discredit on the material and induce growers to substitute their nostrum. Our own studies made here at Hanford by Mr. Quayle and the other studies just referred to have finally settled many of these problems, and this mixture now takes its place among the fully tested standard insecticides. Though much has been accomplished in the study of this insecticide, much more still remains to be done. The substitution of a ready-made lime-sulphur mixture is a great desideratum, since its use is practically limited at present to large-scale spraying work, on account of the inconvenience of manufacture. Even in orchard spraying a ready-made mixture would be a great convenience if the cost were not too great. Such mixtures are already being placed on the market, but can not secure the indorsement of any careful entomologist, because they are not tested as carefully as the standard mixture. We must learn the principles upon which the efficiency of these substances depend and learn what effects the various ingredients of a lime-sulphur mixture produce, whether the various sulphids have each a definite action or whether they modify one another. There is no question whatever but that when these principles are established a ready-made preparation can be produced, if it has not already been produced, that will not only be equal to the crude product now manufactured on the farm, but far exceeding in efficiency much that is now used, for it is beyond question that according to the accidents of manufacture there is now much variation in the material as applied to our orchards. We want not only a good insecticide, but the best.

Next to the insecticide just mentioned the petroleum oils, or their distillates, have received the largest amount of attention. Our contribution, Bulletin No. 153, has given the most light upon the subject, still agitating our growers, of preventing possible injury to the plant. The efficiency against insects and safety to the plant under many conditions are amply proven in elaborate experiments in half-a-dozen states. While the work already accomplished has been of great value, that which is yet to be done is still more extensive, especially here in California, where we have to do with a crude product, extremely variable in composition. We can obtain from among the products of our various oil districts, or by distillation, almost anything we may desire, and we know that some of these substances are among our cheapest, safest, and most effective insecticides, but with the present lack of knowledge it is almost impossible to recommend anything. In the southern portion of the State especially has this subject been of absorbing interest, almost to the exclusion of other entomological problems. With our efficient

mechanical mixing and spraying machinery there should be a great future usefulness for this class of insecticides, but there will not be unless we can learn enough of the essentials to insure the safety of the plants treated.

Fumigation is another insecticide now counted of the first importance which was first made practically successful in California. Several recent studies have added a great deal to our knowledge of this insecticide. Our Bulletin No. 152 gives the most extensive contribution to our knowledge of the amount to use that has yet been presented. At the present time the growers are particularly insistent that further studies be made to improve the certainty of its action. While recognized as the most efficient of all insecticides, under the best conditions it is now too often a failure. One of my assistants goes into the field next week to begin further studies on this subject.

Arsenical insecticides have received more attention than cyanide in the Eastern states, and are a subject of considerable concern in this State. Our Bulletin No. 151 presents precise information upon the character of the paris green found on our market. Bulletin No. 155 brought about a substitution of lead arsenate for paris green to a very large extent in the regions where the latter substance was liable to injure foliage. The danger to foliage is the most important problem in the use of this insecticide. The results of the studies of this Station the last two years at Watsonville will make a notable contribution to this subject. These have not yet been prepared for the printer, but will probably appear before spring. We expect to be able to greatly reduce the cost of this insecticide.

The addition of sulphur to the materials used for spraying purposes for other reasons than the control of mildew is the result of studies of this Station on red spiders, as given in Bulletins Nos. 145 and 154.

Insect control involves numerous other problems than the selection or application of insecticides. In many cases it may be found that insecticides are not applicable. Nearly all the progress in economic entomology has been made in cases where they can be efficiently used. Even in these cases there must be more attention given to the insect than to the insecticides, to make the work effective. Each insect must be studied by itself, and in many cases in each region an insect, like the codling-moth, for instance, may present special problems for study. This division of the subject, however, I will not attempt to discuss in detail, but only mention names of a few of the insects particularly studied and against which conspicuous progress has been made.

The insects toward whose control the most decided progress has been made by studies at the California Station are the codling-moth (Bulletin No. 155), potato-worm (Bulletin No. 135), peachtree borer (Bulletin No. 143), peach-worm (Bulletin No. 144), and hop-aphis (Bulletin No. 160).

Insects injuring crops in California for which other states have made notable advances in their control, are apple-aphis (Idaho Bulletin No. 40), woolly-aphis (Missouri Bulletin No. 35), tent caterpillars (Connecticut Bulletin No. 139 and New York State Bulletin No. 159), Hessian fly (Kentucky Bulletin Nos. 103 and 111, and Missouri Bulletin No. 62), and the squash-bug (New Hampshire Bulletin No. 89). On several of these, studies are now in progress by the California Station. Many other insect pests call imperatively for study.

There never was a time when such an amount of careful, scientific study was given to the practical control of insect pests as during the past few years; never a time when larger financial returns have resulted from this kind of study. In this progress California has taken no backward part, and nowhere, I believe, the need of continuing and expanding this kind of work is more evident than here. Above all, it should be realized that whatever measure of success has been achieved has been due to the application of the scientific method of study. It has been no series of accidents or fortunate discoveries, but the application of hard work, systematically and persistently directed to the discovery of the laws governing the facts of nature. This kind of work, I say, should be supported by the State in a liberal manner; it is a good investment; but in providing for it, there should be full assurance that it be real scientific work. Only those who have the right kind of mental aptitude and such seriousness of purpose that they will take the necessary training to fit themselves for scientific investigation are able to accomplish such research work.

In this paper I have called special attention to the need of work with insecticides. Judging the immediate future by the past, it seems beyond question that the most promising field of study lies in this direction. I do not want to be misunderstood, however, as suggesting the abatement of effort along other lines. I am only predicting that the greatest proceeds from the investment of effort will come from the further working of the fields that are now productive.

In this connection it may not be out of place to say something in regard to the question that has been discussed so often before this Convention: that of the need of parasitic and predaceous insects. Nearly all of the older economic entomologists have expressed themselves as hopeful of securing practical control of insect pests by favoring their natural enemies. There was none more outspoken along these lines than Professor Riley, and no one of his contemporaries made more effort than he to practically carry out this principle. The introduction of the *Vedalia cardinalis* into this State was one of these efforts, which our honored chairman played no small part in bringing to success. Since that time there has been a great deal of effort along similar lines, especially here in California, due to the activity of our chairman,

but practically no literature of real scientific value is in existence. It is a matter of regret that the work done in this State along this line has been done without any effort toward the scientific study of the problem. No one has adequate knowledge of exactly what has been accomplished thus far. The literature that does exist shows clearly that the kind of observations and experiments that it is necessary to make in order to speak intelligently on this subject has never been made. No one is safe in estimating how much has been accomplished, nor can he make any true estimate of the future prospects of this line of work. What is needed most now is to have an exhaustive study made to determine the results already secured, and if future work of this nature is to be done provide first of all for a careful, scientific study of the problem, which shall follow through all the work day by day and accumulate data valuable in the prosecution of the work and giving a reliable basis for judging of the results secured.

It would seem that in this State, where we are willing to spend so much for horticultural inspection work and for so many other purposes intended to be in the interest of the grower, we should also provide—we should not be so shortsighted as to fail to provide—for the scientific investigation of these practical problems of insect control.

VICE-PRESIDENT POWER. We will now listen to a paper entitled "The Horticultural Commissioner," by R. P. Cundiff.

THE HORTICULTURAL COMMISSIONER.

BY R. P. CUNDIFF, OF RIVERSIDE.

The rapid development of the horticultural interests of California during the past thirty-five years has never been equaled by any other country. The great area of our State, with its diversity of soils and climate, has made it possible to produce, not only the greatest variety, but the finest and best flavored fruits, easily placing California in the lead in horticulture.

From the "Trade Index" of 1904 we quote the following: Twenty-four states report a fruit crop exceeding \$1,000,000 in value, California leading with \$21,700,000, New York being second with \$10,500,000. Since the above figures were compiled the increase for California has been not less than 15 per cent. As a fruit-producing State, California leads in the following varieties: Oranges, lemons, figs, olives, apricots, pears, prunes, and apples. The orange crop, in the report above referred to, was 28,000 cars from this State. The area devoted to citrus fruit in California is estimated to be about 76,000 acres, while Florida, its only competitor in the United States, has about 26,000 acres.

The grand results achieved by our horticulturists in placing our State in the enviable position it occupies as the greatest in horticulture, have not been attained without most careful and energetic effort.

Aside from careful cultivation, pruning, fertilization, and selection of best varieties, the protection of our orchards from destructive insects and plant diseases has engaged our most intelligent consideration. California was the first State to enact and put in active operation laws designed to protect horticulture against insect pests and plant diseases. Our commerce with many of the oriental and tropical countries, where insect life is abundant and destructive, brought to us some very troublesome and expensive pests. Our first law intended to promote and protect horticulture was enacted in 1881. This law was intended mainly as a quarantine measure, for the purpose of preventing the introduction of dangerous fruit pests from foreign countries. Unfortunately this law was not enacted in time to prevent the establishment of some very serious insect enemies of fruit culture. The law has been amended from time to time as the increasing importance of the fruit industry appeared to demand.

From the cumbersome State Board of Horticulture of nine members who were appointed by the Governor from different districts of the State, we now have an active State Commission of Horticulture, consisting of a State Commissioner and the necessary number of assistants, to properly carry on the great work intrusted to his care.

The State horticultural law provides for the establishment of County Boards of Horticulture, to consist of three members. Such commissioners are authorized to district their counties, appoint inspectors, etc. The appointment of County Boards of Horticulture can only be made upon the request or petition of twenty-five, each of whom must be a resident freeholder and owner of an orchard. Upon such petition being presented to any Board of Supervisors they must appoint a Board of Horticultural Commissioners, as above provided for. Though the law explicitly states that such commissioners shall be qualified to properly perform the duties of such office, it is nevertheless true that in many instances this is absolutely ignored by the appointing power. Unfortunately some of our Boards of Supervisors appear to have but a slight conception of the importance of this office, and in such cases their appointments have generally been political rewards instead of any attempt to place the best and most competent men in these positions. This has resulted, as might be expected in some counties, in bringing the horticultural commissioner into disrepute. Surely an officer whose duty it is to protect and promote the leading industry of our State should be endowed with better qualifications than his mere ability to do politics. The man selected for commissioner should receive his appointment absolutely upon his ability and especial fitness

for the office, and entirely independent of any political considerations. In this manner only will it be possible to obtain the best benefits of this most important office. The appointee should be a man of well-known intelligence and ability; if possible, one who has made a sufficient study of entomology to correctly classify such injurious and beneficial insects as he is likely to come in contact with in his locality. He should also have a thorough knowledge of remedies or other methods of combating injurious pests. A knowledge of vegetable pathology is also very important, at least a sufficient acquaintance with the same to be able to correctly diagnose, and apply proper remedies for the cure of such plant diseases as he will be liable to come in contact with. He should be a man of first-class executive ability, who at all times will be able to secure the greatest benefits to horticulture in his locality, at a minimum expense.

The horticultural law invests the commissioner with powers, seemingly arbitrary, regarding the eradication of insect pests and plant diseases. This power should never be used in a haughty or unjust manner. The unwise use of this authority has in many instances made enemies for the horticultural commissioner, which by a reasonable amount of diplomacy could have been averted. I should, however, not advise a weak or vacillating policy when it comes to an individual as against a community interest.

In addition to the information gained by close observation and experience, the various bulletins, issued from time to time by the U. S. Department of Agriculture, should receive his most careful attention. The reports of the entomological and pathological divisions should engage his especial consideration. To be an efficient horticultural commissioner, as in any other business or profession, requires an especial fondness for the work. This must be supplemented by energetic study and close observation. In this way only will he be able to give prompt and reliable information to those seeking his advice.

This is the age of specialization. We would advise against the commissioner distributing his energies over too wide a range of subjects, lest he become superficial in many and proficient in none. If the commissioner is able to successfully cope with the insect problem and plant diseases of his locality he will have accomplished all that should reasonably be expected. Reliable information should at all times be available from our State horticultural department on such subjects as cultivating, fertilizing, pruning, etc. The advantages of a competent horticultural commission in any county where fruit-growing is engaged in to any extent are many and important.

The enemies of fruit culture in the way of destructive insects and plant diseases are in some localities of our State already a serious drain upon the income of the orchardist. The best and most econom-

ical methods of combating the pests already established, as well as a determined effort to prevent the introduction of new ones into his locality, should receive the earnest attention of the commissioner. Many instances could be cited where an active and successful County Board of Horticulture has induced the investment of capital in orchard property. The fact that a county is sufficiently interested in horticulture to maintain an energetic, competent horticultural commission should be an inducement to the careful investor. He would naturally infer that such a condition was to a great extent a safeguard against the introduction of insect pests and plant diseases, and that such pests as might already be established would, if possible, be held under control.

To prevent, as far as possible, the appointment of incompetent persons as horticultural commissioners we believe the present horticultural law should be amended as follows: That no appointment be made or application considered by any Board of Supervisors, until such applicant shall have filed with such board a certificate as to his qualifications to properly perform the duties of such office, duly signed by the State Horticultural Commissioner. The term of such appointment to be for four years, unless removed for cause, after charges are preferred and proven. We believe such an amendment would practically eliminate partisan politics, and otherwise greatly improve the personnel and efficiency of our horticultural commissions.

VICE-PRESIDENT POWER. "Root Stocks for Grafting," by A. D. Bishop.

ROOT STOCKS FOR GRAFTING.

BY A. D. BISHOP, OF ORANGE.

The question as to whether we are giving sufficient attention to the stocks on which we are growing our orchards is ever presenting itself to my mind, and the answer, based on experience and observation, is always in the negative, although relating mainly to the business of the south and the citrus industry, as that is the work in which I am engaged.

To those who know more than I do and who practice all that I suggest, these lines are not addressed, but to those people who are continually doing things that were done twenty years ago which experience has proven impossible of success, a few hints may be of service. We often read flaring advertisements with extended head lines setting forth the great success of individual work under especially favorable conditions and circumstances as though this success could be achieved by all, and we fail to realize that for every special success there are hundreds of whole or partial failures. While such statements are unques-

tionably true in the instances cited, they are wrong in the fact that they are misleading, and while we seek to induce the people of the East to come and stay with us and to divide our holdings with them, or have them improve the vast territory yet unused, we should wish them to be contented, and to be contented they must be successful, and to that end start right. It is for this reason that I am making the following suggestions.

As showing the lack of judgment evinced even by people of long residence among us, it is not uncommon to see orchards of one variety removed and another planted, until practically the same land has been replanted three or four times. And when they ask you the best way to start a walnut grove and you tell them by all means to plant a nut of the American black or giant California in the place where the tree is to grow, and when of proper size, graft with a scion cut from a bearing tree producing the character of nut desired that always produced a plentiful supply of staminate blossoms and ripened its pollen at a time when the pistillate blossom was ready for fertilization, you are met with, "Oh, well, I know that is correct; but I am in a hurry, I can not wait for that. I want trees now." And so the planter buys what he can find; possibly none that exactly suit; and when they commence to bear, they produce all kinds of fruit, from good to bad, while some produce practically nothing.

A few years ago, more than fifty per cent of the hybrid walnuts were afflicted with black knot at the surface of the ground before they had been planted in orchard three years. Whether or not this was caused by injury in cultivating, as many contended, it is not as prevalent now as in the past. The transplanting of the walnut causes a greater shock to the tree than to most other deciduous trees, and I believe more so when on the black walnut root.

We have the annual spectacle of people planting grape cuttings in a territory where the mysterious California vine disease is prevalent. These show signs of the disease by the end of the first season, and at the end of the third are practically all dead, without having produced a bunch of grapes; when it is a well-known fact that there are varieties immune to the disease and that all varieties grafted on resistant roots, while not immune, will be prolonged to yield some degree of profit.

It is a peculiar thing that none of us ever contemplate any additional plantings until suddenly seized with an inspiration to plant some special varieties, and still more peculiar that many others are afflicted with the same inspiration about the same time, which results in a great scramble for trees; but if you suggest to a man that it is not safe to plant orange or lemon budded on sweet seedling roots, and especially on land of the character which he has in contemplation, owing to the liability of gum disease, he tells you, "This is all I can get, and as I wish

to receive some return for this work myself, I can not wait." He should know, if he has been a resident for only a few years, that by the second year he will have commenced to doctor some at the ground's surface; the next he will begin to replace, and at the tenth year a large percentage will have been replaced; and if attended to faithfully some will have been replaced at least three times, and I have witnessed the replanting of more than ten per cent at the beginning of the second year. Now, if on the day the orchard was started he had planted seed of the wild or bitter orange of the West Indies, commonly called sour-stock, and grown roots on which to bud, he would surely have had a more profitable orchard at the end of the tenth year.

I find in the published report of a Farmers' Institute held in the City of Santa Ana in 1892, that A. D. Bishop recommended the use of sour-stock as a preventive of gum disease. It was a theory with me at that time, because of the natural condition under which this stock grew and the not entirely dissimilar condition which we create by irrigation. I consider it now to have become a well-proven fact, and while gum disease is much more destructive on some classes of soil than others, it is present everywhere and on the increase. Some twenty-five years ago it was unknown, and we may well ask ourselves if it is unreasonable to expect citrus trees to develop troublesome and destructive diseases, since that is the common history of many agricultural plants, both annual and perennial, when grown for a considerable period in the same field or territory.

Nurserymen, like people engaged in other commercial enterprises, are working for the profit that is in the business, and while striving to supply the public with what they demand, they are growing trees on such roots as will insure the largest and best looking trees in the shortest possible time, and for that reason a large percentage of the stone fruit orchards are of the peach, a root of short life and full of trouble in its susceptibility to attacks from insects and diseases.

If a part of the effort now being expended in the creation of new varieties were devoted to the creation of stocks immune to any serious troubles that affect the industry, it would undoubtedly result in lasting benefit.

The great advantage in using sour-stock is in its magnificent deep-growing root system, its immunity from gum disease in the top grown upon it, provided it is budded high enough to prevent its more tender bark from coming in contact with the ground, and I have yet to find the first block of nursery stock that conforms to that condition, all being budded so low as to lose all advantage from the resistant stock, probably because the grower would have been compelled to keep the stock a year longer to have gotten them of proper size at 12 and 16 inches from the ground.

VICE-PRESIDENT POWER. "Barring Out Suspected Stock," by S. A. Pease.

BARRING OUT SUSPECTED STOCK.

BY S. A. PEASE, OF SAN BERNARDINO.

As all well-posted horticulturists know, all of our very numerous bad fruit tree pests have been shipped into our State on nursery stock of various kinds.

We, of California, are noted for being in the front rank in the matter of inspection and quarantine. And yet it should be apparent to all that something has been awry with our methods, else we would not to-day be taxed with such a long list of bad fruit pests.

The white scale (*Icerya purchasi*) was introduced into California from Australia on acacia plants in 1868 by Mr. George Gorden of Menlo Park. From there it spread all over the State and cost an immense amount of money to fight it prior to the introduction of its natural enemy, *Vedalia cardinalis*.

The red scale (*Aspidiotus aurantii*) was first introduced into California on six lemon trees from Australia by Don Mateo Keller of Los Angeles. When we contemplate the immense amount of damage done by this pest to our citrus groves and the hundreds of thousands of dollars that have been spent in fighting it, surely we realize what a great thing it would have been if those little lemon trees had been dropped into the ocean, or burned, or at least quarantined until the trees were proven to be perfectly clean.

The purple scale (*Mytilaspis citricola*) was first introduced into the United States on some lemons shipped into Jacksonville, Florida, from Bermuda in 1855. This was so long ago and the damage so great in Florida that it would seem to the average person that every care would have been taken to keep it out of our State. It would seem as though nurserymen interested in Florida stock would wish *not* to have it spread. The facts are that certain nurserymen who raised and budded citrus trees in Florida shipped a great many carloads into this State. Many of the trees were covered with the purple scale. When *our* inspectors quarantined the infested trees, burned some, removed the foliage from many, and brushed the trunks, the said nurserymen declared that they were unfairly treated, because this scale would not live in Southern California. And, further, they said that if the trees were allowed to be planted with the scale on them they would pay five dollars for every scale found alive at the end of two years. Fortunately for us, in our immediate vicinity these "fairly tales" had no effect; and we have no purple scale in our county to-day. But these same nurserymen turned their shipments in another direction, where they

were allowed to plant their trees without let or hindrance. What was the result? A friend of mine who lives in that locality told me a short time since that he would like to show me a block of eight hundred acres of a new kind of fruit, a deciduous lemon. I asked him what made the trees shed their leaves, and he answered, "Purple scale."

It has cost California millions of dollars to learn some of these lessons and it would appear that the end is not yet.

The red spider of the citrus tree (*Tetranychus mytilaspidis*) was shipped into California on trees from Florida, as were also the rust mite and the silver mite of the lemon, and the Florida wax scale. We haven't them all yet, and are we to continue until we have all of these known money wasters?

The red spider of the deciduous tree (*Bryobia praetensis*) was first heard of by us on deciduous orchards in the northern part of our State, where the earlier method was to fight them by filling the air through the orchard on damp or foggy days with sulphur thrown through a broadcast seeder; and yet, after reading all this, deciduous nursery trees were shipped south into our county, where the uneducated eyes of our inspectors did not discover the millions of eggs at the base of twigs and limbs on the trees. So, Southern California was set to fighting this pest.

The "San José" scale (*Aspidiotus perniciosus*) came from northern China and was first introduced into Santa Clara County by James Lick in 1870. Since that time, it has spread all over the State of California, and the United States as well. The history of the spread of this scale is so well known that it needs no further mention from me.

In June, 1891, a cargo of orange trees arrived at San Pedro from the South Sea Islands. Upon inspection, these trees revealed the presence of eight different kinds of scale insects. Among them was the mining scale, which it was found impossible to kill without killing the trees. Finally, by an order of the court this whole cargo was burned on March 29 of the following year.

At that time, in the report of Alexander Craw, he recommended that the quarantine laws be further amended, giving the officers more definite powers, as delays in the enforcement of laws is often dangerous (State Horticultural Report, 1892, page 453). In the same report for 1893, page 291, Mr. Craw says, "An ounce of prevention is worth a pound of cure," and further on he says, "It will be readily appreciated here that eternal vigilance is the price of success in the fruit industry, and if we would reap that just reward for which we labor we must take effective measures to keep out those destructive agencies which we have not got, and stamp out by the best means those which we have."

Among the destructive insects which so far are not introduced into our State, I will mention the gypsy moth (*Porthetria dispar*), the

white fly (*Aleyrodes citri*), and the Mexican orange-maggot (*Trypeta ludens*).

In our own county we have no purple scale, Glover scale, wax scale, rust mite, silver mite, nor phylloxera of the grape. It is patent to any one who has had experience in combating scale insects that we do not wish to acquire any more.

To illustrate how our people feel on this subject, I will relate a little incident. A certain nurseryman was very anxious to ship orange trees into one of our districts which practically has no pests. These orange trees were infested with the Florida red spider (*Tetranychus mytilaspidis*). The man insisted that he had a right to ship his trees anywhere that he could find a market for them. A number of the wide-awake growers in that district said that if necessary they would send a representative to where the trees were and purchase them and burn them there. It was not necessary, and the trees were not shipped into their district.

Many of the worst insect pests are so minute that they are very apt to be overlooked by the ordinary inspector, hence we have an ordinance quarantining very strictly against nursery stock from districts known to be infested with insect pests not prevalent in our county.

To illustrate, again, we have over sixteen thousand acres of grape vineyards in our county, and as yet we have no phylloxera. If we admit grapevines from a locality known to be infested with that pest it is patent to any one who is acquainted with the pest history of this State that it would only be a question of time, and a very short time, perhaps, when that worst of all grapevine pests would find its way into our extensive vineyards and the consequent damage would be greater than any nurseryman or combination of them could remunerate. Past experience has shown us "how great a matter a little fire kindleth."

We quarantine very strictly against any possibility of introducing the "peach yellows." Why should we be less careful about acquiring other known injurious pests?

And in the matter of local quarantine inside our State, would not purple scale, or phylloxera, or long scale, or any other scale, be just as damaging and just as costly if introduced from an adjoining county or an adjoining district as it would be if imported from another State or country?

We are spending many thousands of dollars annually in our county fighting fruit pests, and we will not sit down peacefully and allow our county to be flooded with the whole list of pests, simply because some avaricious men have stock that they wish to dispose of for money, whether said stock be clean or infested.

Experience has shown conclusively that if any one has infested nursery stock he is very apt to reduce the price on such stock in

order that he may catch the unwary and dispose of his stock, insects and all. That kind of business I do not excuse, as I have heard many do, by calling it human nature; I simply call it avarice.

I could cite cases where individuals have told ranchers that they could dodge our ordinance by shipping stock under a false name. Is this right, or just, or honest? All we wish to do in these matters is to use all honorable means to avoid past mistakes and not add to our already long list of burdensome insects.

We have no desire to quarrel with the honest nurseryman. His interests and ours are alike jeopardized by the increase of these pests; but we do feel that the best interests of every part of California should actuate their motives as well as those of the Horticultural Commissioners. We can work in harmony and still aim to avoid the expensive mistakes of past years.

(At this time an adjournment was taken until 9:30 A. M. to-morrow morning.)

PROCEEDINGS OF THIRD DAY.

THURSDAY, December 6, 1906.

The Convention was called to order at 9:30 A. M. President Cooper in the chair.

MR. JOHN MARKLEY. If I am in order I would like to offer a resolution.

Resolved, That the coöperation of the press of our city and State, and of organizations and all that have the best interests of our city and State at heart, be and is hereby asked.

Resolved, That the State Legislature, to convene January, 1907, be and it is hereby requested to give early and immediate consideration to the needs of permanent and modern water front improvements in ports under the jurisdiction of State authorities.

Resolved, That a bond issue be recommended for State water front improvements, approximating a total of twenty-five million dollars (\$25,000,000), to be apportioned equitably to the different harbors of the State, including San Francisco, Oakland, San Diego, San Pedro, and Eureka, said amount to be expended over a period of ten years, one tenth each year, and said bonds to be made payable in fifty (50) years, and bear interest at the rate of four per cent (4%) per annum.

The Legislature is to appropriate a sum not to exceed fifty thousand dollars (\$50,000) for preliminary engineers' reports, recommendations, plans, specifications, and estimates.

The Governor shall appoint a special board, consisting of five commissioners, to inaugurate and carry on the work and supervise the expenditure of funds. The work undertaken at San Francisco to be generally but not specifically as follows:

(a) To generally construct seawalls around the water front of San Francisco. To fill in seawall lots adjacent thereto, particularly to fill in seawall lots between Section 14 at the Mail Dock and northerly to the foot of Main street.

(b) To construct generally permanent modern stone docks and piers along the said water front and improve Islais and Indian basins and erect modern and permanent docks therein, whereby generally the rapid transfer and handling of cargoes can be facilitated.

(c) To coöperate with existing and projected railroads, by the construction and completion of a permanent and continuous system of belt line railroad, operated around the water front of San Francisco, being an extension of the present system, with spur tracks on all piers and docks to facilitate the loading and unloading of cargoes to and from railroads, factories, and business houses. Said belt line to cross Market and Channel streets by means of subways, to be constructed for that purpose.

Resolved, That in view of the railroad developments on the southeastern end of the peninsula of San Francisco, the California congressional delegation at Washington be asked to further the plan of dredging the waters of San Francisco Bay, particularly that portion known as Mission Bay, as suggested by United States Customs Surveyor Woodward, now in Washington, and that our delegation at Washington take the necessary steps to include in the Rivers and Harbors Bill an appropriation of two million dollars (\$2,000,000) or more for said purpose.

MR. JUDD. I second the resolution.

PRESIDENT COOPER. It will be referred to the Committee on Resolutions. The first paper this morning is entitled "Horticultural Uses of the University Farm," by Prof. E. J. Wickson.

HORTICULTURAL USES OF THE UNIVERSITY FARM.

By PROF. E. J. WICKSON, OF BERKELEY.

By the munificence of the State, through the Legislature of 1905, the University of California has been provided with about 780 acres of first-class valley land, with deep, rich soil, easily tilled and fully adapted, as the law requires, to produce as many as possible of the crops which can be grown in California. It is upon an established irrigation system and has water rights for its full acreage. It is situated at the junction of two overland routes, within half an hour by rail of the State Capitol, and can be reached by five minutes' walk from the railway station at Davisville, in Yolo County. It is probably the most valuable and suitable for demonstration of the best that can be done in agriculture and for instruction therein of all the farms owned and used by the agricultural colleges of the United States for educational purposes.

By the munificence of the late Mr. M. Theodore Kearney, the University of California will, in due time, come into possession of another magnificent piece of land of about 5,400 acres near Fresno. According to the desire of the donor, this land will also be used for agricultural education, research, and experimentation. The fact that Mr. Kearney should devise this land for these purposes after the State, through its commission for the selection of a University Farm, had declined to accept a part of it to satisfy the requirements of the specific law under which they acted, is very significant of two moving forces in his mind: first, that he would not be actuated by the feeling that a slight had been put upon his proffered gift; second, that he was fully convinced that one farm, no matter how great and good, would not adequately meet the urgent demand in this great and varied State for practical instruction and scientific investigation in agriculture. Therefore, his gift stands for this declaration of his dying faith: whatever the State may provide and maintain for this training and research upon which its future development and prosperity depend, there is ample opportunity and demand that much more shall be done by individual gift and bequest. Thus the University comes into ownership of two grand agricultural properties to be strictly used for agricultural education in its various branches.

This rich inheritance which comes to the College of Agriculture of the University of California must be taken as evidence of full recognition and appreciation of two things: First, the research work, and the popular presentation of its results, by Professor Hilgard and his staff during the last third of a century has convinced the people of California that the fullest knowledge of California conditions of climate, soils, and

culture must be had for intelligent and profitable pursuit of the industries which are based upon them. Second, that the equipment and facilities of the College of Agriculture for teaching the practical arts in accordance with the scientific demonstration of local conditions were pitifully meager and inadequate. Hence arose the popular demand that the College should undertake instruction in California farm practice on much broader lines than it has ever undertaken hitherto, and that it should do this under actual farming conditions on an easily accessible and widely representative farm and should adapt such instruction to the needs and requirements of those who intend to secure a livelihood directly from the soil. That the Legislature from the popular demand, and Mr. Kearney from his own convictions, should place all this value in the hands of the College of Agriculture is a complete demonstration that the foundation laid by it in agricultural science was recognized as sound and enduring, and that the men who had given their lives hitherto to the building of the foundation could best direct the expansion on the practical side of instruction so that agriculture known to be practicable under California conditions should be faithfully and accurately taught. Thus the recent State law indorsed by Mr. Kearney's magnificent gift becomes an incontrovertible decision that agricultural research and instruction shall be henceforth entrusted to the University of California in accordance with the organic act which brought this institution into existence nearly forty years ago.

I have indulged in this general statement in the hope of contributing to a clearer popular conception of the relation of things. The horticultural uses of the University Farm are naturally of particular concern to us as we assemble as representatives of the fruit-growing industries of the State. As is generally known, the equipment and uses of the farm will begin along the lines of the animal industries and general farming. This is a proper recognition of the live stock interests as prime movers in securing the farm for the University, and it is justified also by the fact that those engaged in the animal industries and general farming, as a whole, are relatively less advanced in understanding their best agencies and methods than are those in the fruit industries, although we have a number of individuals who have pushed their live stock work in California to the point of national leadership. To meet, then, this popular demand and opportunity to elevate general farming and stock-growing in California, to better serve individual prosperity and the advancement of the State, the balance of the appropriation of 1905 will be used, so far as it will go, in buildings and equipment along this line. The horticultural phases of equipment and instruction will, however, immediately follow and it is interesting to outline some of them:

First—The University Farm will have standard orchards and vineyards, with all desirable kinds of fruit and varieties thereof, which

shall be grown true to name and shall serve as a source of material for wide pomological studies, as well as court of last resort for all questions of identification and nomenclature. It will also be a source of cuttings and scions necessary to test these questions locally in various parts of the State, whenever issues arise.

Second—Aside from these standard collections there will be commercial orchards and vineyards, with enough of each variety to demonstrate the best methods of handling in actual practice the trees and vines and the fruits which they bear. There will be, at proper times of the year, announcements that any one interested can go to the farm to learn pruning, spraying, fumigating, irrigation, and all other practical arts of culture, and other times when fruit picking, packing, drying, etc., will be demonstrated.

Third—There will be a full outfit of buildings for the different methods of fruit preservation with artificial agencies, and for the manufacture of fruit products, such as fruit drier and cannery, winery and cellar, distillery and other equipment. All these operations will be actually performed and taught.

Fourth—Plantations of small fruits will also be maintained for observation of varieties and for instruction in culture and handling of products.

Fifth—The growth of vegetables will be undertaken on a commercial scale, both under rainfall and irrigation, and variety tests will also be constantly in progress. Forcing operations will be provided for. .

Sixth—Methods of propagation of trees and plants will naturally be constantly pursued for instructional purposes and as introductory to nursery practice with all classes of growths—ornamentals, fruit trees and vines, and forestry plantings.

Seventh—Plant protection, to be secured by an understanding of the various injurious insects and plant diseases and the best ways to cope with them or to avoid them, will be amply demonstrated and inculcated.

Eighth—In all buildings and appliances for horticultural work, as for other equipment of the farm, it is intended to regulate design and expenditure, so far as possible, so that the pupil shall work in buildings and use tools and machines such as he can construct and purchase for his own use afterwards, and not in show buildings and with gilded tools. Thus he can return from the instruction with sketches and lists of these, to use in making up his own home outfit. Although, of course, large buildings will be required for assembly and class-room purposes, the working parts of the farm will be, so far as possible, instructive, because susceptible of reproduction for actual use.

Ninth—There will be going on on the farm constantly, so far as funds will permit, research and experiment work in pomology, plant breeding, plant protection from pests and diseases, all of which will constitute

horticultural uses of the farm and be effective not only in advanced instruction, but in the promotion of horticultural science.

Of course all these things, and others like them which will undoubtedly be provided for as they arise, are not new to University instruction in agriculture. Many of them are now taught in Berkeley, but they will be taught from a different point of view and with fuller demonstration on the farm. We shall be enabled to do more because possessed of our own outfit. We can not forget, however, how we have been helped hitherto by the generous coöperation in horticultural investigation of such organizations as the Pajaro Valley Orchardists' Association and many other groups of progressive fruit-growers. We are deeply gratified, however, that we shall be able to do so much more for the horticulture of the State in the future than we have heretofore.

PRESIDENT COOPER. The next paper is "The Water Supply of the Sierra Nevada Mountains," by John Tuohy.

MR. TUOHY. Mr. Chairman, as this hall is large and I am not in very good voice, I will ask that the Secretary read my paper.

(The following paper was then read by the Secretary:)

THE WATER SUPPLY OF THE SIERRA NEVADA MOUNTAINS.

BY JOHN TUOHY, OF TULARE.

Mr. President, Ladies and Gentlemen: In undertaking to address you on so important a subject to the fruit-growers of the San Joaquin Valley as is the water supply of the Sierra Nevada Mountains, I assure you that none of you have graver doubts of my ability to do justice to the subject than I have myself.

What I have to say as to the streams of the Sierra Nevada Mountains, and of their utility to the fruit-growers of the State, is from contact and experience more than from scientific investigation and study.

I arrived in California early in 1850, and, like nine tenths of new arrivals in those days, went to the mines in the Sierra Nevada Mountains, thinking like most others that gold mining and incidental industries were the only possible ones for a soil, a climate, and a geographical location such as pertain to this State. My mining life of eight years was spent in Tuolumne and Calaveras counties. Then and since that time I have had ample opportunities and more ample time as a miner, a stock-raiser, and a fruit-grower, to reconsider my first verdant views, and to know that for diversity of profitable industries, rich and productive soil, and healthful, delightful climatic conditions, its great mineral productions equaling the best of any State in our Union, being a leading one of the minor ones, California leads the United States.

I have heard at various times enthusiastic admirers of California call it the Italy of America. It is less than two years since I visited Italy, and although I was there only a short time, it was, however, long enough for me to see that to call California the Italy of America is a misnomer. In the size and safety of its harbors, in its geographical position, in the productiveness of its soil, and in the salubrity of its climate, California has no superior. One may say Italy is the California of Europe; it is as good a California as they can have; but there is only one California, and that is ours where we live; and the tillers of the soil, the general farmer, the vineyardist, and the orchardist have the cream of the land, in which are the loveliest homes a rural population can have for dwelling.

I heard a prominent lecturer call Lake Como the "shrine of the universe," but I consider him a false teacher, and worship not at that shrine. I have visited Lake Tahoe, one of the brightest gems of our Sierra Nevada Mountains. For picturesque grandeur of setting, for charming tributaries, for depth and intensity of coloring, and for sharp lines of coloring according to its depth, Lake Tahoe has no peer. Even in conditions beautiful, impressive, and grand, as well as in those industrial and habitable, we have our lakes, our Yosemite, our Kings River Cañon, our Sequoia gigantea. If I worship at one of nature's shrines, whether lake, mountain, rock, or tree, I will worship at home, where I have idols unsurpassed in such lines. Ladies and gentlemen, I have lived nearly fifty-seven years in California, and speak of it from heartfelt convictions. It is my home, and I think it the loveliest place on earth. I ask your patience for the digression.

In discussing the Sierra Nevada Mountains and their water supply, I take it for granted that the cause which produces the supply should be given due consideration.

The Sierra Nevada Mountains extend from Tejon Pass on the south well up to the Oregon line on the north. It is the highest range of mountains in the United States, and has on the west side the best supply of streams for utilitarian purposes of any range of equal extent therein. How is this accounted for? How can one extent of catchment area supply a greater amount of run-off than another of equal or greater extent? Does it? Climatic observations; now of many years in California, show that our moisture-laden clouds come from the west and northwest. That as they pass through the rarefied and cool atmosphere pertaining to mountain ranges, the moisture acquired under warmer conditions condenses and precipitates; but the lower the range the less the atmosphere is cooled, and the less precipitation it causes. The greatest precipitation, however, will be on the side of the mountain which the storm first strikes. It is this atmospheric phenomenon which causes a greater precipitation on the mountain

than in the valley, and a greater fall on the high mountains than on the low ones, and greater on the side the storm first strikes than on the opposite side. This is established by the rainfall records, which show that the rainfall and run-off on the west side of the Coast Range, and on the west side of the Sierra Nevadas—the sides the storm strikes first—is greatly in excess of that on the east sides of those ranges, and greatly in excess of the rainfall in the intervening valleys. For instance, the survey and records show that Kern River, on the east side of the mountains, has a catchment rainfall area of 2,345 square miles and a mean discharge of 734 cubic second feet, whilst Kings River, on the west side, with a catchment area of but 1,781 square miles, has a mean discharge of 1,781 cubic second feet. From a comparison, then, of the drainage area and the discharge of each river, it appears that Kings River on the west side has, to the square mile of catchment, a rainfall practically three times as great as that of Kern on the east side of the ridge, and thus, too, showing the moisture-depleting conditions of the mountainside the storm first strikes. Kern River has on its west side all the mountain conditions as to elevation that Kings River has, and has besides an almost equally elevated range of mountains on its east side.

A comparison of Truckee River on the east side of the mountains, and the American on the west, drainage area and discharge of each river considered, will show about the same difference of rainfall between them.

I will now speak of the irrigable lands of the San Joaquin Valley. We are here not far from its center, and we see before us object lessons in its wonderful productiveness. Those of us who were here in the early years of its settlement know how unattractive its condition was then, and those of us who have survived until the present and who have the privilege of attending this Convention can see the transformation. There is no part of our State more prosperous than this is, and this in a measure can be said of the whole San Joaquin Valley from the Cosumnes River on its north boundary to Tejon Pass on its south. In those early days the valley had the same fertile soil and salubrious climate it still has, but it lacked its present intelligent population. Then in this locality, owing to the distance to market, and the cost of getting products there, stock-raising was the only industry to be engaged in. Besides, the climatic conditions were unfavorable. Rain in amount for cultivated crops was insufficient.

About that time the overflow of population from the northern portion of the State began coming in. But few could go into stock-raising, and if any could the country was already stocked beyond its grazing capacity. It was realized that if homes were made here—I am speaking now of Kings County, but the principle applies to the whole valley—

other crops must be raised, and cultivated crops required a greater amount of moisture than the average annual rainfall.

The early settlers in this section had many trying conditions to contend with. The law requiring them to build costly fences to protect their crops from roving and numerous herds of stock was against their best interests and retarded improvement of the land. The cattlemen with one accord opposed the repeal of this law, contending that stock-raising was all the land was suitable for, and that it was valueless for other purposes. These conditions bore hard on the poor pioneer settlers, who claimed that the land then used for roaming herds of stock could, with proper irrigation by means of the waters of Kings River running waste from the mountains, be utilized for homes for American families, who could live in comfort on twenty acres properly irrigated and tilled, whilst twenty acres were necessary under old conditions for the maintenance of one head of cattle.

For several years the contest was bitter, but right prevailed, by the settlers electing to the State Senate the Hon. Tipton Lindsay, a man representing their own principles, and the fence law was repealed, and a "no fence law" was enacted. In other words, stockmen became liable for damage done by their predatory stock.

Another trial with which the early settlers had to struggle was their contention with the Southern Pacific Railroad Company. It is unnecessary to go into the details of this sad and bitter experience, but I know of no section where the settlers suffered such tribulations for their homes. One thing they have demonstrated: that land, be it ever so rich in this valley, as in the valley of the Nile, without water is unfit for homes; with water in sufficient quantity it is marvelously productive.

In this paper I do not propose to name the quantity of water that is sufficient for crops in this valley. That depends upon the character of the crop and the fertility and the amount of cultivation of the soil in which the crop is grown. One thing is certain: our experience proves to us that from the climatic conditions of this valley the waters of the west slope of the Sierra Nevada Mountains are of vital importance to the fruit-grower.

There are some things pertaining to the San Joaquin Valley I assume to be granted, at least by the audience I now address: that we have a salubrious, healthful climate, and a rich and fertile soil; that these are conditions, but not all, that go to make desirable homes; that intensive farming is an essential industry in supporting the largest population. These claims I assume are granted.

Of farming industries which can be successfully and profitably carried on in our valley, a leading one is fruit culture, citrus and deciduous, and all the conditions requisite to fruit-growing pertain to

our soil and climate, except one—a lack of sufficient rainfall on the lands best suited therefor. We do not count this dearth of rainfall as altogether a calamity to the fruit-grower. If the natural rainfall is not sufficient to perfect his crops the waters of our Sierra streams are ample to meet all deficiency, and has this advantage over the rainfall: it can be applied at the time the crop most needs it and can best stimulate its growth and maturity. The rainfall can not be gauged to meet such requirements.

Happily the greatest stream flow is during the months the crops most require it. It is therefore conclusive that the streams of the Sierra Nevada Mountains which supply so readily and so amply the rainfall deficiency, are of vital importance to the fruit-growers of this valley.

I know the sufficiency of moisture for the best crop yield, and the sufficiency of discharge of our streams for proper and scientific irrigation of all our valley lands, are debatable subjects, into which I do not propose to enter.

William Ham. Hall, for several years State Engineer, and whose physical data on the subject is a most valuable work of reference, and also General Alexander, have both carefully investigated the subject and declare that the discharge of our streams is, with proper application and cultivation, ample for any deficiency of rainfall for all the lands of the San Joaquin Valley, and for all of the crops that can be grown thereon.

Careful and continuous study and investigation of the amount of moisture good crops, of all kinds, have received, should be taken as determining the amount of moisture requirements of such crops. These investigations are changing the views of many of us on the duty of water.

Successive years of carefully kept data show the rainfall from the south to the north end of this valley, and the discharge of every stream therein. The amount of that discharge which can be profitably used, which will include the amount that can be impounded, supplemented by the amount of the underground flow, which is vast, should go far in determining the problem of crop requirements in irrigation.

Observation and experience have proven that the amount of irrigation water required depends much on the crop, the time of its maturity, and the amount of rainfall in that locality.

The rainfall records of the Weather Bureau, kept carefully for many years, show that the average seasonal rainfall at Bakersfield is but little, if any, in excess of 6 inches; at Hanford, 11 inches; at Stockton, in excess of 16 inches; at Sacramento, 22 inches; and at Redding, 36.11 inches, in twenty-six years. Hence the healthful growth of trees at Hanford will not require so much irrigation as at

Bakersfield; will need less at Stockton, and still less at Redding; but although the seasonal rainfall at Redding may be sufficient for the healthful growth of trees and fruit, if the precipitation is not in sufficient amount at the time the health of the crop requires it, irrigation must be had to get profitable results. So that in the San Joaquin and Sacramento valleys it is of inestimable value to the fruit-growers therein to have the streams of our Sierra Nevada Mountains from which to draw on for a sufficiency of moisture for their fruit crops, when the rainfall is deficient or inopportune.

It may not be out of place for me, before closing, to say something on the conditions that maintain and regulate the flow of the streams so beneficial to us.

I have heard it asserted that forests produce rain, but this I have been unable to verify by any observations of my own, or by any good authority on the subject. It requires about 24 seasonal inches of rain to produce a forest growth, but it also requires a climatic condition, and not the effect of forest growth, to produce that amount of precipitation. Atmospheric conditions in the San Joaquin Valley pertain to a certain elevation on our mountains, where moisture conditions favor and produce a forest growth. Frequently there are passes in mountain ridges through which currents of moisture-laden clouds are drawn, and it is noticed that in the lines of these currents a greater amount of precipitation falls and more forest grows than does on either side of the line of current.

It is now fully ascertained that forests conserve and regulate the stream flow. The dead foliage of the forest, the amount of undergrowth, and the loose, absorbent character of the soil underlying the fallen foliage, prevent any rapid run-off of the rainfall, retaining it for a more gradual outflow through the soil. In this way the direct discharge of our streams is conserved, and the underground water supply, now known to be very extensive, is replenished and maintained.

A very interesting article on the "Relation of Forest to Stream Flow" is given in the Year Book of the U. S. Department of Agriculture for 1903.

I will assume now that we all agree upon the vital importance of the stream flow to the fruit-growers of this valley, and that we also agree, if we are to get the greatest benefit of our rainfall, that the discharge of our streams must be regulated and conserved, and that this is best done by our forests, and can not in any other way be done as well, and it can not be denied that the preservation of the forests is of primal importance.

The necessity of forest preservation was recognized by some of our progressive farmers some years ago, before Kings County had an existence, or fruit-growing was the great industry it now is. In 1890 Tulare Grange, Patrons of Husbandry, had under consideration the subject of forest preservation for the hoarding of stream flow. By

resolution a convention of delegates from the several counties of the valley was called to meet in Fresno. The convention was held, Hon. Tipton Lindsay representing Tulare Grange. The subject of forest preservation and stream flow was discussed, and a petition was prepared and sent to the Secretary of the Interior praying for a withdrawal of our Sierra forests from further sale. The petition was given very full consideration, and Congress passed an Act authorizing the President to withdraw the forest. The President issued his proclamation therefor, and the Sierra Forest Reservation was duly established.

About this time very much of our best forest land was being bought by syndicates and speculators through dummy locators, and in a short space of time all of it would have passed into private hands had it not been for the timely action of the Fresno convention. As it was, nearly all of the best *Sequoia gigantea*, the grandest tree the world has known, were in the hands of private ownership, with the exception of what is known as the Giant Forest, then claimed by a colony of communists known as the Kaweah Colony, and one township on the south fork of the Kaweah River not then on the market, as the survey had not been accepted.

Speculators were then making every exertion to have the survey of this township accepted and the timber sold. Numerous parties of them had been on the land and selected the portions they wanted, and they had their agents at Washington who would telegraph them when the survey was accepted and the order of sale made; on receipt of which information, their application for the land would be filed at the United States Land Office in Visalia. This scheme would in all probability have been successful had not a few men in Visalia, the Hon. Tipton Lindsay, Major George Stewart, Mr. F. J. Walker, and the writer, being cognizant of the facts, and desirous of having the grand old trees in that township preserved for posterity and saved from the vandal ax of the lumberman, reported the conditions to the Secretary of the Interior, who had his agent here at the time investigating the merits of the claims of the Kaweah colonists to the Giant Forest.

They also prepared a bill, setting aside two townships for a Sequoia National Park: the township before mentioned, and the one east of it. This bill, with the statement of all the facts, was sent to our then Representative, General Vandever, who presented the case to the Committee on Public Lands. The result was the bill passed, but it took in six townships, including the Giant Forest, the presumption being that the Kaweah Colony claim on the latter was not such as the law provided for.

Another and a smaller reservation of sequoias was made at the same time, to be known as the General Grant Park. It consists of four sections of beautiful sequoias, and is northwest of the larger park.

The next season, 1891, and every season since, a company of United States cavalry has been in charge of the parks.

While the withdrawal of the timber-covered portion of the catchment area of the streams for forestry purposes is now universally conceded as the proper thing to have been done, it at that time met with a vigorous protest from timbermen, speculators, and timber-boodlers, for that class was here as well as in Oregon and Washington, who used every means and every influence at their command to have the withdrawal set aside. However, the Department of the Interior knew well the full merits of what had been done; the few men who had exerted themselves in getting the withdrawal were insistent on its maintenance, and the Board of Trade of the City of Tulare on January 19, 1892, passed the following resolution, and sent a certified copy to the Department of the Interior.

To the Honorable the Secretary of the Interior:

The Board of Trade of the City of Tulare, California, realizing the necessity of proper preservation of the forests of the country, now being rapidly destroyed, herein desire to express to your Honor our unqualified approval of the withdrawal from sale (pending the inauguration of a more prudent system of disposal and marketing of public timber than has heretofore obtained) of the unsold portion of the forests on the western slopes of the Sierra Nevada Mountains in the counties of Mariposa, Fresno, and Tulare.

The necessity of forest preservation is more than usually important to the counties above named, and among others, for the following reasons:

Our forests prevent the too rapid melting of snows which otherwise must cause destructive freshets, to be succeeded by scarcity of water for irrigation purposes not less destructive of agricultural pursuits than floods.

The system of lumbering heretofore followed has been wasteful of the product, destructive of young timber, and has left denuded areas a prey to fires, or to become a jungle of young growth harmful to the production of milling timber in the years to come.

The public health of the great and fertile valley at the foot of the Sierra Nevadas requires that certain portions of the mountain fastnesses adjacent to the several centers of population shall be set aside and reserved for public resorts; and that such resorts shall not be overrun by bands of sheep or cattle kept for profit of individual owners, which thereby prevents such public and healthful use. Nor will such restrictions necessarily prevent the grazing by sheep and cattle, under proper conditions as to rental, of extensive areas not requisite for public resorts.

We therefore recommend that the timber lands in the counties named be reserved from sale until a plan shall have been matured whereby the denuding of forest areas shall be made to bear the expense, and secure the rehabilitation of such areas with new growth properly thinned out and protected against fire, and that when such plan has been perfected the said reserved lands, or timber growing thereon, be again placed upon the market in such parcels and at such time as a competent forestry commission may deem wise.

In this historic statement I did not mean to digress from the subject assigned to me, but as the streams are of vital importance to the growing of fruit, and as the forest is also of vital importance to the regulation and the maintenance of the stream flow, I deemed a short account of the establishing of a national park and the withdrawal of the Sierra timber lands from public sale would be of interest to a convention of fruit-growers of California, and pertinent to the subject.

RESOLUTION RELATIVE TO THE AGRICULTURAL COLLEGE OF THE UNIVERSITY OF CALIFORNIA.

MR. SPRAGUE. For the sake of getting before the Committee on Resolutions a brief resolution, I would be glad to read it now.

Resolved, That this Convention express its hearty appreciation of the work of the Agricultural College of the University of California as it has been conducted under the direction of Director Hilgard and Acting Director Wickson, and urge upon the Legislature the necessity of liberal appropriations for the work, and especially for the equipment of the University Farm.

To retiring Director Hilgard this State is deeply indebted for the labor of more than a quarter of a century of scientific work, which has, it is believed, given to the State a better knowledge of our soils and their possibilities than is possessed by the people of any other State of the Union. He will enjoy, during his declining years, not only his world-wide reputation as a scientist, but the profound respect and esteem of the people who have had the benefit of the labor of his riper years.

In Acting Director Wickson, as the best informed of all living men in respect to agricultural practice in California, we recognize the man best fitted to take up the work where Professor Hilgard left it, and we recommend to the Regents of the University that Professor Wickson receive the permanent appointment to the position which he now fills, at the earliest date possible, in order that he may with more confidence and authority lay his plans for the rapidly increasing work of the Agricultural College.

MR. JOHN TUOHY. I take pleasure in seconding the resolution.

REPORT OF COMMITTEE ON RESOLUTIONS.

JUDGE AIKEN. Mr. Chairman, the Committee on Resolutions is ready to report.

PRESIDENT COOPER. The last resolution will be placed before the Committee on Resolutions.

MR. JUDD. The resolution I present on the table there is the labor resolution, and it is signed by a majority of the committee, and I move the adoption of the same.

JUDGE AIKEN. The Committee on Resolutions should first make a report, and this will come as the last report. We can take up the other reports first and then finish with the subject of labor.

MR. JUDD. I believe the chairman of the Committee on Resolutions is out of order until that is disposed of. It has the right of way.

JUDGE AIKEN. If that is so, Mr. Chairman, I wish to make a minority report on that subject.

PRESIDENT COOPER. We will hear the minority report after the majority report is read.

SECRETARY ISAAC. I will read the resolution.

Resolution Favoring Modification of the Chinese Exclusion Act.

WHEREAS, Farm labor is becoming increasingly difficult to obtain, and in California especially the great fruit and wine industries are threatened with disaster unless some remedy be found to get more labor; therefore, be it

Resolved, That the fruit-growers of California, in convention assembled, favor such modification of the Chinese Exclusion Act as will permit the enactment of laws making possible restricted immigration of laborers irrespective of nationality.

PRESIDENT COOPER. Now, the minority report.

JUDGE AIKEN. I will read it.

Minority Report from Committee on Resolutions on a Resolution for Virtual Repeal of the Chinese Exclusion Law and the Admission of Chinese Laborers to this Country.

I recommend that the resolution be not adopted for the following reasons:

That the Chinese Exclusion Law is an expression of the will of the nation, regardless of party, and is strongly supported by the President;

That America must remain distinctly American, for the only way American labor can successfully compete with Chinese labor will be to lower the standard of living to the level of Chinese living;

The families that now camp in our orchards and vineyards to earn wages with view of buying homes of their own will be driven from the fields in despair.

Break off the top of the Exclusion Law in order to secure Chinese labor for California and the dark flood of Chinese millions will break over all barriers and flood this fair land of ours.

Is it not better to suffer the ills we have than to flee to those we know not of?

Respectfully submitted.

W. H. AIKEN,

Chairman Committee on Resolutions.

JUDGE AIKEN. Mr. Chairman, this is in the nature of an amendment to the report, and when an amendment is offered to a resolution, the question arises on the amendment, and I would ask the adoption of the minority report.

MR. DORE. Mr. Chairman, it seems that there are two separate reports.

PRESIDENT COOPER. I presume it is unnecessary to discuss these reports, because every man and every woman, probably, has made up his or her mind on this question, and therefore I put the question before the assembly on the minority report—that is, to remove the Exclusion Act. All those in favor, please hold up their right hands.

MR. DORE. I don't know that we all understand you. Will you please state it again?

PRESIDENT COOPER. As it is now, we are voting in favor of the majority report.

MR. DORE. Which is for the modification of the Exclusion Act?

PRESIDENT COOPER. Yes, for the modification of the Exclusion Act.

JUDGE AIKEN. To repeal the Exclusion Act. That is all it amounts to.

MR. JUDD. Read the resolution so we will understand it. We don't care to have it falsified.

PRESIDENT COOPER. The Secretary will read it.

(The resolution was again read by the Secretary.)

MR. LEONARD COATES. As one of the members of that committee—the chairman of that committee has made various explanations as to his minority report. I think either Mr. Judd or myself should be allowed to make some explanation of the majority report.

PRESIDENT COOPER. I will allow you five minutes.

MR. JUDD. I want to explain some things that the general public perhaps does not understand. The Government of the United States in the last two or three months has issued a bulletin which I presume some of the members of this Convention have received. The title of that bulletin is "Farm and Farm Values; the Rise and Fall of the Same in California." According to that report of the Government of the United States, it appears that practically all the farm lands in all the New England states, and all the Eastern states, that are in excess of six miles from any populated center, have depreciated in value. One man reports in New York that two miles and a half from where he is now writing his report, eighteen farms have been abandoned. In other places hundreds and hundreds of farms have been abandoned all over the Eastern and Middle and New England states, and in every instance the cause is the scarcity, the poor quality, and the high price of labor.

Now, I want you to take the first volume of the Census Report of the United States, and I want you to look it over carefully, and I want you to dig right down into the bottom facts of the increase and decrease of the population of the State of California in its rural townships. While California as a State increased 22.6 per cent in the ten years, the city populations increased 77.2 per cent. My own home district has decreased in population, and there are but two counties in the State in which there are not one or more rural townships that have not decreased in population. Those counties are Alameda and San Francisco. Santa Cruz County, where I live, has two townships that decreased. Santa Clara County, within five or six miles of San José, has two townships that have decreased in population. You may ask why it is. If you will examine the mortgages, you will find the mortgages eat up the farms, simply because they had not the labor to make a crop on the farms. How many men before me now have got plasters on their places for the sole purpose of paying the laborers that which the profits of the farm will not support? That is all I wish to say.

Now, in support of the resolution, don't let any subterfuge, don't let

any sentiment, step in the way. Let us look it squarely in the face. (Applause.)

PRESIDENT COOPER. Your five minutes are up.

JUDGE AIKEN. I will ask three minutes to reply.

PRESIDENT COOPER. You have already made your argument.

JUDGE AIKEN. This man has had five minutes. I want three minutes to reply.

MR. DORE. I want a minute to make a personal explanation after he gets through.

JUDGE AIKEN. A few years since, the residents of Imperial Valley, down in San Diego County, wanted water; and they wanted it bad. They saw flowing the great Colorado River, and they said, "We will go and we will have a restricted supply of water from the Colorado River. We will just dig in the river a little. We will lead it up over our farms. We need it badly, but we will have a restricted supply." And they started to get it, and they got the whole river, and then they sat down in sack-cloth and ashes and said, "For God's sake, we made a mistake. Can anybody remove this great flood from us?" It destroyed their homes, and it destroyed millions of dollars' worth of property—it was destroyed by getting a restricted supply of water.

Now, here are gentlemen who come here and say that that great dam against the Chinese shall be removed to get a restricted supply of Chinese labor. When the hordes of five hundred millions step against that restriction they will destroy that dam and overflow our fair land, and we will be in a worse condition than the men in Imperial Valley. Let us be men, and let us first protect Americans from the Chinese. (Applause.)

MR. DORE. Mr. Chairman, Ladies and Gentlemen: As indicated in my talk last evening, I regret that any acrimonious discussion has taken place, and I regret it now; but I can not and will not on this occasion remain silent when the matter is presented in the manner it is now presented. In walking from this meeting place last night that gentleman said to me, "I am not pleased with the manner in which this committee has acted. I agree emphatically with everything you have said, Mr. Dore." Now, there was an approval; there was an expression; perhaps in confidence, that I ought not to make public here; but I can not and will not remain silent when such matter is presented in the manner it has been to warp the votes of this body on a proposition of this kind.

One thing further: I would like, when the vote is taken, that the men and women who vote stand on their feet and tell us how much of California orchard or vineyard or land they have in charge. Then we can get an intelligent expression of the views of this audience. I

don't want to wrangle here. I live in America, a country where majorities rule, and if the majority of the people of this country say that these people should stay out, out they stay; but in the same breath, the Japs and some others that are not as good as the Chinamen, should stay out. Now, Mr. Chairman, I want to know who is voting for it and who is voting against it.

PRESIDENT COOPER. Your minute is up. It is useless to discuss this question. As I said before, every man has made up his mind, so we will put the question now. All those in favor of the majority report please hold up one hand.

There were 43 ayes.

PRESIDENT COOPER. All those in favor of the Chinese Act remaining as it is will hold up one hand.

There were 26 noes.

PRESIDENT COOPER. The majority report has carried. You can present the report of the Committee on Resolutions.

JUDGE AIKEN. Here is a resolution on insecticide control. It is a formal matter asking for legislation. It is approved by the Committee on Resolutions.

PRESIDENT COOPER. Read the resolution.

The Secretary here read the resolution on insecticide control, introduced at the Wednesday morning session, and on motion it was adopted by the Convention.

The Committee on Resolutions reported favorably on the resolution opposing the free distribution of seeds by Congress, and the report was adopted by the Convention.

The resolution favoring a bond issue for the improvement of the harbor of San Francisco was also reported favorably, and adopted.

The resolution offered by A. Sbarboro at the conclusion of his paper on "Wine as a Remedy for the Evil of Intemperance" was reported upon unfavorably, and on motion of the chairman of the Committee on Resolutions that it do not pass, the same was rejected unanimously.

The committee reported favorably on the resolution approving the work of the Agricultural Department of the University, and urging a further recognition of the services of Professor Wickson, which was carried by the Convention, with one dissenting vote, that of Professor Wickson.

PROFESSOR WICKSON. Mr. President, I want to express my profound sense of gratitude to the majority for not paying any attention to my negative vote.

SECRETARY ISAAC. I have here the report of the Committee on the President's Address.

REPORT OF COMMITTEE ON PRESIDENT'S ADDRESS.

The committee to whom was referred President Cooper's address made the following report:

We, your committee appointed to report upon the President's address, beg leave to offer the following recommendations and suggestions:

We recommend the especial attention of the Convention to the paragraph referring to the pear blight, and suggest a resolution giving expression of the appreciation of the horticulturists of California to the United States Department of Agriculture for giving to us the most helpful services of Prof. M. B. Waite and other workers of the Division of Plant Pathology.

We feel that the expression of our President that "the pear blight in one or two localities is very bad," hardly expresses the gravity of the situation.

We recognize the seriousness of the labor problem, and that, as the address truly says, "California can not progress without an increased number of workers"; that proper resolutions should be passed, and committees should be appointed to press those resolutions to the attention of the people of the State, to the end that more laborers may be secured to harvest our crops. At the same time we do not agree with our President that "further planting of fruits shall be discouraged." We feel that Californians should arise to meet the condition which confronts them and not confess defeat without strongest effort to correct the existing shortage of laborers. By all means let the State progress, let capital as well as labor be invited here, and let this body of fruit-growers show to the world our faith in our abilities to care for the fruits which the matchless climate and soil conditions give to us.

Owing to the action of the last Congress of the United States in giving the present Pure Food Law, we suggest the attention of this body be given more particularly to features of the address other than the paragraphs referring to pure food.

The attention of members of the State Legislature should be called to the paragraph regarding an appropriation for a State insectary and a larger appropriation secured for continuing the search for beneficial insects.

Respectfully submitted.

D. T. FOWLER,
C. B. MESSENGER.

MR. A. N. JUDD. I move the adoption of the report.

Motion seconded.

The question was put by the Secretary, and carried.

THE IMPORTANCE OF DRAINAGE IN THE SAN JOAQUIN VALLEY.

BY JOHN S. DORE, OF FRESNO.

Mr. Chairman, Ladies and Gentlemen: The topic assigned to me is one that I, for the past five years particularly, have regarded as the most important problem before the people of the San Joaquin Valley. Those of you who came here at an early day remember the conditions of soil and moisture. You know the depth to water and the need for irrigation, and how rapidly the ditches that took the water out from the rivers soaked the water into the porous land. For more than twenty years Kings River has been turned out upon this plain, and where at the beginning the ground water was very deep in the soil, it is

to-day, and has been for a long time, near the surface, and in many places on the surface. Scattered over this valley are places where once grew orchards and vineyards that were productive, adding to the wealth of California and making beautiful and prosperous homes. By the rise of the ground water, bringing with it the salts and alkali to the surface, some of those homes have been destroyed, and large areas of land have been rendered unproductive.

In 1902, through the advice and with the assistance and encouragement of Professor Hilgard, I began in a humble way to try to interest the National Government in a problem which was too large for me, and too large for the community in which I resided, to grapple with. We adopted some resolutions in the grange in our community. Next the Chamber of Commerce in Fresno did the same; and after that the raisin-growers did the same. We asked that the department of the experimental division at Washington should send a competent man here to investigate the conditions and outline a remedy. Considerable correspondence was exchanged. Secretary of Agriculture Wilson sent out Dr. True, who stands at the head of all of the Experiment Stations of the nation. He came to Fresno and looked over the field, and reported to the Secretary of Agriculture what he found as to the conditions. It was my pleasure to ride over the country with him and to stand by his side. After he had pretty thoroughly examined the conditions, he penned to the Secretary of Agriculture a telegram saying, "The investigations asked for at Fresno are imperatively demanded by the conditions I find." Secretary Wilson then ordered that an examination should be made by the best engineering force at the command of the Department. The engineers came out. Some 20,000 acres were carefully examined and a plan of drainage was outlined. Wells were bored to determine the depth of water, and reports were printed as to the conditions and distributed among the people, but a large majority of the people do not comprehend the situation.

These Government men who were sent out here outlined two methods by which we might reclaim this land. One of those plans was by pumping into the irrigation ditches and running the water off, and the other was by gravity system and open drains. Either plan would cost about the same to install—some \$14 an acre for the main drains. Additions to this would have to be made to drain the individual land. After the Government had spent some \$12,000, and had done a very great deal of intelligent work, we decided to organize a district and proceed to drain the country and reclaim it. There was no law in California by which we could vote bonds, so the next move was to get such a law, and then our next recourse was to the President of the State University, and through his influence we were enabled to get a good law.

Now we are going to pump the ground water down. We are going to have the machinery to do it, and in a few weeks we will be able to pump this water out and irrigate other land.

(At this time a recess was taken until 7:30 P. M.)

EVENING SESSION—THIRD DAY.

THURSDAY, December 6, 1906.

The meeting was called to order at 7:30 P. M. President Cooper in the chair.

PRESIDENT COOPER. We have received a letter from Mr. J. A. Filcher, saying that he can not be present on account of sickness in his family. There were two papers that were laid aside this morning on account of lack of time. We will take up those papers before we commence on this evening's program.

GOOD ROADS, AND HOW TO GET THEM.

BY A. R. SPRAGUE, OF SACRAMENTO.

The principles of road-making are few. Some one has well said it may be summed up in, "Keep the water out of, off from, away from the road." This involves proper drainage to make sure that the soil is not saturated within from four to six feet of the road surface. It makes necessary the packing of the road material, and particularly the surface, in order that, from travel, no depressions may result that prevent water from draining off.

Where possible, it suggests the use of heavy asphaltic oil to the smooth, hard surface, in order that it may be perfectly water-proofed. The asphalt of crude oil, like paint, is adhesive, but not cohesive, and should be used precisely as if it were a *paint*—to be applied only upon a hard, smooth surface, and only so much of it as will sink into the material of the road surface, *and never in any other way*. Only one exception to this rule is known: where it is to be used only to prevent dust and not to water-proof the road. In this case but little should be used, much short of saturation of the dirt. Thus used, it will not seriously increase the draught of vehicles and will prevent most of the dust from rising.

In case of applying oil to a sand road, it must penetrate deeply enough to give a heavy body of resistance to pressure, and the sides of

the track should be so protected as to prevent the breaking down of the edges.

All oil should be used as nearly cold as it can be handled conveniently, as the lighter oils which are driven off by heat are the chief solvents of the asphalt, which enable it to penetrate almost any hard surface.

Where clay can be added to sand, or sand to clay, and well mixed and puddled and kept smooth by road drag, or other such expedient, a very good surface for light travel results. Where it can be given two inches of broken rock and traveled and sprinkled until the surface is well bound together and hard, and then is given a light coat of heavy asphalt crude oil, a very desirable, dustless road, at small cost, will result. No road should be rounded more than three fourths of an inch to the foot—just enough to carry off the water.

As applied to a wide area varying in industrial development and natural conditions, "good roads" may be defined as roads constructed upon a scale of cost proportioned to the amount of travel upon each per mile, so that within reasonable limits of expense every portion of the commonwealth shall have easy access to its centers of business and to railway and water transportation. The cross roads and branch roads, having comparatively little travel, may well be constructed and maintained with comparatively light cost, while the main lines of travel must be built to resist much hard usage and to require little expense for annual maintenance. This at once suggests a classification of the highways of the State upon the basis of the prevailing use of the same.

This is the principle governing in railway construction—the roadbed and rails must be fitted to the traffic which is to go over them: a four-track, rock-ballasted roadbed, with straightest practicable lines and lowest gradients—constructed nearly regardless of cost for main lines with heavy traffic; while remote branch lines with but little traffic may be left with single-track light rails, roadbed unballasted, and with curves and gradients consistent with low cost construction. Doubtless every railway manager would be delighted to have every mile of branch track as well constructed as his main lines, but to attempt this would be to court bankruptcy.

So in this State of California, doubtless every citizen would be glad to have every mile of our fifty thousand miles of public highway made of the best macadam; but this could only be achieved by most excessive cost. Yet the macadam construction of main lines, with properly graded, drained, and compacted branch and cross lines, is an entirely reasonable ambition for the people of California to entertain. No people able to have good roads can possibly afford to have poor ones.

The U. S. Department of Agriculture has been making very careful investigations as to the average cost of tonnage haul upon the highways

of the United States, and reports that it is slightly over 25 cents per ton per mile, while upon good macadam roads the cost is not in excess of 10 cents per ton per mile. (See Report U. S. Dept. of Agr., 1905.)

From 1884 to 1904 the people of California have spent \$49,567,000 upon their roads—nearly two and a half millions per year—and our roads are still very poor. But this waste of money is the smallest part of the loss to the people of our State from the failure to enter upon permanent highway construction. The Secretary of Agriculture estimates at \$500,000,000 the annual loss of the people of the United States from the greater cost of traffic upon poor roads than upon good ones. California's share of this would make a large addition to the two and one half million dollars, most of which we have yearly thrown into the mud.

Apart from this heavy money loss from bad roads, consider the social isolation which they compel. At best, in the larger part of California our rural population is widely separated. How much nearer together good roads would bring them, thus adding greatly to the attractiveness of country life and giving greater efficiency to church and school.

If many of our communities were to be barred from travel to and from their nearest town by toll gates, where they were assessed from 5 to 15 cents per mile for every mile traveled with a moderate load, what a protest would arise and how soon those barriers would be abolished; and yet their bad roads constitute a barrier just as expensive as the toll gates would be, and they protest but feebly.

California is the natural playground of the whole East. With good roads the prevailing condition in California, the millions would be trebled which Eastern people now spend during their yearly play spells here, and many more of them would determine to spend all of the year amid the delightful surroundings of fruitful orchards and sea, rivers, and mountains, with roadways of such excellence linking all as to permit, with modern vehicles, a freedom and ease of travel only equaled by the flight of birds. Surely California, of all states, can not afford poor roads.

Our present road law was evidently enacted upon the supposition that only the farming population should be taxed to maintain public highways, it being considered that as the cities take care of their highways they should be relieved of any care of roads beyond their city limits. This is now very generally held to be a mistaken view of the matter. If it costs four times as much to haul supplies for the city over bad roads as over good ones, does not the city suffer because of such roads? Even if the supplies go from farm to railroad and thence to the city, the loss is still evident. To get their goods to the country consumer, the city merchants need good roads as much as does the farmer to get his to the city. Cheap transportation to and from a city probably is the chief cause of rapid city growth.

The effect of the embargo placed upon traffic by bad roads is the same as if some foreign power were to be permitted to place toll gates, with extravagant charges, upon every public road and then appropriate to its own use all of the revenues therefrom.

In such cases the city surely would not be indifferent. The less it costs the farmer for the transportation of his products and supplies the more he will have to spend in the city. Again, it is altogether unfair for the citizens of the commonwealth who happen to be placed where the population is from ten thousand to fifty thousand to the square mile, to insist that where the people number but ten to the square mile they shall maintain their own roads. To do this effectively would require that they be taxed for public uses many times as much as the city inhabitant.

The centers of population everywhere are the nurseries of crime and incompetency, which load vast expense upon the State. These expenses are shared by the rural population and without protest, although they are thus taxed quite out of proportion to the expense caused by their own criminals and incompetents.

From every point of view it seems just as desirable that a large part of the cost of the construction and maintenance of public highways should be provided by State funds.

The advocates of national aid in the construction of main lines of road connecting the various parts of the whole nation, it seems to me, have much force in their arguments. The right of the nation to appropriate funds for such a purpose was fully considered at the time the old Cumberland and St. Louis turnpike was begun in 1807. Even the sticklers for State rights, such as John C. Calhoun and Hayne of South Carolina, were earnest advocates of this national highway. The arguments afterwards used to justify the vast subsidies given by the United States to great railroads were used with far greater propriety in support of this Cumberland turnpike, since it was to be free to all citizens who might desire to make use of it. It was urged that it was necessary to provide for the easy transmission of the mails, an argument good to-day, for the distribution of the mails still involves the use of the public highway in very great measure, so that the annual expenses of the postoffice are vastly larger than they would be if the contract route carriers could make use of good roads. The excessively high rate of 8 cents per pound, payment to the railroads for carrying the mails, aggregates a vast sum in excess of reasonable and customary charges, which excess would far better be spent upon the public highways of the nation, facilitating the delivery of mail upon thousands of miles of post roads.

Since the National Government reserves to itself the power of indirect taxation, it is proper that the funds thus raised, after providing for the necessary functions of the Government, should be used for the benefit

of the whole people, so far as this is possible, and in no way is this more possible than in the construction of permanent highways.

The nation is not averse to taxing the farming population in order that urban manufacturers shall flourish, nor does it hesitate to appropriate vast sums for the improvement of rivers and harbors which advantage most those adjacent to them.

It may be considered that such use of national funds is wise; but if so, how eminently just that the great interior farming populations should have some national assistance in providing easier transportation for the vast product of their toil.

Secretary Wilson, of the U. S. Department of Agriculture, recently stated that the farming class, which is but thirty-five per cent of our whole population, has in ten years produced an amount equal to the entire national wealth—the production of three centuries. Surely these producers are entitled to the utmost possible consideration, purely from an economic standpoint even. No other assistance could exceed the value of helping them to secure good roads.

In very many parts of the country it is felt that the freight rates are excessive, and possibly they are, and yet as a result of better railroads—lesser grades and curves, and heavier rails with well-ballasted road-bed—freight rates have been greatly lowered in the last twenty years, until, with the present cost of labor and supplies, managers of railroads claim that rates can not be further reduced.

However, the average haul to the railroad costs more than the average railroad haul to market, and clearly this cost may be decreased by two thirds, by providing good roads. This, therefore, would have the same effect upon the prosperity of the country as would a heavy reduction in the freight rate, since the cost of getting things to market from producer to consumer, both manufactured articles and the products of the soil, is usually made up of wagon haul and railroad or water transportation; and so if either part of this total cost is lessened the burden laid upon the producer is lessened in that proportion.

I have doubtless said enough about the *value of good roads*, for no one refuses to concede this. However, I have been desirous of giving the greatest possible emphasis to the fact that *bad roads are wasteful*. What, then, shall we do?

This State, every State, is abundantly able to have them if we will but set out to get them in some orderly and efficient fashion.

In the first place the people must be stirred to feel the necessity of action to secure some effective legislation for this purpose. Fortunately we need not enact any legislation experimentally, for other states have already enacted laws which, after several years' experience, are proving entirely satisfactory. A provision for State aid for a large part of the cost, with the balance divided between the county and the local district, characterizes nearly all of these recent laws.

New York in 1898 initiated her extensive road improvement work by passing the Higbee-Armstrong Act. This provided for a constitutional amendment, twice approved, authorizing \$50,000,000 in fifty-year bonds for permanent road construction. Under this Act \$10,746,707 has been spent from 1898 to 1905. The Fuller-Plank Act, 1899 to 1905, provided for bounties to counties and townships adopting the contract system in place of the custom of the farmers of working out their tax by personal service upon their own local highway; under this law \$5,540,000 has been spent between the years 1899 and 1905.

Under the Higbee-Armstrong Act the State pays half, the county thirty-five per cent, and the township fifteen per cent of cost; all plans for work must be approved by the State road engineer, and no work is accepted until after approval by the County and State road engineers. The work in any district must be initiated by petition from the locality desiring the improvement. The popularity of this law may be judged by the fact that, up to 1905, 5,466 miles of road construction have thus been petitioned for. (See N. Y. Report, 1905.) Under the Higbee-Armstrong Act \$5,000,000 is available as State aid every ten years.

An admirable synopsis of recent road legislation by the several states is contained in the Year Book of the U. S. Department of Agriculture for 1905.

All of the New England states, and New York, New Jersey, Delaware, Pennsylvania, Ohio, Illinois, Wisconsin, and Minnesota have enacted laws proposing to secure permanently good roads in an organic, progressive manner.

The U. S. Department of Agriculture, among its many beneficent activities, is conducting a department of highways which is inquiring, experimenting, and promoting, in the interest of good roads for the whole United States. May we not reasonably hope that this is the beginning of national aid, which shall enlarge its effectiveness as rapidly as the states shall prepare themselves to make use of it efficiently?

Efficient organization should precede extensive appropriations. Fortunately the recent road legislation of many states is very strongly of a common type, which, if followed by the rest of the states, will make national aid easily effective whenever it may be provided.

What place is California taking in this great movement for good roads? We are distinctly in the rear. Not in the very last rank, it is true, for with the "work tax" method from which many of the states are still struggling to free themselves, we are not incumbered. We have also a State Highway Commission, whose functions are purely advisory, except as special construction of lines of State highway are authorized by the Legislature, and funds provided. Beyond this our road construction, outside of incorporated towns, is in a condition of simple anarchy. The County Supervisors undertake to supervise road construc-

tion and maintenance in their several supervisorial districts, and their custom is that of the ancient Hebrew days, when, it is recorded, "each man did what was right in his own eyes."

Many County Supervisors are very capable men, but few, if any, are competent road engineers. While much excellent work has been done by individual Supervisors, even this work is largely wasted, because not followed up in some harmonious fashion by their successors in office. In far the larger number of instances, however, the work is simply left to local ranchers, who follow their own notions in road repair, using their own teams, or bestowing patronage upon their neighbors, as the situation may suggest. Under these laws, in the last twenty years, we have, on the average, annually thrown into the mud nearly two and a half million dollars (see Report of U. S. Department of Agriculture, 1905), and we still travel most wretched roads, characterized by mud in winter, and dust and holes and hummocks during the dry season; in many places without proper drainage, and with poor road grades in the rougher areas of the State.

What are the influences tending to maintain these deplorably bad road statutes?

First among these we place inertia, resistance to change, an indisposition to take any trouble in a matter requiring so much thought and energy for its development and application.

Second—It is commonly supposed that the County Supervisors will strenuously resist any legislation tending to limit their patronage and so to weaken their political support.

Third—The increase of taxation which it is supposed must result from entering upon the extensive construction of permanent roads.

Fourth—The supposed unwillingness of the cities to be taxed for State aid in such highway construction.

Fifth—The presumed indifference of the people in certain areas of the State where the roads are already fairly good, either because of natural advantages, or by reason of more generous expenditure and more wise activity in road construction and maintenance.

These are doubtless the chief difficulties to be encountered in securing adequate legislation for good roads.

The first difficulty, the inertia of the people, can only be overcome, as in mechanics inertia is overcome, by energy. We may not sit down and wait for good roads to grow. They won't do it. Only intelligent and persistent agitation in the interest of good roads will secure them. The subject should be considered always in order everywhere, at all local and general associations and conventions. We should see that an adequate road construction exhibit is provided for the annual State and County fairs. Good roads associations should be formed, wherever practicable, for discussion and demonstration. We should secure the

presence in our State of the Good Roads demonstration train, such as has been demonstrating in other parts of the United States. The hearty coöperation of our great continental railroad companies can no doubt be secured, as east of the Rocky Mountains the great railroad companies have given most generous and hearty support to this movement. Every Farmers' Institute should include this topic in its program, and our colleges and great universities should actively support the movement both by discussion and courses of instruction in road engineering.

In case it should prove impossible to secure proper legislation during the next session, it would be desirable to enable the Commissioner of State Highways to carry on an active campaign in the interest of good roads, making him responsible for organizing all the forces available for such a purpose.

The second difficulty, the opposition of the Supervisors, is not likely to prove at all serious. Our County Supervisors are paid but beggarly salaries for the work required of them. Where a friend and political supporter is gained by an appointment as road overseer, a half-dozen enemies are made in those who hoped to get it and failed. The Supervisor's task is generally a laborious and thankless one, and doubtless the majority of them would be glad to be relieved of the burden of road supervision. Many of them are representative citizens who could be counted upon to take the lead in a movement so manifestly for the advantage of the whole people.

The increase of taxation is not an argument that will bear investigation. A road is like a cow. A cow is cheap almost regardless of her first cost, in proportion as her annual product exceeds her cost of maintenance. So a road is cheap only in the proportion which its efficiency through a term of years bears to its cost of annual maintenance. The millions of money which we are now spending to procure a poor and temporary efficiency would go far in the making of permanent roads. Again, good macadam roads properly cared for at trifling annual expense will last for half a century. Why not, then, let the next half century assist in paying for them by the issue of long-term State bonds? This is true economy, for the reason that the use of money can be obtained by the State at much lower cost than by any subordinate part of the State, and for the further reason that construction wisely planned on a large scale is much more economic. Interest and sinking fund sufficient to pay a bond issue of \$50,000,000 can be provided with no more money than California yearly spends in temporary construction.

Again, as in other states, prison labor is used, greatly to the advantage of prisoners and roads. Such labor in this State might well be used to a large extent to decrease the cost of permanent road, culvert, and bridge construction, and in the construction of road machinery.

It is stated by careful investigators that the rise in property values in cities, consequent upon paving and sewerage, often many times exceeds the cost of such work. Without question the rise in values of property adjacent to good roads would go far to afford a fund for their construction without seriously increasing the rate of taxation.

The remaining argument is, that important areas of the State have already fairly good roads and, therefore, they would probably protest against assisting in any general scheme for road improvement. This protest probably will not be raised, for in other states it has been found that those communities which already enjoy many fine roads are the most active in promoting a like improvement for the whole State.

An amusing illustration of the kind of communities which most oppose the movement for good roads occurred in the New York campaign. When the constitutional amendment was pending providing for a \$50,000,000 bond issue, the strongest protest came from an interior community which wished the consideration of the matter by the legislative committee postponed, giving as a reason that the mud was so deep that they could not reach the meeting point.

The outlook for suitable legislation in California seems most encouraging.

The limit of this paper does not permit even a synopsis of recent road legislation in other states. This will be found in the Year Book of the U. S. Department of Agriculture for 1905, before referred to.

Either the New York or the New Jersey law, with modifications to adapt it to California, would afford an excellent method of procedure. Each divides the cost among the State, county, and local communities; each provides for systematic and progressive construction, with expert and responsible supervision, which is non-partisan to the largest possible extent. We should not ask for less in California. We shall secure good roads at far less cost in California than in the Eastern states, because in most parts the roads are free from the disintegrating effect of annual frost; and since the road metal or macadam structure is not for the purpose of bearing weight, but only to resist wear, with the proper consolidation of the dirt substructure, this macadam or gravel surface may be made much thinner than in Eastern states and yet give equally good service.

Again, no part of the State is very far from rock available for crushing for road metal, and, perhaps most important of all, we have very cheap crude oil, rich in asphalt, which, properly applied to the hard, smooth surface of well-packed macadam or gravel surface, renders it hard, smooth, water-proof, non-abrading, and so practically indestructible.

In this connection I venture to relate some significant experiments in Sacramento recently. The use of oil upon roads had become most

unpopular in Sacramento and vicinity, for the reason that it had been so applied, both upon macadam and dirt roads, that in summer hardly more than half a load could be hauled over their yielding surfaces, and with the advent of the rainy seasons these surfaces worked up into a most vile mud, which took off the hair from the legs of the horses, the paint from the buggies, and provoked most profane utterances from divers and sundry drivers.

Hence the attitude of the City Board of Trustees, of whom I asked the privilege of demonstrating that oil could be used upon macadam so as to produce a perfect road surface. They authorized the experiment upon two blocks, but declared that if it failed they would use oil no more upon their streets.

Two blocks were selected upon H street, between Thirteenth and Fifteenth. The pavement had been down over two years and had been subjected to extremely hard travel, so that in very many places depressions had been worn of from one half to three fourths of an inch in depth and in area from half a square yard to two yards square. The street was washed clean by a torrential rain a few days previous to the application of the oil, and any dust which had accumulated in the meantime was swept off, leaving the surface clean, well cemented together and hard. Then heavy crude oil of about 12° gravity, heated only sufficiently to permit it to be handled, was applied so as to thinly but entirely cover the surface, and travel was kept from the street for about two weeks. Then a very fine gravel was thinly sprinkled over any surface remaining at all sticky, and the street was opened to travel. The demonstration was made in March, and three days after the oil was applied a heavy rain fell, which did no harm except to separate the oil in the puddles from contact with the surface of the road beneath, thus preventing its proper penetration into such surfaces. Several rains followed after the street was opened to travel, and except where an undue amount of oil had been used—more than would penetrate the surface—the road remained in fine condition.

So satisfactory was it that the City Trustees ordered that all macadam surfaces in future should be treated in this fashion, and L and Twelfth streets now show surfaces which are often mistaken for asphalt, but which in some ways are better than asphalt and which cost but a fraction as much.

In later experiments we demonstrated that such depressions as are above referred to can be filled and their surfaces be made to shed water, by throwing in macadam or gravel screened to about the diameter of the depth of the depression. Also, that a subsequent application of oil perfectly unites with the road surface.

Where a street is thus treated it is practically everlasting, with but a trifling use of oil in repair. It is free from dust arising from the abra-

sion of its own surface, and hence may be kept very clean by sweeping. In wet weather it is not so slippery as is asphalt, and yet heavy loads can be hauled over it without difficulty, as it presents an almost perfectly unyielding surface. On country roads the rains and winds would keep the surface clean. In mountain sections and elsewhere where it is not possible to keep travel off the road a sufficient length of time to permit the oil to penetrate the surface, it is probable that a thin covering of carefully screened, broken rock, excluding all the dust and finer and hence more absorbent material, would enable the oil to penetrate the hard roadbed and finally consolidate with the rock covering. No road which is thus oiled will be injured by torrential rains. I am sure I speak moderately when I say that the right use of crude oil upon our roads will enable the people of California to build and maintain good roads for long periods of time at less than fifty per cent of the cost of construction and maintenance without it.

I close this paper by quoting from an address by the father of modern permanent road construction in 1786(?), at the beginning of a movement which in bleak and rocky Scotland secured the construction of one thousand miles of permanent roads in the first decade of the last century:

"Surely we have satisfied ourselves now by wasting all our time, by squandering our money, by wallowing in the mud with our teams in the transmission of our commerce. Let us for once lay aside all our foolish ideas and treat this question as a business proposition; a proposition of importance. Let us assemble in public conferences; let us give to these conferences the benefit of all our experiences. Let us not leave these rooms until we have resolved ourselves into a convention that will adopt and lay down some plan, some system, some regular business method that will provide for the proper construction of our roads by annual installments. Each year seeing an improvement upon the last; each year seeing a certain amount of roads built and these extended from year to year until we radiate from the centers, that is, the towns, and eventually reach the limits of our possessions."

MR. SPRAGUE. Now, Mr. Chairman, to make this paper effective, I beg to offer the following resolution:

WHEREAS, It is everywhere conceded that the present laws and prevailing customs of road construction and repair are most unsatisfactory and wasteful, resulting in an enormous waste of public road funds and a greater waste of private funds resulting from bad roads; and

WHEREAS, The experiences of many other states already demonstrate the advantage of coöperation of State, county, and local communities in the construction and maintenance of good roads; therefore,

Resolved, That this Horticultural Convention urgently requests the State Legislature to submit, for the approval of the people of California, a constitutional amendment providing for the issuance of State bonds sufficient in amount to provide fifty per cent of

the funds necessary to construct progressively a system of good roads throughout the State, and to enact such legislation as will secure such construction under the plans and supervision of the State Highway Commissioner, and also provide for the proper coöperation of the county and the local communities in which such construction is undertaken, directing that each of such communities shall provide for paying for an equitable proportion of the cost of such roads, and shall in all such construction and repair of roads be strictly subordinate to the State Road Engineering Department; in general, following the lines of road legislation which for several years has been found so satisfactory in New York and other Eastern states; and be it further

Resolved, That to carry out the spirit of this resolution a committee of three be appointed to coöperate with similar committees from other organizations to properly get the matter before the next session of the State Legislature.

A MEMBER. I move the rules be suspended and the resolution be adopted.

Motion seconded.

PRESIDENT COOPER. The question is on the suspension of the rules. All in favor say "aye."

Carried.

PRESIDENT COOPER. Now, the question is on the resolution. All in favor of the resolution you have just heard read, say "aye."

Carried.

PRESIDENT COOPER. The next paper is "The Relation of Bees to the Fruit Industry," by J. M. Rankin.

THE RELATION OF BEES TO THE FRUIT INDUSTRY.

By J. M. RANKIN, of CHICO.

I do not want my hearers to imagine for one moment that I am going to attempt to cover the entire field as my subject would indicate. On the contrary, I want to consider briefly a few of the ways in which the bee may be useful or otherwise to the interests of the fruit-grower.

Unfortunately there is in some of the fruit sections of this State a prejudice against the bee. This makes it necessary for us to discuss two different phases of the question: First, the good resulting from the presence of the bees; and second, the possible damage done by them.

It is an undisputed fact that the blossoms of most of our fruits are self-sterile. They require some outside agent to complete their fertilization. In some instances all the fertilizing agent necessary is the wind; but this is true, I think, to a very limited extent with our fruits, owing to the adhesive nature of their pollen. They require an assistant or servant, as it were, to do this fertilizing for them, and almost universally this agent is found in the insect world.

In nature all life is so proportioned that each individual fills its natural place; but when man enters with his aggression and progress, conditions are changed. He sows hundreds of acres of wheat, and the Hessian-fly breeds and multiplies faster than its natural enemies, and so

damages the crop. He plants thousands of acres of fruit, and the pests on this fruit, imported with it from other countries, and in the absence of their natural enemies, thrive and multiply. They become such a pest that the fruit-growers must fight them, and yet in nature there was provided a remedy to hold them in check. So, then, with the multiplying acres of fruit some artificial means of assisting in its fertilization becomes necessary, and the most efficient and easily installed agent is the honey-bee.

If we were certain of clear weather during the entire time the trees were in bloom we would not worry, but unfortunately it often happens that one variety of fruit will only see a few hours of fair weather while in bloom. This was true the past spring in regard to a peach orchard standing beside the Plant Introduction Garden at Chico and under the writer's observation. The time of bloom happened during a prolonged cold storm, and the blossoms saw less than a half day of sunshine. The insects on this bloom numbered four bees to one of another kind, not because there were more bees than other insects, but because the bee is the strongest insect that does this work and will fly during inclement weather when other insects are unable to do so.

The progressive fruit-grower of to-day is the man who does not leave a straw unturned to secure the best possible yield in his orchard. He is beginning to realize that in the past he has neglected to assist nature in this respect, and so lost crops that might have been profitable.

The blossoms were placed on the trees for a reason, and the nectar was placed in these blossoms for no other reason than to attract the insects, because the tree wanted their assistance to enable it to produce its fruit.

In regard to the second part of my subject, I think the most of my hearers will agree that the drying yards where fruit is being cut is the only place where bees sometimes become a nuisance. If a dearth in the honey flow comes at the time when the fruits are being placed on the trays, bees sometimes cause more or less annoyance. I regret that more beekeepers have not guarded against this honey dearth, which occurs almost universally over the State in July and August. Some such plant as *Melilotus alba* or *Phacelia taucetifolia* could be scattered in waste places, and these would occupy the attention of the bees when nothing else was in sight.

In regard to bees puncturing and eating the fruit, let me say plainly that it is absolutely impossible. The mandibles of the bees are constructed in such a way that they can not puncture the skins of fruits. Place a bunch of ripe grapes inside a beehive and the bees will coat it over with propolis, and if the grapes have all been perfect ones none of them will be punctured. Prick the skin of one half of another bunch and place this bunch in another hive, and the bees will clean out the punctured grapes and coat the rest with propolis. Let a mouse or a

lizard get into a hive and the bees will embalm him with this same propolis. Hang a string between the frames of a hive, and it will be unraveled and carried out bit by bit. A piece of cloth will suffer the same fate, showing that the bees tolerate the bunch of grapes for the same reason they do the lizard and the mouse; that is, because they are unable to remove them.

Many orchardists to-day have established small apiaries on their premises, because they realize that the presence of the bees sometimes means a fair or even a good crop of some certain fruit, when their absence would have meant an entire failure. This is particularly true of the almonds and earlier blooming fruits that are apt to select for their period of bloom a run of cold or rainy weather.

Let me quote a portion of a personal letter from the President of the Yolo Orchard Company. He says: "By close observation we were led to believe that the working of bees in our almond orchard, especially during seasons when little dry weather prevailed, materially added to the fertilization of the bloom by the mixing of the pollen. We were sufficiently convinced of this fact to feel justified in the purchase of fifty colonies of bees, and still retain them, although they have not made enough honey to justify taking any from them. On the other hand, there is no question but that bees, as well as all insects and birds, carry the germs of pear blight, which has become a very serious menace to pears, apples, and quinces."

As a rule, the fruit sections are not the honey-producing sections, and so it is not probable that any fruit section will ever become heavily stocked with bees. In fact, it is generally conceded that, aside from the orange, there is no fruit bloom that produces enough nectar to justify maintaining the bees for the honey they produce, but many prominent fruit-growers are doing just what the Yolo Orchard Company has done; that is, installing a few colonies of bees for the sake of occasionally insuring a crop that would otherwise be a complete failure when the blossoming period happens to fall at a time when, owing to weather conditions, other means of fertilization are unable to accomplish the work.

PRESIDENT COOPER. The next is "A Fixed Price for Prunes, and How to Obtain It," by J. Luther Bowers.

A FIXED PRICE FOR PRUNES, AND HOW TO OBTAIN IT.

BY J. LUTHER BOWERS, OF SANTA CLARA.

Prunes are now so well known that every school boy and girl, from the rock-bound coast of Maine to the perpetual summer region of California, and from Puget Sound to Florida, has for a by-word, "You are full of prunes." So it will not be my object to advocate that we adver-

tise prunes, but I will show you that too much advertising has been done already, and that the essential feature, the keeping qualities, has been left out, or overlooked. And I wish to show the prune-growers that good prunes can be grown in Kings County. Almost every section of the State of California has made itself famous for some production. Salinas for potatoes, Watsonville for strawberries, Pajaro Valley for apples, Petaluma for eggs, Lodi for Tokay grapes, Merced for sweet potatoes, Oroville for early oranges, Santa Barbara for walnuts, Santa Clara Valley for prunes. Why not make Hanford famous for her large prunes of fine quality?

Sonoma and San Joaquin valleys have been advertising Santa Clara Valley prunes for the last fifteen years. My hearers will say, "In what way?" All over the United States and elsewhere, market quotations read: "Santa Clara prunes, 'so and so'; Sonomas one eighth and San Joaquins one fourth less." This is a plain acknowledgment that Santa Clara prunes are the best, consequently Sonoma Valley and San Joaquin Valley have a standing advertisement booming Santa Clara Valley prunes, and the loss to these two valleys each year is great.

The Santa Clara County packers buy many carloads of Sonoma and San Joaquin Valley prunes from one eighth to one fourth cent per pound less than they have to pay for Santa Clara prunes, and brand them "Santa Clara Prunes." It is also a well-known fact that packers outside of Santa Clara Valley brand their prunes "Santa Clara Prunes."

Let the Kings County grower stop this business. Pack your own prunes and brand them "Hanford Prunes, grown and packed in Kings County, California."

What are the conditions to be met with in the East? Do our prunes keep when processed and packed in cartons and twenty-five and fifty-pound boxes now in use?

During the past summer I made an extensive trip all over the Middle West and the East, visiting all the large cities from New Orleans to Boston and from Boston to Chicago and Kansas City, and on this trip I found in many localities prunes that were certainly not fit for food. I will name a few localities that certainly were a poor advertisement for California prunes.

At Lexington, Va., July 6th, I visited three stores and was told, "We do not keep prunes in stock during the summer months, for the reason that they get wormy and full of little bugs."

In Washington, D. C., July 11th, I visited the celebrated Center Market. There I found prunes in very bad shape. A lot of 80-90's were so sugar-coated that they had lost all resemblance to prunes. Price, 5 cents per pound. Certainly no California prune-grower would want to eat such prunes. A box of 40-50's was shown—some four or five pounds had been sold out of the box. My wife asked the price, and

was told 20 cents per pound. She picked up two or three prunes to see how they looked, and in so doing exposed a lot of mold; all of the bottom of the box was one mass of mold; certainly one half of the box was not fit for food.

Four days later at Martinsburg, W. Va., I visited four grocery stores, but found no prunes for sale. All said, "We can not keep prunes during the hot weather." And two said, "Did you ever examine your prunes with a magnifying glass?" I was told here that "all California prunes were full of little bugs."

July 26th I was in Lawrence, Kan., and here I visited three large grocery stores and found the same conditions that I found in the East. "They kept no prunes during the summer months."

Professor Childs, who had charge of the prune demonstration from Santa Clara County at the St. Louis exposition, in his report said, "By the 10th of August there was not a box that we dared to open. All the processed prunes had spoiled."

I do not think I can better illustrate the conditions East than by quoting from Mertz's Magazine for November:

"True Story about Prunes.—Who can say, in the face of the evidence, that the conventions of the Pacific Coast Advertising Men's Association have not been a factor in creating the present satisfactory condition of the prune market? In a single paragraph the editor of the 'Graphic Los Angeles' goes on record as having bought five separate lots of prunes as the result of the prune talk at the Los Angeles convention. If we may be allowed to give a bit of fraternal advice, let us suggest, Editor Chapman, change grocers. No respectable grocer knowingly sells 'little bugs' with his prunes. So here's hoping that he will try again. Here is his lament:

"'Prunes! California prunes! Of thee I sing.' I attended a meeting of advertising agents some time back, when one of the speakers gave an address on California prunes as a breakfast food. He held that California prunes should take the place of the cereals that we foolishly consume for breakfast. I agreed with him, and began to buy prunes, California prunes. The first lot was all right; the second was worm-eaten; the third was good; the fourth was suspiciously stale; the fifth was full of little bugs, and I quit."

California prunes would be all right if they were prepared with the same care that is given by Eastern manufacturers to their food production. But this does not seem to be the case. You can buy any of the accepted Eastern cereals for a year, and every package will be just as good as the preceding one. Our prunes vary from perfection to impossibility. Do we need a prune trust that will turn out packages of even excellence and reliability? When that happens, perhaps we will all be full of them.

Now with such as I have stated, is it any wonder that our prune industry has been in such a demoralized condition for the last five years? Were it not for cold storage, the present mode of packing would soon go out of commission. As long as cold weather lasts in the East, a box of processed prunes will keep; but just as soon as the Eastern temperature gets up to 70° and over, processed prunes will spoil, unless sold very soon after being taken out of cold storage. They either sugar-coat, mold, or get full of little bugs.

I have known for many years that a processed prune would not keep in the Eastern summer heat. Yet I never had an idea that conditions were so bad until I investigated for myself.

During the last six years I have made many experiments to find some way to overcome the loss from sugar-coat, mold, insects, and shrinkage. Some two years ago I was lucky enough to discover a way to overcome all of these difficulties. Since that time I have made many tests as to keeping qualities, and in every case the prunes showed up perfect.

The next thing was to find a market for the goods. On July 26th I started East, but before going I sent by express a large lot of samples, packed in one-pound glass jars, to Richmond, Va., Baltimore, Md., Indianapolis, Ind., New York, Chicago, and Vancouver, B. C., and took with me a case holding ten jars. My case was replenished at points where I had sent samples ahead. Wherever my goods were shown they were pronounced of the finest quality ever seen.

In Philadelphia a jar of the French imported prunes was opened and compared with mine, and all who tasted them said my goods were of a better quality than the French goods. My goods were to be retailed at 20 cents per pound and the French goods at 45 cents per pound. Certainly no fear of competition with such odds in my favor. My goods will be packed in tin cans holding, net, 1½ pounds, 2½ pounds, and 5 pounds, and I only make three sizes: No. 1, 30-50's; No. 2, 50-70's; and No. 3, 70-90's. I have with me several cans of No. 1 and No. 2, and you can see by the label that the price to the consumer is printed on the label. Prices of No. 1 are as follows: 1½-pound cans, 25 cents; 2½-pound cans, 40 cents; 5-pound cans, 75 cents. Prices of No. 2: 1½-pound cans, 20 cents; 2½-pound cans, 35 cents; 5-pound cans, 70 cents. Prices of No. 3: 1½-pound cans, 15 cents; 2½-pound cans, 30 cents; 5-pound cans, 60 cents. Only two brokers objected to the price; but after tasting the goods and seeing the quality, nothing more was said about the price.

I was told on two occasions, "No prune grower or packer ever had the nerve to come East and name a price for his goods." I was also told, "If I stayed by my price, and if I could pack prunes like the sample shown, that I had the coming goods." With an article like sample and backed up with a guarantee to not sugar-coat, mold, or get wormy and

not to shrink in bulk in any country or climate, California could never grow enough of prunes to supply the Eastern market.

The price on the can has been a fixed matter for over two years. I have been in correspondence with brokers all over the United States, Canada, and Europe during the last two years. Only one broker made any objection to the price on the can commercially, and he said, "It did not interest him. Let the retailer and the consumer fight it out among themselves."

The Southern Pacific and Santa Fé have given me a rate of \$15 per ton, which is a saving of \$100 per car over box rates and \$140 over bag rates. With these advantages it has been no trouble to make a fixed price. The broker and the jobber both say, "With your fixed price, we will have something we can tie to. But under the present system we do not know where we stand." They said, "This season opened with everything in favor of a 3-cent bag basis. We bought freely at that price, but almost before we knew it prunes were offered at a 2½-cent box basis. In consequence, we are heavy losers."

The commercial packer will tell you that the Eastern retail grocer will not handle California prunes for less than 100 per cent on his purchase price. After seeing the conditions under which he has to get that 100 per cent I do not blame him. His losses are great; he can not do otherwise.

With my proposition, the f. o. b. price is just half of the retail price. Now, for example, we will take a case of 2½-pound cans, No. 1. The f. o. b. price is \$4.80 for 60 pounds net, or 8 cents per pound. The railroad will get 57 cents, the broker will get 27 cents, the jobber will get 81 cents, and the retail grocer will get \$3.15. The grocer makes 50 per cent on his purchase, and has no loss. The consumer is not paying any more for his goods, and certainly gets an article of better quality.

What will the grower get? To make a long story short, he will get, if he does his own packing, a straight 4-cent basis.

Now, as to the system. It is simply this: The prunes are packed 85 per cent dry, in hermetically sealed cans, without exhaustion, *and then sterilized*. So simple; nothing more, nothing less. Prunes have been packed in tin cans for years, but no one ever thought of sterilizing them after they were packed. This is the secret of the whole matter.

Now, what has the grower to do? First of all, stop making quantity, and work for quality only; the average grower does not take the care and pains he should in drying his crop. All over the State of California too many growers are leaving too much wood on their trees. I have noticed some orchards that have twice as much wood as should be on them. Such orchards produce a large quantity of small prunes. It would be far better to have 80 pounds of 40's than to have 160 pounds of 80's, per tree. In our drying we too often do not have our dipping

fluid hot enough, and the result is we have too many tobacco-colored prunes that take a long time to dry, and when they are dry are of a very poor quality and are not fit to be graded as first-class prunes.

When I was asked to read a paper on this subject, I at first hesitated, but the thought occurred to me, "send to Hanford and get some prunes." After some correspondence, your Mr. W. A. Long sent me a lot, and these prunes are here in the hall on exhibition, and I have a jar I will open and you can test them.

As I said in my opening remarks, why should the San Joaquin Valley prune-growers advertise the Santa Clara Valley prunes. Stop this foolishness and call your prunes "Hanford Prunes." Has anybody ever said that your raisins, peaches, or apricots are of a poor quality and do not contain enough of sugar? Then why are your prunes quoted at a discount? Ponder over this matter before another season.

PRESIDENT COOPER. "Report of Fruit Distributors," by Hon. Alden Anderson, which will be read by the Secretary.

REPORT OF CALIFORNIA FRUIT DISTRIBUTORS.

By HON. ALDEN ANDERSON, MANAGER.

In compliance with request for a report of the fruit shipments from this State this year, I herewith give figures compiled by this company, the same being for actual carload shipments (not estimated ton cars) of fruit leaving the State.

The first carload of cherries (which variety of fruit opens the deciduous fruit-shipping season in California) was shipped on May 2d, and the last carload (apples excepted) of grapes was shipped November 28th.

The following gives total carload shipments, by varieties, except apples, which shipment is not finished yet:

Cherries	150 cars.
Apricots	16 "
Peaches	584 "
Plums	1,220 "
Pears	1,513 "
Grapes	2,050 "
Apples, to December 1st	669 "
Miscellaneous	22 "

There was an increase in shipment of cherries over 1905, but on account of the cold, late spring and late rains the shipment did not reach the average quantity.

The shipment of apricots was light, on account of the very short crop.

The shipment of peaches was less than one third of the shipment of 1905. This was occasioned somewhat by the short crop in California,

but more particularly on account of the heavy crops in the Eastern peach-growing districts.

The shipment of plums was only a few cars less than in 1905, while that of pears was some five hundred cars more.

The shipment of grapes exceeded that of 1905 by some 450 cars. The weather for shipment of grapes was very satisfactory, but the cold, late spring held them back and they were late in ripening and maturing. When ripe they seemed to have a deficiency of sugar compared to normal years, and there was much complaint that they did not carry as well as usual.

Of apples, there has been to this date something over a thousand cars less shipped than for the season of 1905. This decrease was occasioned by the large apple crop in the East and the fact that many apples are being stored and handled locally.

Although not called for by the report, I venture to remind the Fruit-Growers' Convention that there has now been enacted into law substantially the recommendations made by the Fruit-Growers' Convention of San José in 1904, and telegraphed to the President and our Congressional Representatives, both as regards the increase of power and duties of the Interstate Commerce Commission and the operation and control of refrigerator cars by the transportation companies themselves.

With reference to the amended Interstate Commerce Act, I know of no disadvantageous condition that will apply to shippers of California because of its enactment to offset its advantages. When the law first went into effect some of the Eastern railroads declined to make diversions, or make back hauls when necessary to reach the main line for diversion purposes, but these incidents are, through the assistance and understanding of the matter by the initial transportation lines, being protected by publication in tariffs.

The new refrigerator cars that will be operated by the railroad companies are said to be very fine, and it might be well for this Convention to request that the department having charge of their operation be separate and distinct and independent from all other departments of the railroad, so that there will be no chance of having the cars appropriated for other transportation purposes when needed. If such action is taken, growers and shippers should always be assured of a sufficiency of good, clean cars at all times for fruit transportation purposes.

Notwithstanding the large Eastern crops of the current season the fruit season just closed has, on the whole, been a remunerative and prosperous one for the fruit-growers of California.

PRESIDENT COOPER. The Secretary will now read the report of the Committee on Transportation.

REPORT OF THE COMMITTEE ON TRANSPORTATION.

To the Chairman and Members of the Fruit-Growers' State Convention:

Your Committee on Transportation beg leave to submit the following report for your consideration:

CORRESPONDENCE.

SACRAMENTO, CAL., October 4, 1906.

MR. C. S. FEE, *Traffic Manager, Southern Pacific Company, San Francisco, Cal.*

DEAR SIR: Herewith please find clipping from San Francisco "Examiner" of this date. If the statements therein contained are correct they will gladden the hearts of the fruit-growers of California.

Any information you can give regarding the subject will be thankfully received.

Yours truly,

R. D. STEPHENS,

Chairman California Fruit-Growers' Transportation Committee.

Following is a copy of the clipping above mentioned:

"Beginning October 10th the Southern Pacific will make a twenty-five per cent reduction in the tariff on commodities shipped under refrigeration. * * * At present the charge of shipping perishable commodities is twenty-five per cent above the cost of shipments. This cost is to be annulled and perishable goods will be transported at the same rate as other goods which do not need the protection of a refrigerator.

"The results of the change of policy are numerous. California fruit can be bought at a much cheaper rate in Eastern states; larger shipments of fruit and other perishable commodities will also be encouraged. The reduction is wholly voluntary on the part of the railroads."

MR. R. D. STEPHENS, *1210 N Street, Sacramento, Cal.*

DEAR SIR: Your favor of the 6th instant. Our Freight Department advises me that the reduction of twenty-five per cent referred to affects the Southern Pacific lines and is purely a local question in which our connections are not interested. It has been the practice to charge twenty-five per cent extra for fruit moving under refrigeration locally and this charge our Freight Department has decided to eliminate for the benefit of the industry.

Yours truly,

PAUL SHOUP.

SACRAMENTO, CAL., November 19, 1906.

H. A. JONES, ESQ., *Freight Traffic Manager, Southern Pacific Co., San Francisco, Cal.*

DEAR SIR: Herewith please find clipping from Sacramento "Union," stating that the Southern Pacific Company had contracted for 6,000 refrigerator cars to be used in the transportation of California fresh fruits to Eastern markets, etc.

Is the statement correct? If so, when will the cars be put into the service?

For years the growers of California have asked the Southern Pacific Company to supply its own refrigerator cars and if the company is now going to do so, such action on its part will meet with the hearty approbation of the growers, for the reason that they believe their interests will be greatly promoted thereby.

In order that you may know how the fruit-growers regard *private car lines*, we inclose a copy of the report made by their Committee on Transportation, which was unanimously adopted at the State Fruit-Growers' Convention at Santa Rosa last December, and, in substance, at all former conventions held within the last five years.

Never in the history of fresh fruit shipments made from California has there been so much complaint made regarding the impaired condition in which a large proportion of the shipments arrived at their destination.

The reports read, "Some wasty," "A good deal wasty," "Some rot," "Rotten," "Condemned by the Board of Health."

In the latter case, there was an additional charge made for "dumping," which, when added to all the other cost of growing, packing, and transportation, means a loss to the grower of from \$1,000 to \$1,100.

There is no disposition on the part of the fruit-growers of California to unnecessarily antagonize the Southern Pacific Company. On the contrary, they are anxious to be placed on the most friendly terms with it, and will do all in their power to bring about such a result.

Any information you can give our committee regarding the subject of this inquiry will be reported to the fruit-growers at their next annual convention to be held at Hanford, December 4-7, 1906.

Yours very truly,

R. D. STEPHENS, Chairman.
W. W. PHILLIPS.
A. N. JUDD.
R. I. BLOWERS.
ALEX. GORDON.

SOUTHERN PACIFIC COMPANY—PACIFIC SYSTEM.

H. A. Jones, Freight Traffic Manager.

SAN FRANCISCO, November 24, 1906.

MR. R. D. STEPHENS, *Sacramento, Cal.*

DEAR SIR: I beg to acknowledge receipt of communication of the 19th inst., signed by yourself, W. W. Phillips, A. N. Judd, R. I. Blowers, and Alex. Gordon, and in reply desire to say the Harriman lines have ordered 6,000 refrigerator cars, of which 600 are to be delivered on December 1st, and the balance at the rate of 1,200 a month, beginning January 1st, which they propose to operate under their own management. From this you will understand that we will have a sufficient supply in time to handle the next crop of deciduous fruit.

It will probably interest you to know that these cars are to be much larger than those now in use. The outside length is 41 feet 10 inches. The distance between ice-tanks is 34 feet 3 $\frac{3}{4}$ inches. In height the cars will be 7 feet 6 inches, with a width of 8 feet 2 $\frac{3}{4}$ inches. This available cubic capacity is 2,119 cubic feet.

As compared with the cars now in use, these new cars are 1 foot 10 inches longer, nearly 2 feet wider, and have nearly 200 cubic feet more available space. They will also have capacity for one ton more ice than the present cars.

I would be pleased to have your committee transmit this information to the fruit-growers at their next annual convention to be held in Hanford, December 4th to 7th.

Yours truly,

H. A. JONES,
Freight Traffic Manager.

SACRAMENTO, November 30, 1906.

MR. H. A. JONES, *Freight Traffic Manager Southern Pacific Co., San Francisco, Cal.*

DEAR SIR: Your favor of the 24th ult.—in reply to our communication of November 19th, asking for information regarding the statement published in the daily papers that the Southern Pacific Company was making arrangements to put on an equipment of refrigerator cars of its own,* sufficient in number to successfully handle all California-Eastern fruit shipments, confirming the report—received.

That the fruit-growers of California will fully appreciate this action on the part of your company there can be no doubt.

That the growers for the best of reasons have been diametrically opposed to private refrigerator car lines is demonstrated by the repeated action taken by them in their State Conventions in the past.

The reasons that prompted the growers to take such action were, that they believed and felt confident that the private car line was a menace to their interests, and also a menace to the best interests of the State, and that by its elimination much good would come to them and to California.

Now that their prayer has been granted they feel that their interests will be better

protected, through more attention being given to the proper handling of their shipments, in the way of icing and attention given to the proper condition of the cars.

What the fruit-growers of California ask for more than anything else, is, that all who are interested, and engaged in growing and shipping fruit, shall be placed upon an equality.

They are opposed to the granting of special privileges to any one as being inimical to the best interests of all concerned.

Thanking you for the information you so kindly gave, I remain,

Yours truly,

R. D. STEPHENS,

Chairman Fruit-Growers' Transportation Committee.

STATEMENT

Showing Shipments of California Deciduous Fruit, and how Distributed in Eastern Auction Markets.

From July 14 to October 20, 1905, there were 3,066 cars of California deciduous fruit sold in the Eastern auction markets, and in 1906, for the corresponding period, 3,619 cars, or 553 more than in 1905.

There were 1,267 cars of California fruit sold in New York, 902 cars in Chicago, and 605 in Boston, making a total of 2,774 cars, leaving 845 for the other ten auction markets.

There were 253 more cars sold in New York this year than last year, 158 more in Boston, and 105 in Chicago, making a total given for New York, Boston, and Chicago of 516 cars, leaving a gain of only 37 cars for the other ten auction markets.

There were 1,580 cars of deciduous fruit sold in New York altogether from the 14th of July to the 19th of October; 313 of these cars came from Washington; Oregon, Idaho, and Colorado.

Up to October 17th, this year, there were 5,456 cars of deciduous fruit shipped, and to the same date last year 6,819 cars, showing that there were 1,363 more cars shipped last year than there were shipped this year up to an even date.

The time made in the transportation of California fruit from about the 15th of October to the close of the season was very unsatisfactory. It varied all the way from 14 to 20 days on the long haul, many cars being out 16 to 18 days.

For some reason, which has not yet been satisfactorily explained, a very large proportion of the fruit shipments arrived in poor condition. It was reported "wasty," "much wasty," "a good deal of rot," "rotten," and some of it in such a bad condition that it was condemned by the board of health.

If the cause of the decay in the fruit is one that can be controlled, it may not be one of much concern, but if it is attributable to deterioration in the keeping qualities of our fruit, then it is a very serious matter, and portends no good to our horticultural interests.

It is a matter that should be thoroughly investigated both by fruit-growers and the transportation companies.

Respectfully submitted.

R. D. STEPHENS,

Chairman of Committee on Transportation.

MR. R. D. STEPHENS. Now, Mr. President, Ladies and Gentlemen: There is much between the lines, and particularly in regard to the distribution. It seems that there were five hundred and odd more cars sold in three cities than there was last year, with about 1,300 cars less shipped during the same period. All the statistics contained in this report correspond with like periods of last year and the year before. They are for corresponding periods, and it seems rather singular that with less shipments there should be so many more cars placed in the same markets. A great deal was absorbed by the auction markets in Canada, that is, Toronto and Montreal, where there were 153 sold this year against 103 last year, leaving for the other nine markets a deficit. There is something peculiar in the other nine markets. For instance, in Cincinnati and other markets, for a whole week there is not a carload of California fruit sold. That is something peculiar.

Now, regarding the condition in which the fruit arrived at destination. The first part of the season better time was made and the fruit arrived in such a condition that I heard of no complaints, generally speaking. Some claimed that the keeping qualities of the fruit were impaired in consequence of the late spring rains. It seems to me, if that theory is correct, that the first shipments of the season ought to have gone forward and arrived in a much more impaired condition than the later shipments that had the dry air and hot weather in which to mature. However, that is something which we don't know anything about at this time. We do know, however, and we base our hopes in the future for improved conditions upon the fact, that the Armour Company is going out of business, and it is possible it may not have given the care and attention to the later shipments that it ought to have given. There is one thing certain, that if the decay is attributable to the condition in which the fruit was packed, in other words, if it was the impaired condition, it does, as stated there, portend no good to the State of California.

Now, in regard to time. There were many cars out eighteen days. Why, I do not know. The time, as I stated, in the first part of the season was better than in the last. Some cars were out twenty days. That is a long time. There should be better time made in the close of the season in shipments of grapes, for the reason that necessarily their keeping qualities must be somewhat impaired either by rain or by frost. It seems universally to happen that, at the close of the season, the worst time is made by the railroad companies. They make better time in the beginning of the season than they do in the last.

Another thing: The car lines may think it unnecessary to put in large quantities of ice because of the fact that the weather is cool. When the fruit is in an impaired condition, it needs more attention than it does at any other time, and if they ever fill the tanks with ice

they should be filled during the last shipments. The fruit stands in more need of it than it does at any other time. One of the peculiarities about it is, that when we could get what was called a ventilator car, those used in early days, five or six or seven years ago—I think they were built by the Southern Pacific and the Union Pacific—the fruit arrived in better condition than it does in the refrigerator car. The explanation may lie in the fact that the refrigerator iced car is sealed up. No air can pass through it at all, and unless it is fully iced, it is like an oven, and of course the contents would arrive in a much more impaired condition than they would if the air was passing through.

That is about all we have to say, with the exception that we feel that any improvements in the transportation of our fruits to Eastern markets made by the Southern Pacific, or by any other company, should be encouraged. We don't want to get into a contest with the railroad company if we can help it, and we will not if they take the proper care of our products. Therefore, the committee felt that it was the duty of the fruit-growers of the State of California to give a vote of thanks to the Southern Pacific Company for putting on its own refrigerator cars. What we look forward to as being beneficial to us is the fact that the railroad company will be responsible directly for the handling and management of those cars. I don't agree with Lieutenant-Governor Anderson regarding the suggestion to segregate it and make it a different and separate institution. I believe that the officials of the Southern Pacific should be held responsible for any dereliction of duty. It will be much better than to make a separate department and let that department handle it, because then the Southern Pacific officials will say, if anything happens, that it is the fault of the other department. In case it is not properly handled or does not arrive at destination in a proper condition, you can go right directly to the officials of the Southern Pacific Company. Therefore, I believe that the management of these refrigerator cars should lie directly with the officials of the Southern Pacific Company.

In conclusion and in line with what I have said, I wish to offer the following resolution for the consideration of this Convention:

WHEREAS, Mr. H. A. Jones, Freight Traffic Manager of the Southern Pacific Company, has through its transportation committee notified the members of this Convention, that it will in the near future have an equipment of refrigerator cars of its own, sufficient in number to properly handle next year's deciduous fruit shipment; therefore, be it

Resolved, That a vote of thanks be tendered the Southern Pacific Company by this Convention for its action in supplying such cars for the purpose above mentioned; and be it further

Resolved, That all the future acts of the Southern Pacific Company that will result in fostering and promoting the legitimate and equitable interests of the fruit-growers of California will be heartily welcomed and fully appreciated, for the reason that the future welfare and prosperity of California mainly depends upon a much greater development of its almost unlimited horticultural resources.

MR. JUDD. I move that the rules be suspended and the resolution be immediately adopted.

Motion seconded.

The question was put on the motion to suspend the rules, and carried.

The question was then put on the adoption of the resolution.

MR. SPRAGUE. Mr. Chairman, as Lieutenant-Governor Anderson is not here, I beg to correct the impression which Mr. Stephens has concerning his recommendation in that paper. Having talked the matter over with him, I know that it is his view that the interests of the fruit shippers of California will be better served in the matter of refrigeration by the Southern Pacific following the method of the Santa Fé and creating a special department—not an outside company having no relation to nor control by the officers of the Southern Pacific Company, but a special department of car refrigeration—for the reason that then there will be some particular man whose interest it is to look after the refrigerator business to see that the cars are properly furnished and the icing is done and all that sort of thing, instead of leaving it to the general operating department. I have no doubt but what this will be the better method, and, in fact, it is the method which has been already adopted by the Southern Pacific. Mr. J. M. Seacrist is the new manager of the Southern Pacific refrigerator line, and he is laying plans, I may say, for an entirely new departure and a greater improvement in refrigeration than has ever before been made. There is certainly great promise for getting our products through with better satisfaction in general than they have ever been transmitted as yet.

There is another point. Had it not been for the universal congestion on the railways during the last few months, I should certainly be in favor of severely criticising the fact that our grape shipments during the latter part of the year have been so delayed that it has been a very serious matter. We have the right to complain of both railroad companies; but they say that this is only a part of the general burden, and that all traffic has been congested. But we certainly should not tolerate any customary delay of that kind.

MR. STEPHENS. I desire to explain my position. The objections that I have are to making it a separate concern. Of course it must necessarily follow that some Southern Pacific official take charge of this matter, but I want him to take charge of the refrigerator cars in the name of the Southern Pacific and not in the name of any side company. One of our great evils, and one of the evils of the fruit-growing interests of California, has been rebates. The manager of the Santa Fé refrigerator cars testified under oath before the Interstate Commerce Commission that he gave a \$25 rebate on the long haul and a \$25 rebate to Chicago

and like destinations. We don't want anything of that kind. We want the Southern Pacific Company to be responsible for the management of these cars. We want them managed by that company and not by any side company. Now, since that question has been raised, it was heralded through all the newspapers in the State that there was to be a great reduction made in refrigeration for the past year. Taking into consideration the rebates paid by the Santa Fé, which the manager stated under oath he had made to meet the competition of the Southern Pacific (and therefore it is reasonable to assume and deduce from his evidence that the Southern Pacific Company paid like rebates)—Mr. Sprague refers to shippers. I assume that the growers should be considered as well as the shippers.

MR. SPRAGUE. I consider the growers are the shippers. It is their fruit.

MR. STEPHENS. It is their fruit, but they have no more say about it than the man in the moon in nine cases out of ten under present conditions. Instead of being a reduction it was a raise, considering rebates given, of \$17.50 on the long haul in the case of refrigeration, to the shippers, at least, and a raise of \$15 to Chicago. As a matter of fact, the ostensible cut was more than covered by an increase in rates. In all shipments to Chicago it cost the growers \$3 more this season, including the reduction, to land a car of fruit in the city of Chicago and like destinations than it did last year (1905). There was a reduction of \$1.40 on the long haul, but that did not cover the raise of \$17.50 which was made in the rate, considering rebates. If there is anything that is ruinous to the horticultural interests of this coast, it is rebates, and we want to cut them out. We want the Southern Pacific Company to be responsible for the management of these cars. (Applause.)

MR. MARK L. McDONALD. If there are any prune-growers here, I hope they will remain and discuss this question with me. It certainly is one of great importance. I consider the matter of fixing the price of prunes as equal to that of transportation. The gentleman stated in his paper on prunes why it is we are suffering so much and getting so little for our prunes. If you will remember, he remarks in his paper that prunes from other places are being sold as Santa Clara prunes. Now, that is unfair, that is unjust, and it should be remedied. Aside from that, we should get together. The prune-growers should get together and do something to see if we can not get a better price for our prunes. And in view of that I will offer a resolution which will bring the matter before the Convention.

I move that the Chairman of this Convention be authorized to appoint, at his earliest convenience, a committee of five, whose duty it shall be to take measures looking to the organization of the prune-growers of this State, and that such committee shall take immediate action.

MR. JUDD. I move to suspend the rules and move the adoption of the resolution.

Motion seconded.

The question on the suspension of the rules was put, and carried.

MR. SPRAGUE. Now, is the question on the adoption of the resolution open for discussion?

PRESIDENT COOPER. Yes.

MR. SPRAGUE. It will not be effective to adopt this resolution. Mr. Bowers has suggested a method for getting at a remedy, and I am inclined to put considerable confidence in his method. I believe some of you with a little money should get back of Mr. Bowers and put up these prunes just as they ought to be put up, with a price on them, and then get them to the East and sell them. Then send forward four times as many and sell them. Then you will bring out a remedy for the evils that beset us. Not for many years will we be successful in appointing a committee of three or five to organize the prune-growers. Let us do something a little more practical.

MR. McDONALD. I suggest that Mr. Bowers be placed on this committee.

MR. SPRAGUE. If that is what it means, I will vote for it.

MR. McDONALD. Yes, I would like to have him on the committee.

PRESIDENT COOPER. We have one more paper, which is entitled "The United States Plant Introduction Garden, and its Value to California," by Roland McKee.

THE UNITED STATES PLANT INTRODUCTION GARDEN, AND ITS VALUE TO CALIFORNIA.

BY ROLAND MCKEE, OF CHICO.

You undoubtedly all are aware that at Chico, in this State, is located what is known as the Plant Introduction Garden of the U. S. Department of Agriculture, and most of you, perhaps, are more or less familiar with the history and general character of this institution. However, we have endeavored to bring together data that may perhaps be of interest and at the same time lead to a more perfect understanding of the work being carried on at the garden and its value to this State.

The Plant Introduction Garden was established by the Honorable Secretary of Agriculture, through Dr. B. T. Galloway, Chief of the Bureau of Plant Industry, in 1904. The object in establishing the garden was not to found an experiment station for the State of California, but to establish a garden where importations of seeds, cuttings, scions, buds, and plants in small quantities could be cared for and

propagated for further experimental purposes. Thus, the immediate cause that justifies the maintaining of this institution is found in the fact that men of the Department of Agriculture, specializing in definite lines of work, find that it is most essential that they have some place where they can send material for propagation, care, and preliminary testing. This, of course, applies more particularly to new introductions that are being sent from various parts of the world, but is also true of all new introductions.

Formerly this work was carried on in the greenhouses at Washington, but they became inadequate for the demands made upon them as the volume of work with new introductions increased, therefore the garden at Chico was established to fill this need, and thus far it has proven quite satisfactory. Conditions at Chico are quite favorable for the accommodation of a wide range of plant growth, and we find at the Plant Introduction Garden plants from widely separated parts of the world succeeding quite well.

The work at the garden is broader in its scope than one not entirely familiar with the institution might imagine. Many lines of investigation are being carried on. Seeds, cuttings, scions, buds, and plants from all parts of the world are being introduced, propagated, and tested. By introduction, breeding, and selection we are endeavoring to discover and develop plants suited to particular soils and climates and that are less susceptible to adverse conditions; to improve varieties both as to quality and quantity of fruit produced.

We wish to mention briefly the more important lines of investigations being carried on at Chico and to call attention in particular to a few lines of work that may possibly result in immediate benefit to this State. The purely agricultural investigations may not be of immediate interest to this Convention; however, we wish to call attention briefly to this line of work, that you may get a better idea of the full scope of the work we are carrying on.

Some five hundred varieties and selections of grasses were grown at the garden the past season as preliminary work in the testing of this class of plants for the hay and pasture. The problem with the grasses, in so far as California is concerned, is readily resolved into three lines of investigation: the securing of a plant that will withstand continued drought and extreme heat; the securing of a plant that will make good winter pasture; and the securing of a plant that will make sufficient growth under irrigation to be of value. In working to this end grasses from all parts of the world are being secured and we now have growing at the garden a number of grasses that are recent introductions from South Africa, India, Australia, and China, together with many introductions from various other parts of the world. Some of these give promise of being of interest and value to the farmers and stockmen of this and other states.

Quite extensive investigations are being carried on with the Medicagoes, including principally the alfalfas and bur clovers. A number of varieties of alfalfa are being grown to determine the relative value when grown with and without irrigation. One variety in particular is showing up remarkably well as a variety to be grown with irrigation, and our work thus far indicates that, during the season, two crops more can be cut of this variety than of the ordinary alfalfa. However, while it has been observed that this variety makes a much more rapid growth than does the ordinary alfalfa, it has also been observed that the hay of this variety weighs lighter than that of the ordinary alfalfa. Whether this variety will produce more weight of dry hay than will the other varieties has not been determined; however, we are of the opinion that this will be the case. The variety referred to is known as the Arabian alfalfa and should be of interest to farmers and stockmen of this as well as other states.

The work with the bur clovers is quite promising. Nearly all the species of the genus are being tested and thus far some are giving promising results. We are in hopes of finding among these a variety or species that will make a good range pasture plant for cattle and sheep. We have several varieties growing at the garden that give promise of serving this purpose. The varieties referred to are strong growers and produce seed in abundance. The burs are entirely spineless and are from one half to one inch in diameter, being of course considerably flattened.

Seed of these varieties was secured from Algeria through Mr. C. S. Scofield. Thus far, while making preliminary tests with these, our aim has been to secure seed in sufficient quantity that they might be given a fair test on the open range. In another year we are in hopes of having seed of these in sufficient quantity that they may be fairly tested as range pasture plants. (Sample of seed shown.)

A line of work being carried on particularly for California is that of investigations with Indian corn. The past season thirty-one varieties of corn were grown at the garden to determine their relative adaptability to the conditions of this State. Aside from the variety tests selective work was begun with a hybrid variety that gave promising results in the tests of 1905. Mr. C. P. Hartley, who is in charge of the Indian corn investigations, writes that he is quite hopeful of materially benefiting the California farmer by work in the selection and adaptation of corn varieties to the conditions in California.

The work with the legumes should be of special interest to both the agriculturist and horticulturist of this State. At Chico our work with this class of plants has been and will be more extensive with the Vicias, Pisums, and Lathyrus. This year we are growing ninety varieties in these genera. We are endeavoring in this work to find the best plants

to grow for either a summer or a winter crop, to be plowed under for green manure. That such practice with this class of plants is of inestimable value to every class of fruit-growers as well as to the farmer is being more generally realized. The more progressive fruit-growers of this State have come to realize the advantages in the increased size, quality, and quantity of fruit, attained by the use of a leguminous green-manure crop as a fertilizer and soil renovator, and are using them to quite an extent. I am also pleased to say that some are carrying on their work with the view of aiding in the finding of better or improved crops for this purpose. However, there is a great part of the State where the value of this work is not realized and in such sections what might easily be is not attained. Some of the most promising crops for green-manures for California, so far as our work indicates, are *Vicia bithynica*, *V. atropurpurea*, *V. sativa*, *V. fulgens*, *Lathyrus coccineus*, *L. tingitanus*, together with the Pisums, a number of which do well.

Work is being carried on in testing varieties of cowpeas, soybeans, and various *Phaseolus* sp., and while not intended for California alone this work can not help but be of first value to this State.

Some three hundred varieties of sorghums were grown at the garden the past season. These were introductions from China, South Africa, Abyssinia, together with varieties of this country. From the fact that California's climatic conditions are such as to make a forage crop that can be grown during the dry season without irrigation desirable, it is possible that this class of plants, already famous for their drought-resistant qualities, and to a greater or less extent already grown in this State, may furnish something of value.

Quite extensive investigations with cacti, under the direction of Mr. David Griffiths, are being undertaken at Chico. Some two hundred and fifty types are being grown with which breeding and selection work will be carried on. The object of this work is to secure, if possible, varieties that will be of value for stock food on the ranges and drier regions of the United States; also for ornamentation and the production of fruit for man. Quite a market has already been established in the Eastern cities for the fruit of this plant, which is now almost wholly imported from Mexico and other countries. (Photos shown.)

Another plant of especial interest to the agriculturists is the guar (*Cyamopsis psoraloides*). This is a kind of bean that was secured in India. This plant is exceedingly drought resistant and gives promise of being a good crop for both fodder and seed. In India the guar is used by the natives as a vegetable. This year, sown at the garden the latter part of June, it made a growth of from three to five feet in height and has set a heavy crop of seed without irrigation and on land not subirrigated. We are very hopeful for this plant and think it will be of value to California, as well as to other parts of the arid regions of the West. (Seeds, plant and photos shown.)

I wish here to mention a few of the more important lines of work that are of immediate interest to the horticulturist. The more promising introductions of this class were discussed fully by Prof. P. H. Dorsett yesterday in an address before the Nurserymen's Convention, which many of you attended; however, we wish to call attention to this work in a general way, dwelling more particularly upon lines of investigation not discussed in that address.

The past year we have carried on considerable work with vegetables. This consists in the testing of varieties comparatively to ascertain the relative value of new varieties and to determine the trueness to name and type of both old and new varieties placed on the market by the various seed firms of this country and to ascertain their adaptability to California conditions. A very interesting collection of Turkestan muskmelons was grown at the garden the past summer. These were importations from Turkestan, and some of them apparently are valuable melons.

The Udo salad plant (*Aralia cordata*) has been grown at the garden for two years. This has not been tested here as to its quality as a vegetable, but has been grown in quantity for distribution and testing elsewhere. However, from all information attainable this promises to fill a place in the list of salad plants that will be distinct in itself. The udo is a winter vegetable, being in season from October to May. This is an introduction from Japan and is said to be crisper than celery and to have none of the objectionable stringy fiber that is often found in that plant. It is used both in a fresh state as is the celery and is also cooked in various ways. From the fact that this plant is adapted to winter culture it might be made a profitable crop in some parts of this State as well as in many other parts of the United States. The udo is discussed quite fully in Bulletin No. 42 of the Bureau of Plant Industry. (Plants and photos shown.)

The pistache, of which a number of thousand plants have been grown at the garden, gives promise of being the means of establishing a new industry in this State. The pistache is a tree attaining considerable size and produces a nut much prized in many markets. The large pistache is used as we use the almond. The nut is now imported at a high price for use in confectionery and also as a table nut. The tree has the advantage over the almond of being a late bloomer and is somewhat more drought resistant. California should be able to produce this nut in sufficient quantity to supply the American market, as it is thought to be well adapted to various localities of this State.

The garden is in possession of one of, if not the finest and most extensive collections of figs in the country, to which additions will be made the coming season and thereafter whenever it is possible to find new varieties. These are in permanent plantings and are to be used in

connection with selection, breeding, and testing of varieties. Those who have given the fig industry any study know that much is yet to be accomplished in connection with this work, and California will be almost alone in reaping the benefits of these investigations.

Viticultural work is also receiving considerable attention. Plantings of a permanent vineyard have already been begun, and it is expected that within a few years nearly every known variety of grapes will be represented in the collection. Here, breeding, selection, and other investigations will be carried on, supplementing the work of the other viticultural stations to be found in various parts of the State. The value of this work to an industry represented in this State by possibly 75,000 acres of permanent plantings should be apparent to all and should receive the hearty support of every one who is at all interested in the welfare of this industry.

The Japanese paper plant (*Edgeworthia papyrifera*) is an introduction from Japan that is receiving considerable attention. This is a small, upright-growing shrub the bark of which is used in the manufacture of paper. A number of thousand of these plants have already been grown at the garden and distributed for further testing. Investigations with this plant have not been extensive enough to say as to its probable future; however, it may possibly be of value.

Another line of work that is of possible value to this State is that with the rush (*Juncus effusus*) or matting grass, from which the matting of commerce is manufactured. The entire supply of raw material for this purpose is now imported. This work, under the immediate supervision of Mr. John Tull, is being carried on particularly with the hopes of being able to establish this industry on the abandoned rice lands of the Southern States. However, it seems probable, if work with the *Juncus* is made to succeed, that some of the low waste lands of this State might be profitably used for this purpose.

A number of other very interesting lines of work might be discussed, but time will not permit. We will, however, mention the work with the carob (*Ceratonia siliqua*), a tree which produces a bean which is said to be of unexcelled quality for stock feeding, and the tree itself is also quite ornamental. We wish also to call attention to the Kai apple (*Aberia caffra*), an introduction from the Cape of Good Hope, which gives promise of being an unexcelled hedge plant. It also produces a fruit which makes an excellent jam, marmalade, sauce, and jelly.

We have but mentioned some of the more important introductions and lines of work that are being investigated at the Plant Introduction Garden, but we trust we have given you somewhat of a general idea of the work and its importance. More interest in the work on the part of the people of California would not only be a benefit to the State itself, but would also greatly help the work. Of course, you will understand that

most of this work is yet in the experimental stage and our remarks have been made from data secured by men who have seen these plants growing in their native soils, and the indications for success as shown by the very limited work with them at the Plant Introduction Garden. We do not mean to say that any of these introductions are entire successes, for work with them has not been extensive enough to warrant any such conclusions, but we do say that they are worthy of being given your closest attention. You all realize that the agriculturist and horticulturist work in the face of many disadvantages. Thus it certainly behooves one to appropriate to one's self every advantage offered and to try and increase one's profits by better methods and better stock, and it is to this end that the Plant Introduction Garden is trying to assist.

We are also endeavoring to aid in the work of introducing new plants of whatever kind that may be the means of establishing new industries or of adding to the value of ones already established. Our constant aim is to help the agricultural and horticultural interests of the country in general, and we trust we will have the hearty support of all.

(At this time an adjournment was taken until 9:30 o'clock to-morrow morning.)

PROCEEDINGS OF FOURTH DAY.

FRIDAY, December 7, 1906.

The Convention was called to order at 9:30 A. M. President Cooper in the chair.

PRESIDENT COOPER. By special arrangements, Professor Waite is to make remarks this morning on peach blight, but until the audience gets settled we will take up the essay of Mr. Berwick. Mr. Berwick has written that he will be unable to be present and has requested that his paper be read by the Secretary. Mr. Isaac will now read Mr. Berwick's paper.

THE FRUIT-GROWER AS A FACTOR IN POLITICS.

BY EDWARD BERWICK, OF PACIFIC GROVE.

Factors are of various kinds. There are prime factors, and there are negligible factors.

The horticulturists of California are the class that produce the greatest amount of its wealth. They are prime factors as contributors to the economic upbuilding of the State. Are they prime factors in the directing of its politics? Or are they not only negligible but also wholly neglected factors in this respect?

When it comes to taxation they are prime factors as taxpayers; but when "political pie" is to be divided they become once again negligible.

Even the party platform usually ignores, if it does not actually antagonize, the fruit-grower's interests; and, should he presume to ask his candidate for Congress to pledge himself to further certain specific measures devised for the general benefit, he is met with the rebuff that it is a misdemeanor for the candidate to so pledge himself, or for any voter to ask such a pledge, and is referred to Section 55a of the California Penal Code.

Why is this thus? Why is the magnitude of the horticultural industry thus slighted?

When Shakespeare wanted Coriolanus to express his contempt for the disunited citizens of Rome he put into his mouth the words, "Go, get you home, you fragments." Note the word "fragments"—"you fragments." Is that what is the matter with the horticulturists? Are they still simply "fragments"—disunited—a prey to every other class?

The merchant has his Merchants' Association to protect and preserve the rights of his class. The lawyer has his Bar Association to decide on the minimum fee in which his client shall be mulcted. The railroad representatives gather harmoniously and decide just how much the traffic will bear. The lumber trust brings together all the mill-owners to raise the price of box material. The very laborers' union seeks to dictate hours and prices to the employer. All are learning that in union there is strength. But the horticulturists remain "fragments." The greatest industry in the land the least organized! The greatest industry in the land, and probably not a single representative in Congress! When a new Senator has to be chosen does any one dream of consulting the fruit-growers? "What Herrin says" heads columns in the newspapers, and what Herrin says almost invariably goes. Herrin runs the machine, and the fruit-grower is hardly permitted to be a cog in that machine. He's simply a "fragment."

Even commercially, whether buyer or seller, he is usually a "fragment"—a prey to every organized body. Price lists, specially arranged to hoodwink the farmer, are printed. His local merchant makes him believe that when he is getting his goods at San Francisco catalog prices he is doing remarkably well. Nothing is said of the discounts, and cash discounts, perhaps ranging from 25 to 75 per cent off the catalog "list." If the farmer would cease to be a "fragment" and learn to coöperate with his fellows he could pocket these discounts himself instead of being mulcted by the other fellow. For instance, why should not fruit-growers organize a coöperative lumber-mill to cut their own box shooks? In selling, it is the same. The farmer frequently does not know what his own product is worth in the world's market. The buyers belong to merchants' associations, or produce exchanges, that enable them to keep posted on values. The growers, who, if united, would be kings of the situation, act simply as "fragments," disassociated, and let the buyers fix prices of the growers' produce.

What obtains in the world of commerce obtains yet more remarkably and unmistakably in the political world.

Here again the horticulturist is a "fragment." Of pooled issues he will have none. He sees transportation companies pooling political issues and bemoans and bewails that they dominate the field, getting all they want for themselves, and all the "pie" for their faithful henchmen. They know what they want, they go for it, and they get it. The bread they cast on the waters of the political pool always comes back buttered; *not* after many days, it comes back right away.

The fruit-grower is just the reverse. He is not even quite sure what he wants. He won't even try to put in his spoon to stir the political pot. Why, he won't even spend a dollar two or three years in succession to agitate for a parcels post, which would do wonders toward making

him commercially and financially independent. He won't even take the trouble, as a rule, to write to his own representative in Congress at Washington to tell him what his views are on a subject of such transcendent importance. And yet it is the lack of action on the part of Congressmen that delays the inauguration of this enormous boon to all classes. Both President Roosevelt and the Postmaster-General have intimated their wishes in the matter, by making the present domestic rates look ridiculous. Those two officials dominate the foreign postal conventions. By their action they have made it possible to send a four-pound parcel from Hanford to Great Britain for 48 cents, while it still costs 64 cents to send the same parcel from Hanford to Fresno. Four cents a pound *more* from Hanford to Fresno than from Hanford to London. If that is not too utterly silly and ridiculous, what is ridiculous? The reason is that Congress dominates domestic postage and railroads dominate Congress. Being simply "fragments," we permit our own representatives to tax us in order to pile up \$31,000,000 surpluses for express companies. So it was fifty years ago, so even now:

"Its notorious in town
That our own representatives do us quite brown."

Some of them join in the chorus raised by the express companies in the subsidized press that an up-to-date domestic parcels post would ruin the business of local merchants. They have sung this so loud that there are actually some local merchants fools enough to believe it. Fancy, fools enough to believe that better and cheaper transportation would ruin the world's commerce. Why, if there be any science of commerce, it consists in bringing producer and consumer as closely together as possible, and this has been done all through the world's history by increasing transportation facilities.

Half a century ago the great Macaulay wrote that, "barring the alphabet and printing-press, those inventions which abridge distance have done most for the progress of mankind." The parcels post practically abridges distance.

But to show the silliness of this contention as to the retail merchant I will give two illustrations.

Many of California's most prosperous towns and villages are within a 100-mile radius of San Francisco. The principal department stores in San Francisco already send goods from their bargain counters *absolutely free of all freight charge* to customers living within the 100-mile radius. According to the express company's argument this should have ruined the business of local merchants in that radius. Is this so? Its utter falsehood can easily be established by visiting San José, Oakland, Berkeley, Stockton, Petaluma, Sacramento, Santa Rosa, or any other place. It will be found that never were all stores in those towns better stocked with goods or doing a better business than to-day. If

absolutely free delivery of goods has not proved injurious, what harm could a two cents per pound delivery do?

Furthermore, the lack of a parcels post often causes much loss of trade to the local merchant. Not only does he lack its convenience in enabling him to keep a wider variety of goods, to send direct to factories for these goods, and to replenish his stock more frequently and easily, but he loses in this way.

There are many things he does not carry in stock that his customer wants, say a pipe-wrench of 11 pounds weight. For the customer to get this from an Eastern mail-order house, there are only two ways: by express or railroad freight, as the postoffice will not handle domestic merchandise parcels over 4 pounds. By express the rates are almost prohibitive; by freight they are more reasonable, but the minimum charge by the railroads is for 100 pounds. What does the customer do? If his wrench is to come by freight he must pay on a full 100 pounds. He thereupon thinks, "Well, if I must pay for 100 pounds I may as well send for enough other goods to make up the 100 pounds," and proceeds to scan the catalog to see what he can send for to make up the additional 89 pounds. So in the end the local merchant loses a whole 100 pounds. Had there been an up-to-date parcels post the customer would simply have sent for the one article the local merchant could not furnish. Or, more likely yet, would have asked the merchant to send for it for him from the factory, where the merchant's trade discounts would permit of an ample profit being secured.

I have dwelt on this retail store argument rather fully because so much has been made of it in California, and the same twaddle was recently telegraphed, *as news*, from New York, where the silliness of the argument becomes too outrageous, seeing mail-order houses can already send packages near such big centers by rail at much lower rates than parcels post calls for.

Another point of vital interest to the horticulturist is the schooling of his children. He is just beginning to awake to the idea that he has a right to be heard in this matter, and that it should not be entirely left to such bodies as the High School Teachers' Association, or even university boards. There has been in the past a tacit acquiescence in the dictation of such bodies that is remarkable. As a result we have a school system based on the idea that the prime essential is to fit pupils for the university. We have also the ridiculous assumption that a knowledge of one or more dead languages is an indispensable requisite for our youth. Years ago the man with a capacity to sling a few quotations from Greek or Latin authors at an audience plumed himself on his superior "culture." He could have said the same things just as well in plain English, but that would not have exhibited the "knowledge that puffeth up." Now he *has* to say them in plain English, or be laughed at as a conceited pedant.

It has been fashionable to hold up the civilization of Greece as a model for us moderns. Well, the Greeks had so poor an opinion of any language but their own that they said that all others sounded like "Baa, Baa," and hence they called those who spoke them "barbarians." Perhaps we might follow their pattern, at least so far as to impart a thorough mastery of our own language in our schools rather than a smattering of dead languages.

The reason that schooling is free to all in America is to make this Government that most lovely and desirable thing: a government of a wise people, for a wise people, by a wise people; and not that most ridiculous and contemptible thing: a government of foolish people, for a foolish people, by a foolish people. Wisdom is what? "Wisdom is knowing what is best to do next. Skill is knowing how to do it. Virtue is doing it." Does the average pupil leave school equipped with wisdom, skill, and virtue, as thus defined? Is instruction in dead languages likely to furnish this equipment? Is it not entirely desirable that our youth should learn how to do things as well as how to say things? Could not a course of instruction be arranged that would interest children in the thousand and one things essential to a right understanding of life and how to live—things pertaining to self-maintenance and coming responsibilities as parents and citizens? Shall it be this, or shall we continue making their minds "perfect rag-bags of useless knowledge"?

The chief end set before pupils seems to be to "get credits" so as to "get on" in life. To "get on" is usually accepted as meaning to attain some position where it will be possible to exploit the labor of others: to avoid eating bread in the sweat of one's own brow by making the other fellow's brow sweat unduly. The more other fellows you can make sweat, the more you have "got on."

This is the basic idea that leads to all "graft" and malfeasance in office. Is it the basic idea of Republicanism or Cæsarism? Cæsarism exalts the one at the expense of the many. Up with Rogers and Rockefeller? Who cares for the rabble who toil? "Fragments!" "Fragments!" Is this the creed for your children? Or, shall it be that co-exaltation of the many, which is the essential core, not only of all worthy Republicanism, but of all true Christianity?

Gentlemen, it is for you to dictate which standard you wish upheld. To neglect this duty is to be a traitor to your much-loved country. The only way to keep this "the land of the free and the home of the brave," to keep this a real "government of the people, for the people, and by the people," is for each of us to be willing to do his share of governing, even at the cost of some little self-sacrifice. It is idle to complain of boss rule when this boss rule is made possible simply by our own neglect to attend to our own national business. Each of us must be willing to devote valuable time to the study of our public service, that we may take intelligent action in its direction and oversight.

As members of the leading industry of California we should, if united, be the controlling force in its politics. We should cease to be contemned as "fragments."

This annual convention of the Horticultural Commission is the only meeting in the State's calendar specially called in the interests of the fruit-grower. Would that there were more frequent opportunities for us to gather together and consult on the needs of the State of which we are so important a part, and in which we should be the prime factors in politics!

May I close by expressing a hope that this Hanford Convention will at least distinguish itself by uniting to demand from Congress the speedy inauguration of an up-to-date parcels post, and not only pass proper resolutions, but add their active efforts to those of our good friends, Prof. D. T. Fowler and John S. Dore, as working members of the Postal Progress League of California. May our success in this be so pronounced that we shall take courage to unite, to the end that in future we may become what we deserve to be—prime factors in California politics!

So mote it be. Amen.

MR. FOWLER. I desire to say a few words with reference to this important paper that you have heard read. I have thought of our friend who is the author of this paper and is not able to be here to-day. He was born in that little village across the ocean, London; but for many years he has lived in our State of California, and I am proud to say that I do not believe there is a more loyal American on this floor or in this State than Edward Berwick. I feel like saying that perhaps no more important paper, no more thoughtful one, has been delivered in this Convention.

I don't want to discuss the whole paper, but I do wish to discuss one part of the paper for a few moments, and then I wish to offer a resolution. At the Convention of the State fruit-growers held in Southern California some years ago, Mr. Berwick spoke upon the subject of a parcels post, and there was organized the Coast Postal Progress League of the State of California. He was made the first president, and has been continuously the president of that organization, and he has done much to further this matter. He is absent to-day, or I would not say what I am going to say. If he were here he would not have it said; but he has used, as some of us know, the most intelligent effort, and has put time and money into this matter, in advocating the principles of the parcels post and getting it introduced into the United States. He has placed it before the papers, even the metropolitan papers. He has discussed these questions with commercial bodies, and in some cases has met with great opposition. He has gone to Europe and studied the conditions there. I say all honor to Mr. Edward Berwick

for what he has so intelligently, and so earnestly, and so ably done in the interests of the people of this State and of this nation, because the parcels post is a question that belongs not alone to the fruit-growers of California, but, as a great problem, it belongs to the people of the entire nation, and he has been a very great factor in awakening the people of this nation.

The President of the United States, as is said in this admirable article, and the Postmaster-General, have the power to make a convention with foreign governments in the matter of the introduction and the postage on the foreign post; but when it comes to the domestic post, then it must be done by Congress. And you gentlemen, every one of you, are responsible, because in this country the will of the people should control, and when the people rise and say they will, then they may have it.

So let us take it home to ourselves, you and I. It has been the great express companies that have kept this question behind for years and years. Every man who is an American citizen and who has studied the question knows this to be the truth—the interests of the express companies have prevented us from having a parcels post as good as Japan has, as Mexico has, and as most civilized countries of the world have.

Some figures have been given you in the paper. I want to give you just one. The English postal department can come here and say, "Will you carry our packages everywhere in the United States to the extent of eleven pounds?" And the express companies agreed with the English government, the postal department of England, that they would; and so all packages coming to the ports of New York and New Jersey are taken by the express companies and delivered wherever there is an express office all over the entire United States, and eleven pounds are sent for 24 cents through the express office.

I had eleven pounds sent to me, to make it exact, from Manchester, England. I live in Oakland, California. I live just outside of the dead line, because the express companies have certain ways and means by which there is an extra charge now and then put on above the expressage. Outside of that line, if I have a package delivered, it is 25 cents. I am a few blocks outside of the line, but inside the city of Oakland. But when the package came to me from Great Britain, when it came from the English postal department, the express messenger came up smilingly to my door and rang the bell and handed me the package and took a receipt for the same. If I had had it sent from San Francisco by Wells-Fargo Express, it would have cost me 25 cents, besides the expressage. If they can do this for the English postal department from New York to all places in this country for 24 cents, they can do it for 24 cents for an American citizen.

There is not time to discuss this question and show the inequalities

that are in it. The other day, although it has not been widely published and the country press doesn't get hold of it somehow or other, the President made a convention with Peru. You know what the four-pound package is. It must be of such a size, and it is a very small package. But in this convention with Peru the package may be eleven pounds in weight, and it may be six feet long, and it can be six feet around or in diameter. But that is for a Peruvian. We don't ask in our parcels post what they ask. What is the size of a package there? It is limited to the size of a car door. What is it in Germany? You can send it fifteen hundred miles for 12 cents, and if one wanted a bill collected at the other end, the government will collect it and they will charge you the magnificent extortion, as commission for collecting, of 8 cents. Could you send your package of fruit to the extent of eleven pounds all over the United States and have the bill collected for 8 cents?

A bill passed the lower house of Congress to adopt this measure, but when it got into the Senate, the committee chairman there, Mr. Platt of New York, president of one of the great express companies, pigeon-holed it; and every time there has been something the people wanted upon this line, it has been pigeon-holed. Mr. Wanamaker answered that question thoroughly when he was asked, as Postmaster-General, the reason why this bill could not pass the Senate. He said there were four reasons: the American Express, the Adams Express, the Southern Express, and the Wells-Fargo Express.

Now, the State Fruit-Growers' Convention established the Postal Progress League and elected its officers. What is the percentage among us that are willing to pay their dollar to assist in this matter and to help in the matter of postage? The President of the League has put in over \$200 of his own money, besides his time. Won't you pay a dollar and join the League? Now, here are the resolutions:

Resolutions Urging Congress to Pass a Parcels Post Law.

Resolved, That this California State Fruit-Growers' Convention, in its thirty-second annual session, assembled at Hanford, California, does hereby recommend our Senators and Representatives in Congress, urging them to use their most earnest and intelligent efforts to secure the passage of an efficient parcels post law, permitting the carriage of at least eleven-pound packages through the domestic post; and further

Resolved, That a copy of these resolutions be forwarded by the Secretary of this Convention to each of our Senators and Representatives in Congress; and further

Resolved, That a copy be sent to the Postmaster-General.

PRESIDENT COOPER. It is not necessary to suspend the rules the last day. The Committee on Resolutions has adjourned, and all resolutions have to come before the Convention. Is there a second to the resolution?

MR. DORE. I second it.

Question put and carried.

PRESIDENT COOPER. Professor Waite will now talk on "Peach Blight."

PEACH BLIGHT.

ADDRESS BY PROF. M. B. WAITE, OF WASHINGTON, D. C.

It is somewhat unnecessary to discuss the cause of the disease and the character of the fungus, inasmuch as I treated of this quite fully on Wednesday evening. I may say, however, that this little fungus was described several years ago in Europe, and named after a Swedish botanist. It has an outlandish Swedish name. It was named after the botanist Beyerink. Beyerink is a well-known botanist, but the peculiar spelling rather grates on American ears. The Latin generic name is *Coryneum beyerinkii*. It was discussed by Rev. M. J. Berkeley, the distinguished mycologist, as a disease of the peach, and he named it



FIG. 1. Peach-Blight fungus. A. Manner of propagation. B. Peach twig showing characteristic exudation of gum.

FIG. 2. Appearance of Peach-Blight fungus, artificially produced.

the gumming fungus. It has since been called by several different names. Pierce called it the winter blight, and the California growers, as a rule, call it peach blight. There are, unfortunately, several other peach blights in different parts of the country, so that that is not a distinctive name. However, if you add California peach blight to it you have got a name that would distinguish it anywhere in the world. It has increased very rapidly in this State, and has only recently been attracting general attention. It has, however, been known at the U. S. Department of Agriculture as a rather secondary disease of the peach in Ohio, and it has been sent to the department from Georgia.

The little fungus which causes it is a very characteristic and pretty microscopic object. I made some rather hasty sketches to give you an idea of this fungus. The spore here is drawn from memory, and I would not vouch for its being accurate; it consists of several cells. (See Fig. 1.) It is not content to propagate by a single cell, so it has several joined

together, varying from three to six. Each one of those spores has the power of germinating, and sends out a little sprout, which can sprout out at the time and enter the peach. They are smoky brown in color, and the germs are white. When this germ finds a suitable place to grow, in a drop of water or rain on the tree, it germinates; and this little fungus is sketched to give you an idea of what it is actually like. These little germ tubes are nothing but small, white, thread-like tubes, very minute and microscopic, altogether too minute to see unless you have a great many of them together—very much smaller than the threads of ordinary cotton or wool.

Figure 2 represents the condition which could be produced by growing a spore on nutrient jelly perhaps three or four days, and represents a somewhat similar condition to that which obtains when the fungus grows into the twig of the peach. These tiny threads pierce the cells of the bark, boring down into the wood in all directions, feeding on the material in the cells of the peach and killing the tissues as far as they reach. In other words, this little fungus is a parasite, which grows into the peach twig and kills those little spots. The result is a great many little brown spots form on the twigs. Many of these colonies of the fungus grow into the buds, and during the late winter or early spring the peach twigs are found to be peppered all over with numerous brown spots. Furthermore, many of the buds are either blackened and killed, or readily fall off on jarring, or are blown off by the wind; that is, the blossom buds especially. At certain rainy periods these little spots exude copious gum, which hangs down in strings or forms masses over the brown spots. The gum is produced by the peach tree itself, and is not limited in its cause to this particular fungus, as you all doubtless know. When the tissues are disturbed and partially killed, or perhaps I might say the live tissues in proximity to dead tissues, as in a wound, the stone fruits have a habit, instead of forming normal woody tissue, of forming a degenerate type of wood tissue—a degenerate type of cellulose of a gummy nature, and this gum is the result of these little wounds. It seems as though the peculiar irritation of this fungus of the peach does not instantly kill the cells, but slowly kills them, thus giving them a chance to react to an unusual degree to that tendency of gumming. Therefore, the gumming material is a conspicuous feature of this disease. Peach trees gum from mechanical wounds, punctures of insects, and from a great many other causes.

As to the destructive effects of this disease, I hardly need, perhaps, to go into details before this audience. In very many districts in California, not only in this district about Hanford, Visalia, and Fresno, but all the way up the great interior valley of this State clear to Shasta County, this disease has been remarkably destructive. The disease is probably more serious in the southern part than it is in the north.

although in the moist region about the lower part there are some very bad cases. In fact, the large part of the peach orchards of the Sacramento and San Joaquin Valleys have been rendered almost commercially worthless, or commercially unproductive, during the last two or three years. Furthermore, the disease appears to be increasing, and the growing seriousness of this malady makes it positively alarming to the horticultural interests of the State.

One thing is certain, the fungus does most of its destructive work during the dormant or the semi-dormant season. It requires considerable moisture and rainfall to propagate and germinate. Like most other fungi of a parasitic nature, it requires distinct infection periods in which to gain entrance into a tree. The importance of infection periods is not ordinarily realized by the fruit-growers, but the investigating mycologist considers these periods of damp weather. These periods are not necessarily limited to rainfall, but cloudy and foggy weather, when drops of dew, in other words drops of water, may hang on the trees for a considerable length of time, give the spores time to germinate or sprout and enter the tissues of the peach twig before the sun comes out and dries them up. Doubtless millions and millions of spores are germinated in the night, and then burned up by the next day's sunshine; but when the conditions are just right, and the drops of dew or water can remain through the day, the spores germinate and the fungus enters the tree.

Since the disease has been studied, less than two years, the appearance has been mainly in January or early February. When I first saw the spots on the twigs about the 10th of February, it was evident that they were at least two weeks old. That would make the infection period, in 1905 at least, as early as the last week in January—probably as early as the 15th of January. Careful study will be required to determine whether that is the regular date for the appearance of the disease. This last spring the disease came about the same time, but the autumn was particularly dry, and it is not at all certain that the fungus had an opportunity to gain entrance last December. The fall was dry and cool. Of course, dry and cool weather will hinder the development of the disease on the peach tree, while rainy and warm weather will favor it. The importance of these infection periods, when it comes to the question of treatment, can hardly be overestimated. It is absolutely necessary, in case of spraying against fungi of this sort, to spray ahead of the germination of the spores and ahead of infection. In fact, it was the full understanding of this truth that led to the suggestion of spraying these peach trees in the early winter or late fall to make sure of getting ahead of the infection.

The first attempts at spraying with the Bordeaux mixture, and the repeated sprayings the California peach orchards have received with

lime, sulphur, and salt, made commonly late in January or February, just before the buds swell, or just before the blossoms open, had no effect, or very little effect, on this disease, because infection had preceded. Unfortunately, the California fruit-grower has had more experience with the peculiar disease known as peach-leaf curl, which can be sprayed almost any time through the winter, but which is best sprayed just before the buds begin to swell. This treatment has misled them in attempting to apply the proper remedy for the gumming fungus, namely, fall or early winter treatment.

As to the history of the working out of the treatment for this disease, I may say that, fortunately for the California peach-growers, experiments were made last year, giving such positive and definite results that it leaves no question as to the reliability of the Bordeaux mixture treatment for this disease. The only questions which remain are those relating to the exact dates or the possible strength of the mixture. I will therefore give you briefly the experience on which our recommendations for treatment will be based.

On the William Pierce ranch, of which Mr. George Reed is superintendent, peaches were sprayed December 6, 1905, just about a year ago. The 15-20-100 mixture was used; that is, fifteen pounds of blue-stone, twenty pounds of lime, and one hundred gallons of water. We think the strength is not especially important, but that is what was used. The peaches were not all sprayed on that date. It took several days to finish them—probably ten days. In the spring when the buds were swelling, about February 1st, or perhaps the last week in January, those varieties which had been most seriously affected were again sprayed with a 10-10-100 mixture. The question of whether single spraying or double spraying will answer has not been absolutely settled, but there can be hardly any doubt that a second spraying would be better where the disease is very bad.

Now, what was the result? When I saw these trees early in February, the wood and the buds were just as bright and sound as if no gumming fungus occurred in the vicinity. The spraying was thorough, and it was almost impossible to find a single spot of the gumming fungus on those trees. The trees bloomed out with the greatest of vigor and luxuriance and set a fine crop of fruit. Furthermore, although it was a rainy spring, they matured a splendid crop. Four hundred and two trees of Wager yielded one hundred tons of fruit. One hundred and eighty trees of Lovell yielded forty-two tons of fruit, and so on. Mr. Reed told me the Alexanders had not been as fine for several years as they were this year. People who didn't spray, lost most of their fruit. One orchard was pointed out to me the other day at Suisun where not a single box of peaches was picked and shipped from the orchard this year, which undoubtedly would have given a fair crop with proper spraying.

Mr. J. S. Brown, at Suisun, sprayed the last week in December, using 15-20-100 Bordeaux. Most of his peaches were Muir and Phillips Cling. He only sprayed once and got splendid results. It is possible that his trees had been less seriously affected the year before than those of Mr. Reed.

Mr. J. R. Chadbourne sprayed once early in January. That is still a little later. He got splendid results from a single treatment.

Under Mr. Reed's direction, Mr. J. R. Davidson started spraying early in January, and sprayed part of his peaches early in the month, but through rains, or delays from other causes, a portion of the orchard was sprayed late in January, and, as it proved on examining the peach twigs in February, too late, showing that last season, at least, early January spraying gave good results, but late January spraying was partially a failure.

As I said before, these dates are not considered absolutely safe for future guidance. Inasmuch as the peach buds are already formed, and inasmuch as the Bordeaux mixture is persistent and sticks on the twigs for a long time, it would be safer to begin the treatment early in the winter or fall. We therefore recommend, as the best knowledge we have at the present time, to have the spraying done during the last half of November, and we consider December 1st a date at which most of the spraying should be finished. It is quite possible that from December 1st to 15th may be all right, and we have no reason to believe that up to the present time it is too late to spray peaches in this vicinity. However, we feel that you are beginning to run the risk if you delay later than this.

Undoubtedly, in badly infected orchards at least, perhaps on all orchards, the trees should be sprayed again about January 15th, or perhaps from January 15th to February 1st, according to the date when the buds begin to swell. When the buds begin to swell, give the trees a second treatment. Further tests are being made to determine the safe treatment.

We need further tests as to the strength of the mixture. There is very little doubt in my mind that the standard strength of six pounds of bluestone to four or six pounds of lime will be all that is necessary; and in the Eastern states, in fighting the bitter rot of the apple, the most serious disease in that country, they use the 5-5-50 Bordeaux, or 10-10-100 according to the California way of mixing it. This has given good results.

Now, as to the theory of copper spraying. I wish I had made one more diagram to show that, but we will talk of this supposed peach twig. If you spray this twig in the fall of the year with Bordeaux mixture, there are little spots of the copper sulphate and lime compound dotted all along down the twig, films of it running over the tissues, and portions

of the copper wedged into the crevices of the bud. Now then, when the rain comes, this Bordeaux mixture does not wash off like bluestone solution, but it very slowly dissolves. We call it an insoluble compound. As a matter of fact, it is a difficultly soluble compound, or slowly soluble compound, and minute traces of the copper material are dissolved by the water.

Copper is a very peculiar poison, and very peculiar in its poisonous effects on plant life. While it is very slightly poisonous to man and animals, minute traces of copper, in some places one part to fifty millions of water, are able to kill plant life. I don't know just the susceptibility of the germ tubes of this *coryneum*, but they must be susceptible; in fact, they are extremely susceptible to this Bordeaux mixture. The result is, by having the Bordeaux there first, when the rain falls that makes the infection periods, those same drops of water carry minute quantities of this copper solution, and the fungus can not germinate, and is killed. Spores sprout out and are killed, and, having lost their power of germination, are harmless.

Now, I have been asked what is the function of lime in the bluestone solution. While the copper is the true poison and possesses the toxic properties, lime is absolutely necessary as the vehicle by which it is sprayed on the tree and maintained in this slowly soluble condition by which it is always ready to do its work when the drops of water come on. I saw the other day at Suisun some of these sprayed peach trees with quite a decided blue coating on the wood from three to four years down to where the copper was sprayed on a year ago, or nearly a year ago, showing the wonderful persistence of this mixture.

Now, one of the important questions that you are going to have is how to get good Bordeaux, how to avoid bad Bordeaux. Unfortunately, much of the Bordeaux mixture that is made is bad. Much of the spraying is poorly done, and the fruit-grower is frequently, through lack of knowledge in regard to methods, and lack of experience in doing the best possible work, kept from getting the best results. So we will go into detail a little.

First, as to the composition of the Bordeaux mixture. It sounds like a very simple thing to put a little bluestone solution and a little lime together in water, but the Bordeaux mixture is wonderfully complicated—in fact, is so complicated that up to the present time the analytical chemists have not been able to tell us all the changes that take place in this mixture. No chemist can to-day write the formula for Bordeaux mixture. It will be impossible to go into all the details, because that would take all the morning, but I can give you a few ideas to show you how complicated this mixture is. I regret this can not be discussed without using the chemical terms.

Now, the ordinary milk of lime is calcium hydroxid. Of course lime is not pure. It is always air-slaked and carbonated to some

extent. So the lime consists of calcium hydroxid, or caustic lime. It is a saturated solution with particles of the caustic lime in suspension. Furthermore, it has its principal impurity in the form of carbonate of lime, which is only slightly soluble in water. In fact, the caustic lime, when it changes to carbonate, crystallizes in the form of a scum over the solution.

The bluestone solution is a much more simple mixture, consisting of copper sulphate; that is, sulphuric acid and copper. Both of these materials may have impurities in them which possibly at times are important, and which we will not go into now. When you pour those materials together a curious reaction sets up. The hydroxid of lime has a greater affinity for the copper than the sulphuric acid has, or vice versa, the sulphuric acid takes part of the lime and therefore frees the copper, which combines with the calcium hydroxid; but this is not a simple reaction, for we have formed not only calcium sulphate, that is, sulphuric acid, from the bluestone combined with the lime, but we have calcium copper hydroxid, part of the calcium staying with the hydroxid and taking the copper along with it. That goes down as a blue precipitate; that is, blue slushy material that is carried down. This, however, is not pure, because during the reaction it carries down grains of calcium hydroxid which do not enter into the reaction. In other words, part of the lime goes down into the slush as pure lime, and the carbonate of lime also goes down.

So, you see, that is a wonderfully complicated thing. Furthermore, there is some basic copper hydroxid in the precipitate in which the reaction is not fully satisfied. A still more remarkable thing occurs during this precipitation; namely, that even though you may have an excess of lime, which is always the rule in this mixture, it is impossible to precipitate all the copper sulphate out of the solution. Therefore, in spite of the fact that an excess of lime is used, some of the bluestone always remains in solution.

There are several other interesting phases of the matter which give to the Bordeaux mixture its real value. I refer to the residual products. Having an excess of lime there is residuum always in the clear solution, the saturated solution of lime. When the sulphuric acid leaves the copper and goes to the lime, it forms sulphate of lime, which is gypsum or land plaster. Part of that precipitates, but it is a very soluble material, so we also have a saturated solution of gypsum. These two solutions of gypsum and lime play an important part in the Bordeaux mixture—so much so that it is impossible to drain off the clear solution and again moisten the granular matter with water after keeping it some time, and have the same mixture. You can not make the Bordeaux mixture, evaporate it to dryness, and then wet it with water again and use it. You have got to have all the materials as they come

together. The reason for that is that this saturated solution of gypsum and lime acts as cementing material when the spray dries on the twig. The lime in the form of hydroxid, when it is sprayed on the twigs, turns to carbonate, and it is just like the setting of mortar or plaster. You set this material on there and you not only have the advantage of the copper mixture, but you have the cementing material that sticks it on the twig. Furthermore, that cementing material is not absolutely insoluble, does not lock the copper up entirely, but slowly lets it dissolve.

So, you can begin to see what a complicated thing we have in this mixture. It is twenty-one years since the Bordeaux mixture came into prominence. It was discovered by Millardet of France. Efforts have been made to get other copper compounds which would be cheaper, which could be sold in packages and diluted, but nothing has ever met the requirements as this particular preparation has. There are certain places where the other mixtures can be used to advantage, but as an all-around fungicide, Bordeaux mixture, on account of this complicated thing, the cementing material, and the slow solubility, has proved of most value.

I have given you the composition of Bordeaux mixture as it is thrown on the trees; but the complication does not end there by any means, for just as soon as the material begins to dry on the trees, other changes take place. Bordeaux mixture is almost like a living thing—it keeps going on. The excess of hydroxid begins to carbonate. It takes several days to do it; but the peach leaf, like the violet leaf, will stand the Bordeaux mixture till the caustic lime begins to carbonate; and then at the same time this compound, hydroxid of lime and copper, begins to break down, part of it being converted into carbonate. Copper carbonate is slightly soluble in water; still more so in rain water or ammonia water. Many plants are injured by rainfall after they have been sprayed two or three weeks with Bordeaux mixture. In the Eastern states, where there are summer rains, we are having great difficulty now in trying to spray our peaches with Bordeaux mixture. We tried to avoid it by using peach Bordeaux mixture of three pounds of blue-stone, nine pounds of lime, and fifty gallons of water—an enormous excess of the lime, so that the caustic lime will remain there the greatest possible time. Furthermore, the difficulty can be partially avoided by repeating the spraying, or even by spraying with the lime water alone.

It is a little too complicated to carry in one's mind, and I may not have given you all the important facts, but I have the most of them. At any rate, one should be very humble when he preaches Bordeaux mixture, and accept very positive dictation on the part of the investigators as to how to make it.

As to the practice of making up this mixture in the orchard, there are several schemes that will be helpful, and while you may not all

want to do exactly as I tell you, so far as the arrangements are concerned, I will give you an ideal plant, one that I devised myself several years ago, and which has worked beautifully. This scheme combines all the best known methods of making up the Bordeaux. In the first place, the copper sulphate solution can be made up in stock solution, instead of weighing out the bluestone every time you want to make up a batch. Referring to the figure, this little barrel on the back part of the platform represents this stock solution barrel of copper sulphate. (See Fig. 3.) By suspending fifty pounds of bluestone on top of the fifty-gallon barrel, and filling the barrel with water, you can, in twenty-four hours or so, oftentimes less, dissolve the bluestone. After it is dissolved, fill the barrel to the fifty-gallon mark and stir a little, and every time you take out a gallon you have a pound of bluestone. There



FIG. 3. Apparatus for making Bordeaux mixture.

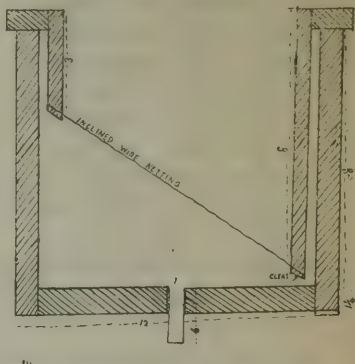


FIG. 4. Details of strainer for filtering Bordeaux mixture.

is some difficulty in keeping this over long periods, but during a reasonable time this can be kept on hand. By having two or three barrels, or perhaps more, a large spraying outfit can be equipped with a continuous supply ready to be drawn off by the gallon. Any of you who, in the early days, spent valuable time while the trees were waiting, and dissolved bluestone without hot water, can appreciate the importance of this.

Lime can also be kept in solution, a pound to the gallon, or two pounds to the gallon.

Assuming, for all purposes, that we wish to make up a hundred gallons of the mixture, enough to fill a hundred-gallon spray tank. To get the best results one should have an elevated platform above the height of the spray wagon. Have your stock solution of copper on one side and your stock solution of lime on the other. If you have a side hill, it is very convenient to build this so that you can drive on

the lower side with the wagon. I hardly need to say, perhaps, that it is necessary to have this at a water supply, where either with a pipe or hose you can run the water rapidly into these tanks.

We call these two large tanks on the front of the platform dilution tanks. It is necessary, to make good Bordeaux mixture, to dilute the material with the greatest possible amount of water, and then run the two solutions together simultaneously. It is a wise plan to strain all this water, unless you have a very pure water supply, through copper wire with meshes about sixteen or twenty to the inch. Especially will it be necessary to strain the lime. This can be fixed up while the spray tank is in the orchard, or it can be fixed up the day before. It is desirable, before running them together, to stir the lime thoroughly. It is advisable to make the Bordeaux mixture just as you are going to use it. Use it all up the same day, if possible. It is better when it is freshly made up. (See Fig. 4.)

In all this preparation, avoid the use of iron in contact with the copper. The vessels should be made of wood, with copper or wooden fittings. The copper is precipitated by iron. Particularly avoid the use of iron in contact with the bluestone solution before it is combined with the lime. You can, in an emergency, use iron in contact with the made-up mixture, although it gradually reacts on the mixture, having a very slight effect on the mixture where it is used rapidly. Where an iron spray tank is to be used, it should be coated with asphalt or something of that sort to prolong its life.

Now, when it comes to work in the orchard, I must not forget the very important matter of spray outfits and nozzles. As a rule, I think you need no suggestion from me as to the pumps and spray machines. California leads the world in power spray outfits. Nozzles need my suggestions. Bordeaux mixture spraying requires a finer spray and a thinner coating than the lime-sulphur-salt spraying with which the California orchardist is most familiar. It is better to use the Vermorel type of nozzle, one that gives a mist-like spray, so that you can not help coating every portion of the twig, or at least thoroughly peppering the spots. Many of your orchard trees are too high to spray from the ground. It will be a great advantage if you will fix an elevated platform on top of your spray tanks. It is so much easier to hold the nozzle on the sides of the tree than it is to go up on top, that many men will always spray the bottom of the tree first, and they spray about four times as much material on the bottom as they do on the top. In this peach fungus, it is important to reverse that, and spray the top first. Then there will be little to do on the bottom.

RESOLUTION OF THANKS.

MR. JUDD. I have a resolution to offer:

WHEREAS, The fruit-growers of California in their thirty-second Convention held at Hanford, deeply appreciate the welcome which has been extended to them; therefore, be it

Resolved, That this Convention give a vote of thanks to the Committee of Arrangements, which has taken such pains to make our Convention a success; to the Committee on Excursions, to whom we owe a pleasant outing, and to the other committees which have aided in the work.

Resolved, That we extend a vote of thanks to the ladies of the Reception, Entertainment, and Banquet committees for their splendid entertainment and the cordial welcome extended to us.

Resolved, That we extend our thanks to Mr. H. A. Beekhuis and the Town Council of Hanford and to the Supervisors of Kings County for their liberal assistance.

Resolved, That we vote our thanks to the press for its full and faithful reports of our meetings, and for its earnest labor in our behalf; and finally, as we can not enumerate all who have made our stay a pleasure, and our convention a success, be it further

Resolved, That we extend a vote of thanks to the people of Hanford as a whole for the generous reception we have met with, and that we shall ever remember the Thirty-second Fruit-Growers' Convention held at Hanford.

MR. DORE. I move the adoption of the resolution.

Motion seconded, and carried unanimously.

RESOLUTION OF THANKS TO THE PRESIDENT AND SECRETARY OF THE STATE HORTICULTURAL COMMISSION.

MR. JUDD. Here is another resolution:

WHEREAS, The fruit-growers of California have learned to appreciate the untiring efforts of our very worthy President, Ellwood Cooper, and our very efficient Secretary of the State Horticultural Commission, John Isaac; and

WHEREAS, Through their untiring efforts the Fruit-Growers' Convention have become a power of great good to the many industries represented; therefore, be it

Resolved, That this Convention tender them a vote of thanks, and to further show our deep appreciation we hereby express a hope that we will continue to have their invaluable services.

MR. DORE. I move the adoption of the resolution.

The motion was put by Mr. Judd, and carried unanimously.

JOHNSON-GRASS, AND OTHER NOXIOUS WEEDS.

MR. D. H. GRAY. We have listened to pear blight and we have listened to peach blight; we have listened to several diseases of fruit; but nothing has been said with regard to many diseases which are spreading throughout the State. I will refer to Johnson-grass. This is a very noxious weed. It is a weed which has spread throughout

the country by means of irrigation, sheep, cattle, and stock generally. It has cost many thousands of dollars to those who have gotten rid of it on their farms. When I was a little fellow I remember my father employing twenty-five or thirty Japs to get rid of this weed, for which a few years before he had paid a dollar a sack. These men dug there for about a year. Our place is now practically free from it. Bermuda is almost as bad, and there are a great many vineyards that have become utterly worthless on account of it. This state of affairs, it seems to me, demands the attention of this body, and I think that some resolutions should be brought before this body, and that we should have the support of the supervisors of the different counties and have State laws which should be enforced. Therefore, I have a resolution here which I will submit.

WHEREAS, The principal fruit-producing parts of California have become infested with Johnson-grass and other noxious weeds; and

WHEREAS, Such weeds and grass have obtained such a hold upon the country that if something is not done to exterminate them within a short time, utter ruin to our orchards and vineyards will be the result; therefore, be it

Resolved, That it is the sense of this meeting that the laws relating to infectious weeds be revised and strictly enforced; be it further

Resolved, That the supervisors of the several counties take this matter up and aid the fruit-growers in saving this country from the grip of Johnson-grass and other such infectious weeds.

MR. DORE. I move the adoption of the resolution.

Motion seconded, and carried.

(At this time a recess was taken until 1:30 o'clock P. M.)

AFTERNOON SESSION—FOURTH DAY.

FRIDAY, December 7, 1906.

The Convention was called to order at 1:30 P. M., President Cooper in the chair.

PRESIDENT COOPER. The first paper this afternoon is "Methods of Increasing the Bearing of Muscat Vines," by Prof. Frederic T. Bioletti.

METHODS OF INCREASING THE BEARING OF MUSCAT VINES.

By PROF. F. T. BIOLETTI, OF BERKELEY.

The statistics of the raisin industry of California which I have been able to obtain are somewhat indefinite. A comparison of the various estimates indicates, however, that there are approximately 70,000 acres

of vineyards devoted to raisin grapes and that the average crop during the last ten years has been about 45,000 tons, or 1.56 tons of dried grapes per acre per year. The variations between different years are considerable, and the variations between different vineyards even greater. Some of these variations are due to weather conditions and differences of soil which are beyond our control. Others, however, can be controlled with more or less certainty. The object of this paper is to show some of the ways in which some unfavorable conditions can be removed and the crop increased at present, and to suggest some methods which promise further improvements for the future.

The principal causes of deficient crops are the following:

1. Unfavorable weather. Spring frosts, cold or wet weather during blossoming, excessive heat during ripening, rain during the drying season.
2. Vine diseases. Oidium, coulure, vine-hoppers.
3. Improper cultural methods. Lack of cultivation, rise of water level, bad pruning.
4. Impoverishment of the soil. Lack of phosphates, humus, lime, rise of alkali.

I will not attempt to cover the whole of this ground, but will simply make some suggestions regarding proper methods of pruning and of the control of the diseases, oidium or mildew, and coulure or dropping of the grapes.

Diseases.—Oidium, or mildew of the vine, is a disease to which many grape-growers of the San Joaquin Valley have given no attention. While it never does such complete damage here as in many districts, it is often a serious factor in diminishing or deteriorating the crop. It is one, however, which is completely under the control of the grower and, in most parts of California, at comparatively small cost.

If the grower in the San Joaquin Valley will sulphur his vines properly at the right time he will have no injury from mildew whatever. One sulphuring during blossoming time might in normal seasons be sufficient if everybody sulphured every year. As it is, a wiser plan is to sulphur once during the first warm weather of spring when the vine shoots are six to eight inches long, and a second time when the vines are in full bloom. After blossoming it will seldom be necessary to sulphur Muscats at all, except in exceptionally moist locations or seasons.

The method of throwing on the sulphur by hand or with perforated cans should be abandoned. It is wasteful of time and material and does not do the work effectively. Some efficient form of dust sprayer should be used. Unfortunately, no efficient hand machine seems to be made in the United States suitable for this purpose. Several are made

in Europe, however, and they will more than repay the cost of importation the first year they are used, in saving sulphur alone. This was well shown by tests made by the Experiment Station this year. The estimates in the following table are based on these tests.

Amount of Sulphur Used Per Acre.

	1st.	2d.	3d.	Total		Cost of Sulphur.
Best Dust Sprayer.....	5 lbs.	7½ lbs.	10 lbs.	22½ lbs., at	\$2.50	\$0.56
Can Shaker.....	7 lbs.	30 lbs.	50 lbs.	87 lbs., at	2.00	1.74
Hand.....	12 lbs.	40 lbs.	75 lbs.	127 lbs., at	2.00	3.54

Sublimed sulphur of good quality should be used with the dust sprayer for the best results, while a cheaper form is almost equally good for the other methods, as much more is used if the vine is properly treated, and, unless the sulphur is of very bad quality there will be enough fine material in the amounts indicated to do effective work. Even though we use cheap sulphur with the usual methods, the total cost of material for three sulphurings will be about \$12 for the shaker and \$30 for hand sowing more than for the dust sprayer on every ten acres.

This does not show the whole gain, however. If the sulphuring is done thoroughly enough to be effective there is a gain in time and labor with the dust sprayer. The principal gain, however, is in the better work done. The machine sulphuring would be preferable even though it cost twice as much, as the control of the mildew is made much more certain.

A small quantity is just as effective as a large, providing some sulphur reaches every part of the canes and leaves of the vine. If we can see the sulphur on the vine from a distance of twenty feet, too much has been used. If, on close inspection, we can not find particles of sulphur on every part of every leaf the sulphur has not been properly distributed. It is impossible to avoid both of these defects except by the use of an effective machine distributing the sulphur by means of a strong current of air.

Coulure—The raisin Muscat is particularly subject to a disease or accident which is commonly known as “coulure.” This consists of two forms: the dropping of the blossoms without setting, which we call *early coulure*, and the dropping of the berries when they are small, which we call *late coulure*. The early form is the most usual and serious in the case of Muscat.

Many theories as to the cause of this trouble have been advanced, but it is only lately, through the researches of Messrs. Viala and Pacottet, that the real origin of the coulure of the Muscat has been discovered.

This discovery has made it possible to increase the crops of this grape in the graperies of Paris more than tenfold. The means used are inapplicable to large vineyards in the open air, but a knowledge of the

facts brought to light by these investigators may enable us to devise methods of control suitable to our conditions. The cause of the dropping lies in the peculiar structure of the flower itself.

The flowers of most cultivated varieties of grapes are what the botanists call "perfect"; that is, each flower has the two elements which are necessary for the development of the perfect fruit. These elements are the pollen contained in the anthers and the ovules contained in the pistil. Unless the ovules are fertilized by normal pollen the pistil will not develop into a normal grape berry.

There are several defects in the Muscat flower which make this necessary pollination more uncertain than with most varieties, and it is only under the most favorable conditions that the ovules are properly fertilized.

In the first place, owing to the shortness of the filaments supporting the anthers, the position of the pollen is such that it may all fall off without reaching the stigma, which is the part of the pistil through which the pollen tube obtains access to the ovule.

In the second place, the pollen is not powdery as with most vines, but waxy and with a tendency to cohere in masses. This renders its distribution by wind and insects much less certain. The pollen grains are, moreover, often imperfect and most of them are incapable of germinating and performing their function, even if they reach the stigma.

The means which have been adopted in the Paris graperies for overcoming coulure is the artificial pollination of the blossoms with the pollen of staminate vines. Certain American vines used as phylloxera-resistant stock are sterile, because they have imperfect pistils. Such varieties, on the other hand, have very abundant and vigorous pollen, which, owing to its dry, powdery nature, is easily collected and distributed. The variety chosen is the Aramon Rupestris No. 1. The Rupestris St. George, which is also a sterile vine, could be used for the same purpose.

The pollen is collected and if necessary kept until needed between sheets of dry blotting paper. During the week or ten days during which the Muscat is blossoming the pollen is blown on to the bunches three times a day by means of small bellows. The result is that graperies which formerly produced only from 25 to 75 pounds of grapes to each 200 square yards, now produce from 900 to 1,100 pounds in the same space. The Muscat bunches, moreover, which were formerly loose and straggling, are now so compact that it is necessary to thin them.

It was found that this artificial pollination, in order to be effective, must be performed when the temperature is favorable; that is, about 77° F.

Another necessary condition was found to be a dry atmosphere. If the air or even the soil was moist, a drop of liquid formed on the end

of the style. Two or three drops would form and fall during the day and carry off all the pollen which had settled before the pistil had been fertilized. When the moisture in the air did not exceed fifty per cent the fertilization took place satisfactorily.

This method, while effective and profitable in a hothouse, is of course inapplicable to vineyard conditions. It offers us some suggestions, however, which may be useful.

We would do well to follow the practice, which is common in the raisin districts of Spain, of planting a certain proportion of varieties with strong pollen in connection with all Muscat vineyards. These varieties should be planted in such a way as to facilitate cross-pollination as much as possible. It is impracticable to mix the varieties thoroughly, but it would probably be sufficient if every tenth row, for example, were of another variety. The pollinating varieties must blossom at the same time as the Muscat and must have strong pollen, as evidenced by the regular setting of their grapes. I would suggest the Palomino, a heavy-bearing sherry grape of good quality, or the Per-runo, useful for the same purpose and also a first-class white shipping grape. The Malaga also might be used, but I have no data as to its time of blossoming.

The moisture and temperature conditions are difficult to modify, but something can be done even here which may help. The mean temperature for the month of April at Fresno for a term of twelve years has been 60.8° F., varying from 54.7° F. to 67.1° F. The temperature during the last two weeks, when blossoming usually takes place, will be slightly higher than this, which indicates a day temperature which is sufficient for the proper setting of the grapes. The average moisture for the same period in April has been 58°, or somewhat less than this for the last two weeks, which is also favorable.

The later the vines blossom, therefore, the more likely they are to set well, as the weather will be warmer. Little can be done to delay the blossoming. Some slight effect might be obtained by spraying the vines with whitewash before they bud out.

We can control the moisture condition to some extent by avoiding cultivation during and just before blossoming. The air is moister near the soil than a few feet above, so that vines with a head two or three feet from the ground should set their fruit better than those flat on the ground. High vines also blossom a little later than low ones.

Probably some improvement in the setting of the fruit could be obtained by a careful selection of cuttings. The Huasco grape, which was imported from Chile and has been growing for many years at the Tulare Experiment Station, differs in nothing from our Muscat, except that it sets its fruit a little better. By selecting cuttings from vines which set their fruit well, and especially from those which blossom a

little later than the average, we might modify some of the defects of the variety.

Pruning.—With many varieties it is possible to regulate the number of bunches which a vine will bear by the method of pruning adopted. If we cut off everything but the watersprouts or canes coming from old wood, we remove nearly all the buds which are capable of producing blossoms and, therefore, prevent all possibility of a good crop. If, on the other hand, we are careful to leave only fruit spurs or canes coming from wood of the previous year's growth, we give the vine the opportunity to produce a large number of blossoms and, therefore, if all other conditions are favorable, a large crop.

With the Muscat the bearing is less easily regulated by this means, as, usually, all canes have fruit buds and we will obtain blossoms even though we leave nothing but watersprouts.

It is for this cause, probably, that Muscat vines are more carelessly pruned than any others. With this variety the results of bad pruning do not always show the first year in diminished crops. A great deal, however, can be done in improving the health, vigor and, consequently, the bearing, even of Muscat vineyards, by intelligent and careful pruning.

If we examine a vine in many old Muscat vineyards in winter we will find that it consists of a gnarled stump rising six or eight inches above the soil, with a diameter of from twelve to eighteen inches. On this shapeless mass of wood will be found from eight to twenty spurs, usually around the edge or coming from below the ground, while in the center will often be found an abundant growth of toadstools, showing that a great part of what is called a vine consists of dead and decaying wood. Such a vine can not produce regular and abundant crops.

While spring frosts are to some extent responsible for this peculiar condition, the main cause is lack of care and system in the pruning. The proof is that some vineyards, more carefully handled, have vines of normal shape.

A Muscat vine, like any other, should have a distinct stem or trunk. This trunk should be smooth and without spurs or scars. This trunk makes it possible to plow, cultivate, and hoe close to the vine without injuring the arms or spurs. It facilitates the removal of suckers from below the ground and holds the bearing wood high enough up to keep the grapes from touching the ground. How high this trunk should be will depend on various conditions. A smooth stem twelve inches in length from the surface of the ground to the branching of the arms is sufficient to give the advantage mentioned. The only reason, in the case of the Muscat, of having a longer stem is the slight protection it gives from spring frosts. The nearer the shoots are to the ground the more

liable they are to injury by freezing. It is perhaps not practicable to raise the vine much higher than indicated, however, on account of the shading of the drying trays which would result. Sultanina grapes, however, are dried in vineyards where the vines are trained up four feet or more.

At the top of the trunk four or more arms should branch out symmetrically. The more even and symmetric the vine the better the grapes will be distributed and the more evenly and perfectly they will ripen. The pruning, control of mildew, and all cultural operations will also be much facilitated.

Another great advantage of this form is that it is less subject to injury, and any injury it does receive is less likely to permanently affect it. If an arm is broken off by accident the wound can be sawn off smoothly and painted. Even if this is not done, it is much less likely to decay, as the position of the wound high up in the dry air makes it less susceptible to the attack of wood-rot fungi, which quickly enter wounds surrounded by moist air near the ground.

Muscat vines pruned high and kept vigorous are more likely to set their fruit better, because they will blossom a little later and the air will be less moist.

Some of the most serious causes of deficient crops in certain Muscat vineyards have not been considered in this paper. Much improvement would result if we could control the rise of alkali and seepage water. This, however, is too big a subject to be properly treated on the present occasion, and the methods to be adopted are still uncertain, or only in the experimental stage.

The ravages of the vine-hopper are responsible for serious injuries to the quality and quantity of our crops and demand thorough investigation. The Agricultural Experiment Station is planning a series of tests looking toward the control of this pest. These tests will be commenced and carried out as completely as our resources will allow during the coming season.

The fertilization of nearly all our vineyards will sooner or later be necessary, and many of them are in urgent need of it at present. This is a subject which we are now investigating, and we hope before long to be able to give some definite recommendations in this respect. Most Muscat vineyards would undoubtedly be benefited by applications of complete fertilizers, and especially of phosphatic and nitrogenous manures. The main subjects for investigation are the relative cost of the various obtainable forms and the amounts of each which it will be profitable to apply.

In conclusion, while waiting for results in those lines which demand further study, much improvement can be obtained by more careful pruning and complete control of the mildew, and, where new vineyards

are started, avoiding the planting of large areas of Muscat vines without a mixture of varieties producing good pollen.

(At this time, two hundred high school pupils came into the Convention hall.)

PRESIDENT COOPER. The chairman of the school board of Hanford made a request that the pupils of the high school come in and spend a short time with us. Of course we have a very extended program, but I will say a few words to the pupils.

Seventy-three years ago, when I first entered the primary schools, there was no public school system in the State of Pennsylvania. I attended a private school in Chester Valley. It was an eight-sided school, known as an eight-square school, but most generally known as the "hornet's nest." So I commenced my life at a very early age in the "hornet's nest." Whether the hornets had anything to do with the activity of my life I am unable to say. After one or two years of life in the "hornet's nest" my father moved to Bart Township, Lancaster County, Pennsylvania. The section was very sparsely populated, and private schools were very far between. However, I was in attendance in these private schools down to the time Pennsylvania established the public school system in the rural districts, which, in the beginning, was very crude and different from what it is at the present time. I have a distinct recollection of attending school with young men all the way from twenty to thirty years old who were learning to read. So, you can see the great advantages which you have over what we had when we were little children.

The Governor told us the other day that half the revenue that entered the State treasury was expended for the public schools, so you can realize the advantages which you have in getting an early and efficient education for the duties of this life.

The public school system at that time, as I said before, was very crude and the school houses were very great distances apart. Some of them were five miles apart, so that some children had to walk two miles and a half to school, carrying their lunches with them, and two miles and a half back at night. The people at that time thought that the number of hours a day spent in the school room must necessarily be long. They were required to be there at seven o'clock in the morning, and remain there, in the short days, until dark.

Now, students, you realize the great advantages you have at the present time over what we had seventy years ago; and it is necessary for you to realize and to understand that very soon we will pass away and you will take our places in the civilization and the government of this great country. I hope that the advantages you have over what we had will give you great advantages over our life and activity.

The greater the amount of energy and determination and desire that you have to do something, to be something, the happier will be your lives.

Of course, if I had time and the circumstances would permit, it would give me great pleasure to go back and give you a history of the conditions that I passed through in my early boyhood, but we have not the time and I am not prepared, so I hope and wish the best results for you. I am very much gratified that the chairman of the school board has brought you here in order that I may see you. The happiest moments of my life have been with the pupils and I must say that I am very happy to see that the sexes are about evenly divided—about as many boys as girls. All the schools I ever attended were mixed schools, and it gives me great pleasure to see you and to know that you have the interest to come here. (Applause.)

MR. W. R. McINTOSH. I am exceedingly glad the children came here this afternoon, which rejoices me more than anything else in the part I shall take in this Convention. The topic I shall present concerns your lives this moment, more, perhaps, the agricultural and horticultural interests of your State and county than anything else. I refer to the lives of the wild birds. The result of no education at all along the lines of care and attention to wild birds in their nests during the breeding season is one of the lamentable things in the life of our nation to-day.

I want to say that perhaps you may know something of the societies which are being organized, known as the Audubon societies. Your speaker is a member of the State society organized in Los Angeles last April. There is a society in Fresno County, in your immediate neighborhood. This society in Fresno was organized twelve months ago, and has done considerable work. We demonstrated the value and importance of taking up this work in last May, when we had what we called our "Bird Day." I hope the time will soon come when every town and village in California will have not only its adult societies known as the Audubon Society, but the juvenile society in connection with it.

THE ECONOMIC VALUE OF WILD BIRDS.

By W. R. McINTOSH, OF FRESNO.

Nowhere in the material universe do we find a more interesting and beautiful law of balance and harmony than formerly existed in the lives of insects and wild birds. Insects are justly regarded everywhere as the enemies of agriculture. Their destroyers—the birds—must, therefore, be the farmers' best friends. So long as nature held undisputed sway our friends kept our enemies in check and small damage resulted to growing crops, and the husbandman was fairly secure in his calling.

In the destruction of the home of wild birds—the forests—by ax and fire, and the wanton and cruel slaughter of birds, in the name of sport, the relations and harmony of nature have been undermined and the balance destroyed.

Wild birds are decreasing to an alarming degree in every part of the United States. Injurious insects, as might have been expected, are, therefore, on the increase in a similar ratio. So striking has been the increase of insect depredations on fruit trees and growing crops of late years that the appeal of farmers everywhere for relief is constantly on the increase. Scientists are searching every part of the known world for insect-destroying parasites, while millions of dollars are being spent yearly in a vain attempt to check the ever-increasing ravages of these enemies of agriculture, horticulture, viticulture, and gardening.

The menace to successful agriculture is not comprised in insect pests only. The rodents and noxious weeds must engage the constant attention of the farmer. Here, again, the feathered friends of the farmer find ample scope for usefulness to mankind. The hawks, owls, shrikes, and eagles live almost altogether upon the rodent enemies of the farmer, while the seed-eating birds—the sparrows, finches, buntings, and grosbeaks—comprise more than one seventh of the North American species of birds.

And, while there has been much wanton destruction of birds and almost universal indifference as to their existence, the birds have not been without their friends.

Since the birds first gladdened the earth with their morning song and the beauty of their plumage, there have always been those who loved them, and who have done all they could to protect and care for them. But in this busy, hurrying world of ours, where the dollar has assumed such abnormal importance, we must be able to give an economic reason for their protection as well as an æsthetic one.

Mr. Scott Way, secretary of the California Audubon Society, said recently: "When the first efforts to organize an Audubon society in this State were made, I was told that the farmers were unfriendly to the birds, and that they would oppose bird protective legislation. I did not believe it, because there is no more intelligent farming class anywhere in the world than we have in California, and every intelligent farmer knows, if he has given the subject the least investigation, that without the birds the insect hordes would soon devour every cultivated crop, and that in a very few years human life would become impossible upon the earth. There was very soon ample evidence of the friendliness of the California farmers toward the birds in the way of resolutions of approval and letters of encouragement from farmers' organizations in every part of the State, and many of these gave noble and valued support to the efforts of the Audubon society for the protection of non-game birds."

Data gathered by the United States Department of Agriculture show that the annual tax paid to insect depredations exceeds the annual expenditure of the National Government, including the pension roll and the maintenance of the army and navy.

In one year a single species of insect, the chinch-bug, caused a loss of \$60,000,000, and the Hessian-fly caused a loss of \$24,000,000 in two states in one year. The average annual loss to apple-growers from the codling-moth is \$20,000,000, and millions of dollars are lost each year from attacks of boll-weevil, corn-root worm, cotton worm, webworm, cankerworm, bark beetle, plant lice, warble fly, and hundreds of other creepers and crawlers, each multiplying after its own kind, and at the rate of millions a minute, and every one of them hungry from start to finish.

Practically, we are told, every kind of plant has certain insects that naturally feed upon it and tend to hold it in check, and, as man produces more of a certain kind of plant, nature produces insects to destroy it. In many instances the withdrawal of the natural food of some species of insects forces them to take another, which may be a cultivated crop.

It is here that the birds, if undisturbed, come in to maintain the balance. To kill the birds is to allow these insect pests to increase and destroy the cultivated crops to which they have turned from their natural food.

Until recently the destruction of bird life in the South Atlantic and Gulf States went on at an alarming rate. There were no effective protective laws, and little value was set upon the birds. The nighthawk, one of the most valuable of the insect destroyers, and one that is absolutely harmless, was wantonly shot by men and boys simply to display their marksmanship. Mocking-birds, cardinals, and indigo finches were trapped by the thousands for the trade. In these states these God-given friends of the farmer and fruit-grower did not seem to have a human friend. Robins, during their migration, were thrashed out of trees by night, blinded by torches, beaten to the ground by brush and sticks, and sold in the markets for a nickel a dozen.

But when the boll-weevil came to practically wipe out thousands of acres of cotton and even threatened the almost immediate end of the industry, and other insects began to seriously menace other agricultural industries, then these people began to pay some attention to the value of the birds.

You can't always make a man stop and consider by hitting him in the head, but when you hit him hard in the pocket you begin to make him do some thinking. Well, the men of those Southern States, when the boll-weevil, armyworm, and other destructive insects got busy, began to sit up and take notice. Then they got together and called on their

State legislatures to pass laws for the protection of the beneficial birds, and the result is that every South Atlantic and Gulf State has to-day a thoroughly good law for the protection of the non-game birds known to be beneficial or harmless to agriculture, and are enforcing them with splendid results.

The State of Louisiana not only has a bird protective law that we might well copy, but her Audubon society has secured the setting apart of several islands as breeding grounds for birds, and is guarding them from plume-hunters and similar outlaws.

A man said to me the other day: "Do you believe in protecting all the birds?" This is as good a time as any to answer that question, and I answer it for myself and the Audubon societies at the same time. We believe in protecting absolutely every bird that does more good than harm, and in humanely destroying those that are shown, by reliable evidence, to be harmful and of no particular benefit. I say "humanely" because we are emphatically opposed to the slaughter of the innocent with the guilty, and I am glad that the ordinances in several San Joaquin Valley counties no longer permit the putting out of poisoned water for birds, a practice to which our peerless mocking-bird is almost certain to fall a victim, while the birds that are doing the mischief usually escape. I know of localities in this State where the splendid song of the mocker, once poured out in ecstasy from hedge and house-top, is heard no more. The pan of poisoned water, made more attractive by the addition of a little sugar put in as a slight additional evidence that some of us have got to suppress a little of our native meanness before we are worthy to wear a halo, has taken the last beautiful victim that, with misplaced confidence in his human brother, made his home in the vine that shaded the cottage window, while the busy linnet is still alive, cheerful and plentiful as ever at the old stand.

The careful, investigating farmer will not kill birds on the strength of a conviction by mere circumstantial evidence. "Not long ago," says Mr. Way, "I came upon a man carrying two California thrashers that he had shot in the vicinity of his seed bed. He was growing orange stock and claimed that the thrashers were eating his seed. He was quite positive about it, and I was just as positive that he was mistaken. He said he had caught these very birds in the act, and because he couldn't convince me of the soundness of his position he got quite as much excited as it is safe for a church member to get and not shatter a commandment. I suggested that the matter could easily be settled by opening up the stomachs of the birds he had killed. In a minute or two we had the recent food of the thrashers before us. It consisted not of a single orange seed or even the sprout of an orange seed, but of several hundred small white grubs, sometimes called thread worms, such as breed and harbor in soil where stable litter is liberally used

and which are destructive to seeds, bulbs, and roots of plants. This man had mulched his seed bed with stable manure and the thrashers were feeding on the grubs that were breeding therein, and making inroads upon his seeds, most of which they would probably have destroyed but for these birds. He was killing his best friend, who, though they might have pulled up a few seeds in their persistent search for worms, were doing him a splendid service for which they deserved his friendship and protection."

It requires long and patient study and observation in order to form anything like a sound conclusion regarding the food habits of birds. It is so easy to be deceived. In a bulletin issued by the Agricultural Department at Washington and entitled "Birds of a Maryland Farm," it is related that a farmer who was growing tomatoes for market claimed that the cat birds were destroying his crop. Observations by a biologist of the department were at the time being made on this plantation, and, as there were great numbers of cat birds in the tomato field, and many partly eaten tomatoes, it was a fair assumption that the birds were guilty. So the biologist shot a few of the cat birds and examined the stomachs. Not a bit of tomato was found. Some hours later more were killed in the tomato field, with like results. There were plenty of tomato worms and other insects injurious to the crop, but no vegetable matter in the birds' bill of fare. And yet the destruction of tomatoes went on. So the biologist put a man to watch the field, and soon the farmer's chickens were seen to march, in single file, through a hole in the fence and begin a raid on the tomatoes. The mystery was solved and the farmer convinced that the cat bird was his friend and not an enemy, as he had supposed.

The study of the food habits of birds is comparatively a new branch of agricultural science. One of the most important as well as remarkable of the early papers on this subject is by Wilson Flagg, published in the report on the agriculture of Massachusetts in 1861, entitled "The Utility of Birds," and which is based on the thesis distinctly stated in these words: "That each species of birds performs certain services in the economy of nature, which can not be so well accomplished by any other species."

Less than twenty years ago the subject of economic ornithology was taken up by the United States Department of Agriculture, and the story of the development of the subject, since that time, has been chiefly the story of the operations of the Division of Biological Survey. It is not within the scope of this paper to give even an outline of the work of that department, but bulletins, covering all the important investigations, are free for the asking. I may add that from the standpoint of economic ornithology the division may be said to have three functions: (1) To determine as accurately as possible the food of birds of eco-

conomic importance; (2) To act as a court of appeal to investigate complaints concerning depredations of birds on crops; (3) To diffuse the results of its work and educate the public as to the value of birds. One important result of the investigations of the division showed that of the seventy-five species and sub-species of hawks and owls which occur in America, north of Mexico, only six were found to be injurious, while many were proved to be decidedly beneficial. Of the forty or fifty birds, exclusive of hawks and owls, thus far investigated, only the English sparrow is absolutely condemned.

Professor Atwater, always a careful and conservative authority, estimates that the birds of the State of Texas will consume more than 35,000 bushels of insects each day. You will agree that, if they are doing so well as that, they are earning their protection and their share of the fruit they take besides.

This estimate certainly seems low enough when we take into consideration the quantity of insects that some of our birds have been known to devour within a few hours. For example, the stomach of a single quail contained 101 potato-beetles and that of another quail 500 chinch-bugs. A cuckoo had eaten 217 webworms, and the stomach of a robin contained 175 caterpillars. The breakfast of four chickadees consisted of 1,028 eggs of the cankerworm, and four others had eaten 600 eggs and 105 mature insects. A barn swallow will destroy from 5,000 to 10,000 flies and other insects every week, and a record has been made of a pair of chipping sparrows feeding their young more than two hundred times in a single day, and mostly on insects injurious to agriculture. I might say here that the amount of food consumed by young birds in the nest is not generally appreciated. At first nestlings consume more than their own weight of food in a day, and if you have ever successfully raised a young bird by hand you will remember that a ten-minute intermission between meals was about what it considered the limit.

The young of a pair of jays observed by Dr. Brewer were fed half a million caterpillars in a single season, and a young robin kept in captivity required sixty insects a day. A mother wren fed her little ones 111 insects in four and a half hours, and the crop of a single mourning dove contained 7,500 weed seeds.

In an orchard infested by cankerworms Professor Forbes shot seven specimens out of a flock of thirty cedar birds. The stomachs of all these were full of worms, averaging 100 each, so that it was estimated that this flock would destroy 90,000 of the pests if they stayed in the orchard a month. If those cedar birds ate some of the farmer's fruit, don't you think they justly earned it?

Government investigations regarding the economic status of birds in California have been going on for some time, but are yet far from com-

plete. Professor Beale has spent the past summer mainly in the northern part of the State. Almost everywhere he says he has found the farmers defending the birds. "They destroy some of our fruit," many of them said to Mr. Beale, "but we can't do without them."

You all know the Western Black Phoebe, a familiar visitor about our homes and a bird we can all love and protect without any reservation. Over 93 per cent of its year's food consists of insects, and chiefly of insects injurious to man's interests. It is not only the friend of man, but of his horses and cattle as well, for the stable and pasture are among its chosen feeding grounds. The knowledge of the exceeding usefulness of this bird should win for it more friends, who shall encourage its increase in every possible way.

Belonging also to the fly-catching family is the Western Pewee, seen frequently feeding about reservoirs and in other localities where winged insects are common. It is a persistent destroyer of gnats, mosquitoes, and other insects troublesome to man and domestic animals. The pewee is said to carry insect food to its young almost every minute of the day. One of the most beautiful and sympathetic chapters in the wonderful work of the great Audubon is that on the pair of pewees that nestled in the mill near his Pennsylvania home. The Audubon society intends to reproduce this passage as an educational leaflet for use in the schools throughout the State.

We, of the valley country, are more fortunate than our neighbors of the foothills in having the splendid help of the Western Meadowlark, sweet of song as well as beautiful and useful. "The farmer can not afford," says Dr. Judd, than whom there is no better authority on the economic value of birds, "to dispense with the services of the meadowlark, for it busies itself all summer eating grasshoppers and noxious insects, and when autumn comes varies its diet with rag-weed, pigeon grass, and other weeds. The record of the food of the meadowlark is unusually full and complete, and its great destruction of grasshoppers, the cutworms and other caterpillars, and the absence of all depredations other than the appropriation of a few scattered grains, indicate that this bird is of extraordinary economic value. It supervises our grass lands more closely than almost any other species and is therefore of special value to the alfalfa grower, and should be carefully protected from the shotgun and bird-egg hunter. Notwithstanding the great value of the meadowlark to the farmer and fruit-grower, it was not long ago the prey of pot-hunters, having, until recently, no legal protection in California, and even at this day, with all the data at hand confirming its wonderful value as a destroyer of some of the worst insects the farmer has to combat, men of much wealth in dollars and lands but poor in gratitude and humane instincts have been known to put out poison for the destruction of these beautiful and valuable songsters because they had picked up a few cents' worth of scattered grain.

"The upland plover, which frequents the inland meadows, is very unfortunately still classed as a game bird and killed for sport, though it has little good and great economic value. It, with the mourning dove, should be stricken from the game list and encouraged to multiply in our fields and about our homes to serve the useful purposes for which the Creator of all things has so wonderfully contrived.

"In 601 stomachs of the valley quail examined by the United States Biological Survey grapes formed only one per cent of the annual food, and the total proportion of all kinds of fruit was only seven and one half per cent. Nearly five per cent of this was *Rhus aiversiloba*, a wild fruit, common in our foothill cañons. Of the yearly food of the 601 quail referred to a little over six per cent was grain, thus proving that the loss to the grain farmer from this source is small. Nearly sixty per cent of its food is the seeds of weeds, more or less troublesome to the farmer. From 500 to 600 seeds of the bur thistle are often eaten at a meal and the destruction of this seed is highly beneficial to the farmer, for this thistle is one of the most difficult to control. It should be worth our while to protect the valley quail on our lands for its usefulness in the destruction of the seeds of this thistle alone. Tar-weed is another favorite source of food, and one stomach collected at Watsonville contained 700 of these seeds. Another stomach collected from the same locality contained 200 tiny seeds of dog fennel, or cayweed, and as many as 900 seeds of the turkey mullein have been found in a single bird. Wild carrot, wild lettuce, pig-weed, black mustard, red sorrel, curled dock, bur clover, and alfilaria all go into the valley quail's bill of fare.

"The animal food of the valley quail consists of a number of leaf-eating beetles, some of them very dangerous to trees and plants, also ground beetles, ants, caterpillars, cut-worms, measuring-worms, leaf-bugs, bugs of the chinch-bug family, assassin-bugs, burrowing-bugs, leaf-hoppers, tree-hoppers, plant lice, stink-bugs, bugs of the genus *Scolops*, and various other bugs with names as long as your arm and appetites in proportion. The animal bill of fare also includes flies, spiders, and snails. The greatest destruction of insects by quail occurs while the young broods are being raised, animal food forming a much larger proportion of young than of old birds of this species.

"Returning to the grape question, we do not deny that there may be, owing to absence of natural food or other unusual conditions, some damages to vineyards from valley quail, but very often mutilated bunches of grapes supposed to be due to the presence of quail in the vineyards would be found, on closer investigation, to have been damaged by other birds or mammals, several of which vary their diet with grapes. The strongest evidence in favor of the quail is the fact, well established by those who have examined birds killed in vineyards,

that grapes are rarely found in the crops, and that poison-oak berries are a staple diet when grapes are at their best. All wild birds prefer wild fruits to cultivated sorts, and it is only when man has destroyed the natural food plants that they are driven to his cultivated fruits.

"Unless the prosecution can produce something better than the evidence it has heretofore put up we shall have to give the valley quail the benefit of the doubt and pronounce it not guilty, except when other food is absent and it is driven to grapes by hunger. When driven to it man has been known to eat army mule, with great relish, but you wouldn't class it as a food for which he would acquire a great and unsatisfiable desire."

Some of the most valued friends and members of our Audubon societies were once hunters of nestling doves. When they came to realize the cruelty of what they were doing they quit the practice and took a strong stand for the preservation of these useful birds. One of these in particular, a resident of Pasadena, reported by our State secretary, though a sportsman and dealer in guns and ammunition, persuaded many young man last July to give up dove-hunting altogether. When they would come in to rent a gun or buy shells, he would say: "Boys, don't do it. It isn't sportsmanlike to kill nestling birds. If you must go after them now, you don't need a gun. Just take a stick and a basket."

I desire to remind you of the value of the wrens, the thrushes, the bushtits, the blackbirds, and even the jays, which, though they are the "practical politicians" of the bird family, taking as they do everything in sight, still have their good qualities; of the birds that plant our forests and then guard them from destruction by hordes of insects; of the owls that hold destructive mammals in check; of the beneficial hawks and eagles that destroy gophers and ground squirrels.

Even under normal conditions birds have to encounter grave perils that many of them are unable to withstand. Young birds are subject to many dangers before reaching maturity. Young and old fall a prey to their enemies of the wild. Heavy rains destroy many more. Electric wires destroy many thousands. Besides these causes there are others still at work which tend greatly to decrease the number of birds possible under existing conditions.

To a very large extent these agencies are the result of human greed, cruelty, and ignorance, and the havoc they commit may be avoided by proper laws based upon and supported by the opinion of an enlightened public.

PRESIDENT COOPER. The next paper on the program is "A Further Plea for Selection," by Leonard Coates.

A FURTHER PLEA FOR SELECTION.

By LEONARD COATES, OF MORGAN HILL.

There has been, of late, an effort on the part of some biologists to disparage the Darwinian theory of natural selection by quoting the mutation theory of Hugo de Vries. We know that all nature is at war—the animal kingdom on the vegetable kingdom, and the latter, as bacteria, preying on the animal kingdom. In both of these kingdoms there is also a great civil war waging, ending, as Herbert Spencer had it, in the “survival of the fittest.” That is “Natural Selection.” Hugo de Vries’s theory is, that at some period in a plant’s life it is liable to produce an offspring which differs in a marked way from its parent. This he calls a “mutant,” and it is, he says, the beginning of a new variety. Any observing horticulturist is aware of what all old gardeners call “sports” occurring, and Professor de Vries, it would seem, simply places this fact upon a broad plane as an accepted theory of horticulture, called “mutation.” It in no way conflicts with Charles Darwin’s theory of natural selection, but is merely incidental to it, these “sports,” or “mutants,” being still subject to the more immutable law of the survival of the fittest.

Pedagogues or professors, call them what you will, often wrangle over what appear to us laymen to be trivialities. Professor S. W. Fletcher of Michigan, for instance, says he believes in

PEDIGREED STOCK

as applied to plants, but does not like the term, which, he says, should be “selected.” Professor John Craig says the term “pedigreed” should never be used, unless both parents are known. At the same time he says that no variety described by the American Pomological Society is pedigreed, making the analogy between a herd of cattle and a garden of plants absolute and arbitrary. Whereas, in one flower may be a perfect blossom, both male and female, and by simply following the law of selection the variety may be improved, so that there can be no two names of parents. In other words, according to this line of reasoning, pedigreed plants are nothing but the result of artificial fertilization between two distinct varieties, which may be absolutely worthless, and yet entitled to the term “pedigreed.” This term has been and is used by horticulturists all over the country to denote a continuation by selection of all the fixed characteristics of a known type or variety. No other name has been suggested, and to attempt to adhere strictly to the analogy between animals and plants would lead us into inextricable confusion.

We all believe, however, in "Plant-breeding"; in the fact that variations occur; that if we select and isolate those variants we can perpetuate the marked peculiarities they evince, whether it be an improvement or otherwise; and it is in the endeavor to impress this fact upon you that I make these remarks.

It is within the province of every farmer to improve the crop he grows; he will benefit himself, and he will benefit those who succeed him still more. Eighty years ago a Spanish botanist, Mariano Lagasca, visited a friend in the island of Jersey. He pointed out to him in his wheat field a dozen or more varieties of wheat, and suggested that seed be kept distinct and saved for further trial. This was done, with the result that a variety was secured much superior to any known sort, and which became the leading variety of wheat cultivated in France. To-day, the Oregon Experiment Station is doing the same work—"selecting" to find a wheat that is drouth-resisting, hardy, and of best quality.

Roland Morrill, the great peach-grower of Michigan and Texas, claims that his success is largely due to growing his peach trees on what he calls the "pedigree" plan.

R. M. Kellogg, one of the largest strawberry growers in the United States, says: "The term 'pedigree strawberry' is especially applicable, because it takes many years to breed it up by high tillage, selection, and restriction. A pedigree plant is one known to have received every possible attention in the way of food and culture, restricted in its fruitage to strengthen its seed- and fruit-producing organs, and these qualities were acquired by the constant selection of those showing the greatest degree of improvement through a long series of years. It is simply the recognition of the individuality of a plant and makes ancestry of value, because characteristics are more surely transmitted through runners and buds than by seeds."

Professor L. H. Bailey, in his "Plant-Breeding," discusses from a scientific standpoint the Darwinian theory, the Mutation theory, and Mandel's theory of heredity. It is needless, for all practical purposes, to attempt to follow these learned men; but Mandel's theory is, simply, that even the hybridizing to produce new types produces results only in accordance with a fixed law. So, after all, the most skillful hybridizer is only a mechanical instrument, possessing a little knowledge, but totally unable to produce variations contrary to a prearranged system about which he is very much in the dark. Or, again, the very careful student of nature may observe, in his travels, all of these, or similar, variants being produced entirely without his or any one's intervention.

The practical application of all this, at a fruit-growers' convention, is to encourage the

IMPROVEMENT OF OUR MARKET VARIETIES

of fruits by selection. Many of the most valuable fruits we grow in California are the results of selection. The Muir peach, Lovell peach, Phillips cling, Chapman and Advance cherries, P. Barry pear, Clyman plum, Tilton apricot, Cook's and Skinner's apples, and many others, are natural selected seedlings. And so with our almonds and walnuts; the Hatch seedlings, I X L, Ne Plus Ultra, and Nonpareil, Lewelling and Drake, and some others, are the commercial almonds of California. Whatever the French varieties of walnuts may prove to be, the fact remains that all the thousands of carloads of splendid nuts that have been grown in the State and which have made California famous, are natural selected California seedlings. All progressive and broad-minded horticulturists recognize this fact, and look to a continued steady improvement in our commercial varieties, mainly through selection.

Half a century ago Mr. Charles Mock of Petaluma, after extensive experiments with the best varieties of apple from the Eastern states, said: "The process of acclimation is not by change on an individual transposed from its native locality, but on the repeated processes of reproduction from seed."

Every fruit-grower can aid in the work, and should seek to do so. All promising seedlings should be sent to the office of the Secretary of the Horticultural Commissioner, where a committee of experts may be called to act upon them. There is no other way to do it; propagators should never pass upon their own introductions.

We may go back a hundred years or more and shall find that all the practical growers and those who have succeeded in giving the world the best varieties of fruits, have followed selection in its simplest form. Van Mons spent his life in producing pears by careful and intelligent selection of seedlings; Knight of England did the same with other fruits; Thomas Rivers, also of England, and his son and grandson after him have put upon the market the best plums, and many of the best cherries, peaches, and nectarines that are known and eaten; B. S. Fox of San José worked in the same way, originating several pears which are recognized as standard; W. H. Chapman of Napa did the same with cherries, merely selecting the finest fruit from the best trees, thinning it out, and sowing the seed of what remained. He died a poor man, unknown, while the cherry-growers of California are making thousands of dollars every year from the fruits he gave us. Phillips of Yuba, who gave us the cling peach bearing his name, died the other day in the county poorhouse. Dick Burton of Vacaville has now in his orchard a collection of seedling plums, prunes, pears, and apples which are, as a whole, superior to any yet raised in the State,

and some may prove of the greatest value. But he is a careful man, and will not propagate for the market until years of testing demonstrate their peculiar merit.

All I would say is, go on with the good work; let every grower try to improve something; select a specimen tree of some fruit which seems nearly perfect; thin the crop very heavily, and save the seed; give it the best of care, and select the most promising seedlings for further experiment. Let them fruit, and the chances are an improved variety will result. The opportunities are great for extension of this work, and the outlook is very encouraging.

THE FRUIT INDUSTRY OF TULARE COUNTY.

By P. D. FOWLER, OF TULARE.

Tulare Valley was first seen by white men in 1826. Jedediah Smith, of New York, entered it near its southern extremity at the head of twenty-five trappers, whom he brought with him from St. Louis. For many years thereafter the vicinity of Tulare Lake was frequently visited by hunters and trappers; but hunters and trappers, while ready enough to detail their adventures with wild beasts and wild men, were very reticent about the character of the country visited. They viewed the advance of civilization with scarcely more favor than did the aboriginal red men.

The Spaniards and Mexicans who settled the coast counties were even less curious about the great interior valleys of the State. It is said that a superstition was current among them that the great valley was the exclusive property of the devil, and that whosoever ventured within his territory was never permitted to return. So it was that the Spaniards contented themselves with the territory lying westward of the Mount Diablo range of mountains, tacitly agreeing with Satan that the country bearing his name should be left in his possession.

This state of affairs has proven most fortunate to the Americans who came to settle the country within the last few years, for they found it for the most part unincumbered by Spanish grants, the primal curse of other sections of the State.

In the winter of 1852 the California Legislature provided for the organization of a new county, to be known as Tulare. The territory to be included within the boundaries of this county was what now comprises Tulare, Inyo, Kern, Kings, and the south half of Fresno counties.

The first election ever held in Tulare County was on July 10, 1853, at which election 109 votes were cast. Since that memorable occasion Tulare County has been gradually developed: first into one of the most prosperous stock countries, and then into the banner wheat county of the State, and to-day one of the best counties for diversified farming.

The soil and climate of Tulare are preëminently adapted to the production of stone fruits of all kinds, with the possible exception of cherries, which do not appear to thrive in the valley, though they undoubtedly will in the higher foothills and lower mountain flats. Cherry trees grow well enough, but the cherries fall off before ripening. But peaches, plums, apricots, nectarines, prunes, etc., grow very rapidly and bear tremendously. Tulare is unmistakably a great peach country. No part of the world can show a superior article from any point of view, and certainly no other country can grow such quantities of them. If left to themselves the trees will bear until their limbs bend over and trail upon the ground, and split off the trunks, wither and die. One of the most irksome duties of the Tulare fruit-grower is to thin out his fruit. A very important point in Tulare's favor is the fact that our peaches, and other stone fruits as well, ripen fully two weeks earlier than those grown in Southern California, and there are only one or two small neighborhoods in the State that get fruit into the market as early as Tulare, and none earlier. This fact holds true with each variety, clear through the season, giving Tulare the top of the market in Southern California and the entire East.

The prune orchards of Tulare County are very productive. The writer has gathered and cured twenty tons of dried prunes from three hundred trees.

The sun-loved shores of the Mediterranean offer to the vine no finer soil and climate than the warm plains of Tulare. The abundant water supply from the snow-filled cañons of the mighty Sierras gives health to the vine and size to the berries, while the long summer heat fills the grape with all lusciousness. When the early September days pour a torrid heat upon the plains, the rich clusters put on a golden tint—the royal amber of full ripeness. Sun and water and warmth can do no more, the vintage time has come.

That county in California is poor indeed which, in this era of citrus booms, has no "citrus belt." From San Diego to Shasta, up through the interior and back down the western coast and eastern border line of the State, there has gone up from every county one universal invitation to all the world to "come and see our citrus belt." Tulare has a citrus belt also, and a good one. The boundaries of this belt, or the extent of territory available for the profitable production of semi-tropical and citrus fruits in Tulare County, can not be given, but the area is very large. All along the line of the Sierra foothills for the sixty miles that they extend through this county are innumerable little nooks, coves, and valleys that are practically frostless. Indeed, it would seem that almost anywhere above 300 feet elevation and below 2,000 feet and in situations not too much exposed to the early morning sun, citrus fruits may be grown with profit.

The first orange trees grown in the county, so far as the writer is informed, were planted by the late Mr. D. Gibbon, of Plano. It was, we believe, in 1863 that a squad of United States soldiers chanced to be at Porterville, and one of them gave an orange or two to one of Mr. Gibbon's little girls. The oranges were promptly eaten, but their seeds were saved, planted, carefully tended and reared, to become large, thrifty trees loaded down with golden fruit. From one of these trees fruit was plucked in 1883, taken to the Citrus Fair at Los Angeles, and there awarded first premium for seedling oranges.

Mr. Gibbon's success in starting orange trees induced others in the neighborhood of Porterville to do likewise, and as a result one of the most prosperous orange belts in California has been established. Last year there were shipped from this district over 1,600 cars of oranges, and this year there will be about the same. There were 123,720 orange trees shipped into this county and planted last spring, besides what was bought from the local nurseries. About 3,000 acres were planted last spring, and a much heavier planting is to be made in the spring of 1907.

All the navel oranges are ripe and sold in this county before Christmas. The trees are all healthy and thrifty. The fruit is clean and bright-colored. Orange scale is very scarce. The only scale that has given any trouble is the cottony-cushion scale, and we have been able to keep that under control with the *Vedalia cardinalis*. We have distributed the past season 213 colonies of these ladybirds in the citrus orchards of the county.

Our deciduous orchards are in good, thrifty condition, except for pear blight, and shot-hole fungus on peach trees. Our peach-growers are going to spray their trees with Bordeaux mixture in December, and we believe this trouble can be controlled.

Our vineyards are in fine condition and have yielded an average crop the past season, and prices have been good.

Our prune orchards have borne heavy crops, and while the price was low during part of the season, it is good now.

Our fruit-growers are prosperous and well satisfied with present conditions, and hopeful for the future.

REPORT OF COMMITTEE ON LEGISLATION.

PRESIDENT COOPER. At the Convention held at Santa Rosa last year, a committee on legislation was appointed. None of the committee is present, but Judge Carroll Cook sends his excuse that he had to attend court and could not be here. Judge Mills of Riverside also sends us word that he was summoned to Los Angeles to be there on Friday, and therefore could not be present. They have sent in their

recommendations for changes in the quarantine laws. The Secretary will read them.

To the President and Members of the Thirty-second Fruit-Growers' Convention.

GENTLEMEN: We, your Committee on Legislation, appointed at the Thirty-first Fruit-Growers' Convention, held at Santa Rosa, December, 1905, would report, as follows:

In accordance with your request, we have looked into the matter of the laws and the suggestions which have been made for amendments thereto and changes therein, and do recommend as follows:

1st. Inasmuch as a county horticultural commission composed of three men has been found cumbersome, inefficient, and expensive, we would suggest that the existing law be so amended as to provide for the appointment of one competent man as horticultural commissioner in each county.

2d. We would recommend that the law be so worded that political considerations shall not enter into such appointment, but that qualification only be considered.

3d. We would recommend a new section re-creating the office of State Quarantine Guardian, which was provided for in the old law organizing the State Board of Horticulture, but omitted in the present law establishing the Horticultural Commission.

The County Horticultural Commissioners should be appointed State Quarantine Guardians, receiving their powers from the State Horticultural Commission, after having passed an examination as to quality and fitness. Should they fail to pass a proper examination as to their fitness for State Quarantine Guardians, then their appointment as County Horticultural Commissioners should be revoked. The appointment of County Horticultural Commissioners as State Quarantine Guardians gives them extended powers and they could serve as State as well as county officers, and could do much better work than where they acted in the limited capacity of county officials.

4th. Upon complaint made by the State Horticultural Commissioner to any Board of Supervisors alleging and proving that the County Horticultural Commissioner is incapable, inefficient, neglectful of his duties, or for any other good cause, the County Supervisors should declare his office vacant and may reappoint another commissioner in his place.

5th. By and with the consent of the Supervisors, the Horticultural Commissioners of the different counties should have power to subdivide their counties into horticultural districts and appoint horticultural inspectors for such districts. The labors of such horticultural inspectors should be under the direction and control of the County Horticultural Commissioner. They should be removable at any time by the County Horticultural Commissioner, or by the County Supervisors. The County Horticultural Commissioners should be required to keep a record of their official actions, and to furnish copies of the same to the State Horticultural Commissioner, and in the case of the discovery of any new pests or diseases, or the serious outbreak of any already established, should be required to give immediate notification to the State Horticultural Commissioner, and it should be his duty to work in conjunction with them for the control of such pests or diseases. This should also apply to the introduction and control of noxious weeds.

6th. The law fixing the compensation of local inspectors at \$2.50 per day was enacted at a time when there was less demand for labor than at present and when money had greater purchasing power. This compensation is altogether inadequate for the class of service required, and should be fixed at not less than \$3 per day, or as much as may seem reasonable to the Supervisors after consultation with the County Horticultural Commissioner.

7th. In cases where a petition, properly signed, is presented to the Supervisors of any county, in accordance with the law, and such Board of Supervisors fails or neglects to comply with the law providing for the establishment of Boards of County Horticultural Commissioners, it should be the duty of the State Horticultural Commissioner to commence action against such Supervisors to compel them to perform their legal duties in the matter, and the law should be so amended as to authorize and require the State Commissioner of Horticulture to take action in such case.

8th. The law, as it stands at present, gives the State Commissioner ample authority to prevent the entrance of any diseased or infested nursery stock, fruit, or other forms of vegetables from sections outside the State. There are, however, very many sections and counties within the State in which diseases and pests may be found which are not found in other sections. In such cases, the law should provide some means by which the non-infested sections can protect themselves against infested districts, and we would suggest that it be so amended as to give the State Horticultural Commissioner power to protect clean districts within our own State.

The above recommendations were referred to a committee appointed by the Chair, and consisting of J. W. Jeffrey, S. A. Pease, and R. P. Cundiff, for consideration and report; which committee, after taking the same under advisement, reported as follows:

MR. PEASE. The committee has decided that, inasmuch as we are about to leave for home and have no time to consider the matter submitted by the committee appointed one year ago, we recommend leaving this matter for the future, and if the matters complained of are true, that President Cooper draft a bill that would improve these conditions and submit it to the Legislature. I make a motion that this whole matter be referred to President Cooper to be treated as he considers best, and that he be empowered by this convention to formulate a bill covering the points raised in the committee's report, and any additions that he wishes to make.

MR. DORE. I second the motion.

Carried.

THE NEXT MEETING-PLACE.

The Secretary read a telegram from the Chamber of Commerce of Chico, asking that the next Convention be held in that town.

MR. JEFFRIES. I renew my invitation of a year ago that you will come to Los Angeles for your next meeting.

MR. SHAW. Chico is my home, and we would be pleased to have you come there.

PRESIDENT COOPER. The time and place are fixed by the State Horticultural Commissioner, according to conditions and circumstances that may take place between this and the time of the next Convention. Probably we may give two Conventions the coming year—a spring convention held in Southern California, and a fall convention in the north, among the deciduous fruit districts. The matter is left to the Horticultural Commissioner. One thing, however, is necessary, and that is that the place be accessible by rail and that there be a sufficient number of hotels where guests can be accommodated.

The Convention then adjourned *sine die*.

ELLWOOD COOPER, President.

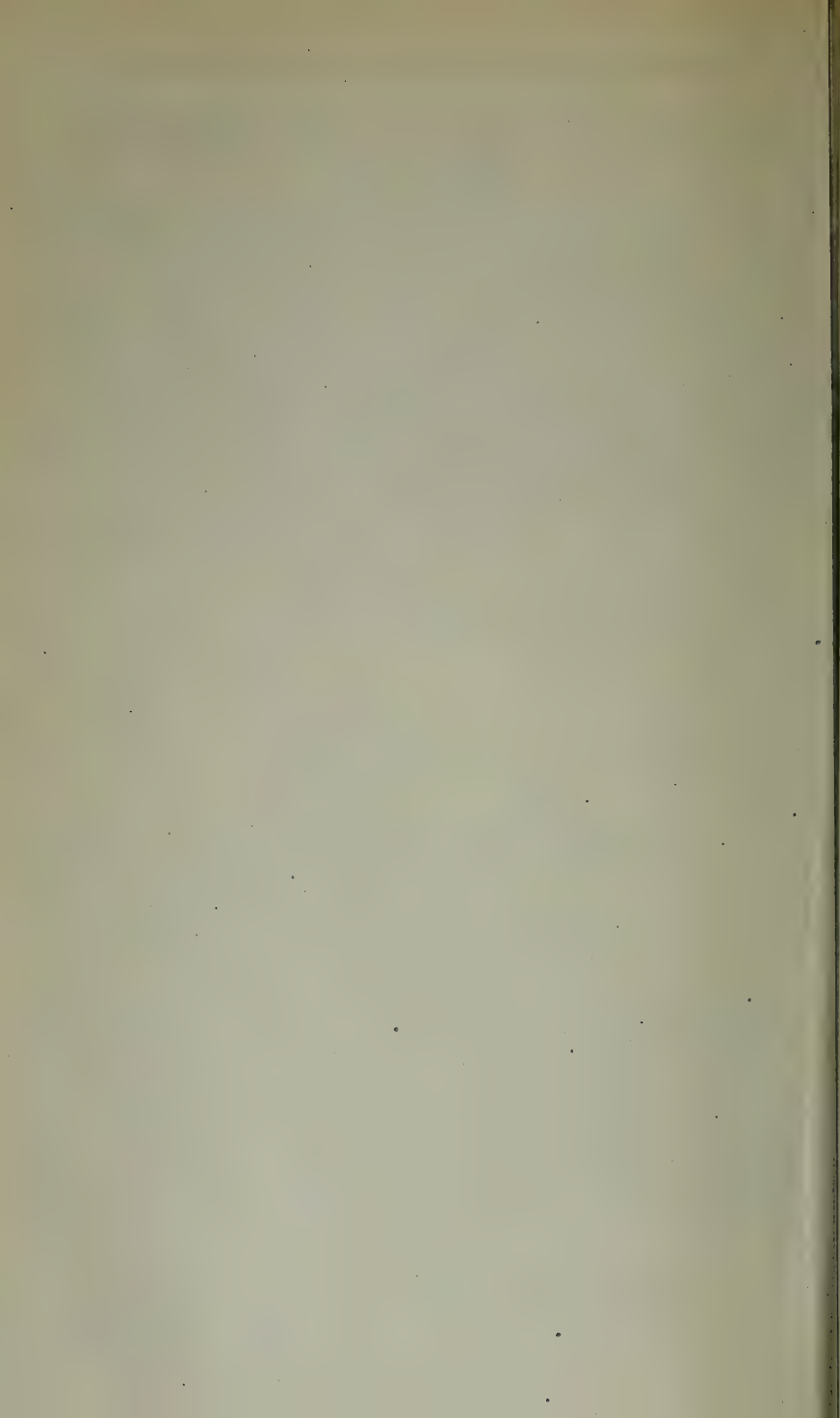
JOHN ISAAC, Secretary.

VOTE OF THANKS BY THE PACIFIC COAST NURSERYMEN'S ASSOCIATION.

At a special meeting of the Pacific Coast Nurserymen's Association, a unanimous vote of thanks was extended to the citizens of Hanford for the delightful entertainment at Odd Fellows' Hall and the banquet following, for the rides into the country, and for the general kind hospitality shown. A vote of thanks was extended to the daily press of Hanford for the liberal notices given to the proceedings of the Convention, and to the officers of the Horticultural Commission for faithfulness and efficiency in the work of this meeting. A vote of thanks was also extended to the officials of the Southern Pacific Railroad Company for excursion rates and stop-over privileges.

F. W. POWER, President.

C. A. TONNESON, Secretary.



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NINETEENTH BIENNIAL REPORT

OF THE

STATE BOARD OF HEALTH

OF

CALIFORNIA,

FOR THE

FISCAL YEARS FROM JULY 1, 1904, TO JUNE 30, 1906.



SACRAMENTO:

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1906.

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GEORGE D. LESLIE, <i>Statistician</i> ,	- - - - -	Sacramento

STATE HYGIENIC LABORATORY.

ARCHIBALD R. WARD, D.V.M., <i>Director</i> ,	University of California, Berkeley
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OFFICE OF CALIFORNIA STATE BOARD OF HEALTH,
SACRAMENTO, September 15, 1906.

To His Excellency, GEORGE C. PARDEE,
Governor of California.

DEAR SIR: In accordance with the State law, I herewith transmit to you the Nineteenth Biennial Report of the State Board of Health of California, including the report of the Bureau of Vital Statistics and of the State Hygienic Laboratory, for the fifty-sixth and fifty-seventh fiscal years.

Yours, very respectfully,

N. K. FOSTER,
Secretary of State Board of Health.

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REPORT OF STATE BOARD OF HEALTH.

The work of the State Board of Health was broadened very extensively by certain laws passed at the last regular session of the Legislature. Instead of being an "advisory board," with simply the privilege of offering suggestions, there are now defined lines of work which it is required to do. These lines relate entirely, as they should, to the gathering and arranging of vital statistics and to public health and sanitation. The Board entered upon its new duties with an enthusiasm born of the conviction that its work was, in importance, exceeded by no other department of the State government, and with a determination that California should, in the excellence and effectiveness of its health department, stand with the foremost states of the Union. How far we have succeeded, the record of our work must show.

The new Bureau of Vital Statistics has, in the short time of its existence, attained a degree of perfection which warranted the United States Census Bureau in accepting its statistics for the Census Bureau's work and in admitting California as a registration state—a distinction attained by but few of the Eastern States.

The State Hygienic Laboratory, which was created by the last Legislature, is well established and has done much excellent work for the various local health departments and physicians. Its examinations of secretions from the throats of patients have been the means of early diagnosis of diphtheria in many cases, thus averting epidemics. Work has been done also in typhoid, tuberculosis, and other contagious diseases. Examinations of water and milk have also been made, and the important subject of disinfection is being investigated.

A full report of each of these departments is appended.

The routine work of the State Board of Health and its Secretary can not be detailed in this report, but can be found in the minutes of the Board and in the reports of the Secretary rendered to it at each meeting. The Secretary has given his entire time to the work, and in answering requests for help and making investigations of unsanitary conditions has visited most parts of the State. One conference of the State and Provincial Boards of Health and one of the United State Public Health and Marine Hospital Service with the State Boards of Health have been attended in Washington, also the American International Congress on Tuberculosis in St. Louis. The conferences

during the present year were not attended, as the extra amount of work falling upon the Board on account of the catastrophe of April 18 took its time and means. This is to be regretted, as the information obtained at these conferences, composed, as they are, of the best sanitarians of the country, is of the greatest aid in perfecting our own sanitary conditions.

The office work of the Secretary has grown to large proportions. The correspondence takes a great deal of time, as there is a general awakening among the people in regard to sanitary matters. The Board has insisted that towns dispose of their sewage without endangering the health of other places or people, and the Secretary is called upon to investigate and recommend plans for doing this. The varying conditions in different parts of the State make this no easy task, and the details require a great deal of time. The Board is in constant receipt of letters of inquiry, the intelligent answering of which calls for much time and investigation. These letters, however, have all been carefully answered and filed.

For the past year we have published a Monthly Bulletin, containing matters pertaining to public health and sanitation, which is sent to all health officers, to those connected with the collection of vital statistics, to newspapers, and to others who have signified their desire for it. This bulletin has been the means of disseminating much needed information among our people.

The plans and specifications of all buildings erected by the State have been carefully examined in so far as they related to sanitary conditions, and needed suggestions and alterations were made.

The sanitary care of the State institutions has received our most careful attention, and beneficial results have been obtained.

No provision is made for any assistance for the Secretary, except such as can be secured from the appropriation of \$2,500 per year for traveling and contingent expenses. As all traveling expenses of the entire Board and its Secretary, as well as all office and contingent expenses, have to come from this fund, there is very little available for help. A clerk should be furnished the Secretary and placed on the State payroll. The State is growing rapidly, and the sanitary work even faster, and unless more help is furnished this work can not be effectively carried on.

As the law requires, we have made suggestions and recommendations as to legislative action. The appropriations asked for are all actual needs of the various institutions or departments and have been suggested only after careful investigation. Some of them are imperatively necessary at the present time, and all will have to be granted in the near future in order that the health of the inhabitants of the State may be guarded and the good condition of the State institutions maintained.

VITAL STATISTICS.

At the last regular session of the Legislature a law was enacted creating a department in the State Board of Health to be known as "a Bureau of Vital Statistics, for the complete and proper registration of births, marriages, and deaths, for legal, sanitary, and statistical purposes, which bureau shall be under the supervision of the Secretary of the State Board of Health, who shall be ex-officio State Registrar of Vital Statistics. The State Board of Health shall appoint a competent statistician to assist the State Registrar of Vital Statistics, and such clerical and professional assistance as may be required for the proper discharge of the duties of said Registrar."

The law fully set forth the work to be done, and it needed only the organization of the department to begin work. The former law relating to the collection of vital statistics had never been enforced to any extent, and but few in the State seemed to appreciate the probability of such a law being made effective.

The Board secured the services of George D. Leslie of the United States Census Bureau, and to his marked ability and knowledge much of the success of the department is due. As the collection of these statistics imposes duties on a vast number of people—doctors, clergymen, undertakers, county and town officials—a great deal of correspondence and work was necessary.

The law took effect May 18, 1905, but owing to a delay in getting blanks, the bureau was not in active operation until a month later. Since that time, however, it has gone steadily forward, not without some friction, but with steadily increasing accuracy, so that now a large percentage of all deaths are reported, as are also marriages. It is much more difficult to get births reported. Much of the objection to this work is, however, being overcome, and this important work is steadily gaining in efficiency.

All deaths, births, and marriages reported to this office have been, as the law requires, properly and completely indexed, and the certificates bound, so that reference can be made quickly to each one on record. This has required the writing of from 7,000 to 8,000 cards each month—a work of no small proportions. The State has been divided into districts and the causes of death have been tabulated in each district, so that it is possible to tell where certain diseases prevail, which will be of value as soon as the data have been carried far enough to reason from cause to effect. Marriages and births have also been properly tabulated and arranged. These tabulations and deductions are made a part of this report. All this has required a great deal of work, and the present force in the office is altogether insufficient. The law requires the Board to appoint sufficient assistants to the Secretary, but the appropriations will not warrant it, and much work that we would

like to have done has, of necessity, been passed. The value of an index is in its accuracy, and the careful making out and filing of 8,000 cards a month, together with making out certified copies which the law requires, is more than one person can do. This is by no means all the work. The correspondence of the department has grown to large proportions. Every day letters are coming from parties interested in these vital statistics, and their answer calls for much careful work and study. At the present time the statistician has no clerk, and must get along with only such aid as can be accorded him from the Secretary's office, which is itself overcrowded with work. It is imperatively necessary that a clerk be assigned to this department, for it would be a great misfortune to the State if the collection of these statistics should be in any way curtailed. They are considered everywhere of the utmost importance, and the United States Census Bureau, considering ours to have reached a proper degree of perfection, has placed the State on its list of registration states, accepting our statistics for its work. Should we fall back, this honor will be taken from us, and California can not afford to go backward.

The advantages of having the original certificates of deaths, births, and marriages on file at the State Capitol were strongly emphasized by the fire at San Francisco, where all records were lost, leaving those at the State Capitol the only ones in existence. This is liable to occur at any time and in any place. Every birth, marriage, and death should be a matter of record in the State Capitol, and stored in fire-proof vaults, for no more important records exist than these.

SANITARY WORK.

During the past biennial term the State Board of Health has been active in awakening an interest in sanitary matters and in seeing that the State laws relating thereto are enforced. As a result there has been a great demand upon the Board for aid and information. Requests are received from all parts of the State asking that a representative of the Board visit them and solve some sanitary problem. These have generally to do with the destruction of sewage; sometimes they are prompted by a demand from the Board that the pollution of some stream or lake must cease; but often the step is taken as the result of a general feeling, now on the increase, that no one has a right to poison his neighbor's water supply. As far as possible these calls have been answered by a member of the Board going in person to investigate and advise. The result has been that much sewage and waste matter which formerly flowed into streams, thereby polluting them and spreading disease, especially typhoid fever, are now destroyed.

Water, which enters so largely into the composition of the human body and is therefore necessary to the comfort as well as the existence of

life, should in all cases be pure. This, however, is not the fact, and many of the sources of supply of cities and towns, as well as of private houses, are bad in the extreme. The sewage of cities of considerable size is even allowed to run into the water supply of some neighboring city, while they in turn drink the diluted sewage of cities above. Probably the greatest danger from this method of sewage disposal is in the pollution of the smaller streams that supply the foothill towns. The Board, in so far as its means will allow, has inspected the various watersheds, and has succeeded in preventing much pollution of ice and water used for domestic purposes and in removing many nuisances. The proper destruction of sewage, thereby safeguarding the purity of our water supplies, is a subject that requires the constant and careful supervision of the Board. There is no part of the work that is of more importance, and none that in some places arouses so much antagonism. The streams are looked upon by some as natural sewers and the proper repositories for dead animals and garbage, and such persons consider their personal or municipal rights infringed upon when efforts are made to keep these streams clean. An epidemic of typhoid fever in the community, traced to such pollution of the water supply above, generally convinces all such that the other man or town is doing wrong, and it is then easy to bring home to them the fact of their own wrongdoing.

During the past two years several towns have installed septic tanks for the destruction of sewage, and generally with very satisfactory results. Some of the State institutions have also adopted this means of destroying sewage, and we earnestly recommend it in such others as have conditions favorable to it.

INSPECTION OF SUMMER RESORTS.

Complaints that come into the office of the Secretary of the State Board of Health of the unsanitary condition of some of the many summer resorts, together with the fact that many persons returning therefrom have almost immediately been taken down with typhoid fever, have demonstrated the need of the inspection of such places. The large number of summer resorts in California, and the vastness of the territory over which they extend, make it impossible for the Board, with its limited force, to inspect more than a small percentage of such places. The work has been confined chiefly to those of which complaint was made and of others in their vicinity.

As a general rule, the resorts are in good sanitary condition; but there are enough that are bad, and very bad, to cast a shadow in the public mind on all. This, of course, is unjust and should not exist, for the outdoor life that is part of a vacation spent in the mountains or at

the seaside is of the utmost value to those who can experience it, and everything possible should be done to encourage such outdoor life.

The visits made by a representative of the Board have resulted in much good, for in no case was there shown anything but willingness to correct all faults and improve the sanitary conditions to the fullest extent. A general inspection should, however, be made, and we have no doubt that much sickness would be avoided and many lives saved by such a move.

The greatest danger is from transient campers outside the organized camps or resorts. They establish a camp for a night or a longer time upon any convenient stream, which they use for all purposes—for bathing, washing clothes, allowing stock to stand in it, as a depository for camp rubbish, and as a sewer. As a result, those below, either permanent inhabitants, other campers, or those stopping at organized resorts, have to use polluted water, and in this way much of the typhoid fever is taken.

A vacation spent in traveling through the State, camping at night and living in the open, is both delightful and healthful, and should be encouraged, but at the same time the campers, as well as others, should be guarded from the dangers that beset them. Camping on streams which supply towns with water should be prohibited within a certain distance of the intake. This would not materially lessen the opportunities for camping, but it would be a great protection to towns.

Authority is already vested in the State Board of Health to guard the purity of domestic water supplies, but the means of doing it are not in its hands. In a State with the dimensions of California, it is impossible to properly guard, with the present force, the sanitary conditions that come under the State Board's jurisdiction. A law should be enacted making the county health officer practically a deputy of the State office, and accountable to it. This would give the State Board fifty-seven deputies, who could be easily reached by mail or wire. Complaints could be quickly attended to, and, where necessary, notices posted on all streams directing what care should be taken by campers so that no danger would result from their acts.

CONTAGIOUS AND INFECTIOUS DISEASES.

While there has been, perhaps, the usual amount of contagious diseases in the State, there has been no extensive or particularly fatal epidemic.

Smallpox has been unusually prevalent, and was much more serious than in recent years, the percentage of deaths in some localities approaching what it was in pre-vaccination times. However, by active measures on the part of the local health departments, the disease has

been checked before it had spread far. In some cases the disease was wrongly diagnosed and many exposures occurred before the mistake was discovered. Most of those exposed sought vaccination at once, and escaped either altogether or with a very much modified form of the disease. A few refused to be vaccinated, and enjoyed the experience of the disease in its full force.

Vaccination, the only known preventive of smallpox, has been neglected for several years in some parts of the State, and there has come upon the stage a generation, too many of whom are unvaccinated. This neglect has caused the death of many innocent victims and the unsightly marking of many more. It is strange that in this enlightened age, when almost all physicians, and especially those who have had great experience with smallpox and vaccination, are so pronounced in favor of vaccination, there should be a few who so bitterly oppose it. They are in a hopelessly small minority, but by organization and by constantly keeping before the people the supposed danger and the idea that their rights are being trampled upon, they keep many from being properly protected.

In most cases where the disease became prevalent, all willingly sought the protection of vaccination, and we have reason to hope that this awakening will be beneficial.

Typhoid fever has claimed its usual number of victims, especially in the foothill and mountainous parts of the State. This condition will continue so long as the mountain streams, the great source of water supply for these sections, are used to receive the drainage of the habitations along their banks. While water is not the only source of typhoid fever, it is in these sections the principal one, and in several cases there has been no trouble in suppressing the disease by providing a pure supply of water.

Flies as a means of its spread should not be forgotten, for if allowed upon the dejecta of a patient, they will carry the germs to any one within their reach, and several outbreaks have been traced to them. It is not too much to hope that the time will come when house flies will not be tolerated. They are a danger as well as a nuisance, and can be practically exterminated by preventing their breeding.

Diphtheria has lost much of its terrors since the use of antitoxin in its treatment, and the death-rate has materially decreased. If this remedy were in the hands of all physicians and used early there would be practically no deaths from this disease. Several of the Eastern States furnish antitoxin free to indigents, with the result that the death-rate is far below what it is in California. There is no doubt that the cost of the remedy has limited its use.

Plague.—One case of plague has occurred during the biennial term. The patient lived in fair sanitary conditions and worked steadily in a door and sash factory. Four days before the attack he was hunting squirrels in a section where they had been dying from some epizootic. No plague rats could be found, and as there was no other probable source of infection, the conclusion seemed reasonable that it was contracted from the squirrels. The patient, while severely sick, recovered. An effort has been made to have the United States Government, through the Public Health Department, investigate the disease among the squirrels, but thus far without success. They have died extensively in some parts of the State, and the farmers are thereby relieved of a great curse. If the disease attacking the squirrels is harmless to man it should be spread, but if in reality it is the plague, that fact should be made known, so that proper steps can be taken to protect the people.

Scarlet fever, measles, and whooping-cough have occurred in their usual amount, and we will have them with us until such time as all cases are properly reported, isolated, and disinfected. In the past this has not been done; many cases, being light, have had no physicians in attendance, and hence are never reported, nor proper precautions taken. Sometimes when a physician is in attendance, he yields to the pleadings of relatives, who, because the case is "light," do not wish to isolate the patient, and frequently allow the child to associate with others long before it is free from contagion. These diseases are by no means a necessary part of one's existence, and as many deaths result from them, particular care should be exercised to keep children from exposure. This will never be possible until there is a law enacted requiring all contagious, infectious, and communicable diseases to be reported to the health officer by the physician, if one is in attendance, otherwise by the parents or guardian, and a severe penalty for its disobedience. Such a law we heartily recommend.

TUBERCULOSIS.

More deadly than any other disease, tuberculosis easily leads the list of causes of death, one in every seven deaths resulting from it. As this is a preventable disease, such a death-rate is not flattering to the State and calls for active work on the part of all classes of society and branches of government. The death of over 4,000 per year from one disease, and that a preventable one, should alarm every one. If diphtheria, cholera, scarlet fever, or any of the actively contagious diseases should kill one quarter this number there would be such consternation that people would leave the State. The fact that one in every seven of us is doomed to die of this disease does not, however, seem to cause concern, except among the very few who interest themselves in the wel-

fare of the human race. The old feeling that tuberculosis is unavoidable has not fully passed away and its slow invasion makes it seem less dreadful. The high death-rate in California is not normal to the State, but is the result of so many coming here from other states, seeking the advantages of our climate, but seeking it too late, and dying during the first few weeks of their residence here.

Consumption should be a rare disease in California, and if people were properly instructed as to means of prevention, and these means provided for them where they can not secure them themselves, it would be. Very much can be done by education, and therefore such means of enlightening our people on the contagiousness of this disease should be pushed to its utmost; but it avails little to teach parents that good food, rest, and country air will restore their child to health when the means of the family will provide only a miserable living in a more miserable tenement. The State has a duty here in passing laws that shall require tenements to be built so that all rooms will receive air and sunshine, and that workshops and factories shall be kept in a sanitary condition; and each city and county should provide sanatoria for those who can not be properly treated at home.

We would strongly advise that an appropriation be made for the purpose of publishing and distributing educational matter relating to the prevention and management of this and other communicable diseases. Also, that a law be passed prohibiting expectoration in public buildings and in public conveyances.

PURE FOOD.

At last a pure-food bill has passed the United States Congress and become a law—a long-needed step in the right direction. Congress can, however, deal only with interstate traffic. The law will give us some relief in the prevention of shipments of impure and adulterated foods and drugs from other states, but none from unscrupulous manufacturers at home. That much suffering is caused and many deaths result from impure and adulterated food, no one who has studied the conditions will for a moment doubt. Most of our long list of deaths from enteric troubles are the result of impure food, and to stop the deaths the cause must be removed. This the State can do, and if she wishes to keep in the van of progress, she must take steps to prevent the wholesale slaughter of her inhabitants. The slaughter of these thousands by adulterated food is, to all intents and purposes, as much murder as though they had been killed by the more active poisons, as strychnine or arsenic, and the perpetrators should be dealt with accordingly.

Our State Legislature should enact a law as nearly as possible along the lines of the United States law, prohibiting the manufacture, sale, or

shipment of impure or adulterated food and drugs, and also insuring their being properly labeled. Our character as a State depends in no small degree upon the honesty of the manufacturer, and one shipment of impure or falsely labeled goods will do us more harm than any number of pure ones can counteract. We should have the same interest in protecting the health of the person who is so unfortunate as not to live in California, as we would have were he one of us. We earnestly recommend a safe and strong pure-food law, with the necessary appropriation and authority to enforce it.

RIVER OVERFLOW.

It may seem a long step from river overflow to sanitation, but a moment's consideration will show that it is a subject pertinent to the State Board of Health. Each winter and spring thousands of acres are flooded with water teeming with vegetable and animal life. This water, as the river falls, is confined behind the levees, and under the influence of the hot sun soon becomes stagnant and putrid from decaying matter. The odors arising from this are terrific, and this Board is sometimes called upon for relief. That these complaints are just, a short sojourn in the neighborhood will prove; but it is impossible for the Board, or any one else, to give the desired aid, for there are no means in our power either to remove the water or to purify it. It is contended that odors do not cause disease, but such intense ones as are here produced will at least lower the resistance of the body by destroying nutrition. Appetite is destroyed, as is often the power to retain food that is eaten. At night the odors are so bad that the windows and doors of houses must be closed, people preferring the close, stifling air of a heated house rather than smell the intense odors coming from the overflow. This, for those used to sleeping in the open air, can not be otherwise than detrimental. Looking at it from a sanitary as well as from a financial standpoint, a broad and statesmanlike policy of reclamation and river improvement should be adopted. Otherwise the inhabitants living on the borders of these large tracts of overflowed lands will, owing to a lowered vitality, be more subject to disease, if indeed they are not entirely driven from their homes.

SANITARY ASSOCIATIONS.

Believing that in the battle with unsanitary conditions, organization is of as much importance as in any other contest, the State Board of Health began the formation of sanitary associations. The advantages of these will be recognized by any one who has had occasion to observe the indifference with which many of the most important steps for the prevention of disease are carried out. Isolation, disinfection, vaccina-

tion, prevention of the pollution of water supplies, the care and destruction of sewage, and the numerous other questions which come before a health officer are as sealed books to some of them. They are subjects that were not taught them in school, and their attention has never been given actively to the consideration thereof. By associating with the more active, earnest officers and by listening to the papers and taking part in the discussions, the less informed officers grasp the necessity for further knowledge and oftentimes make excellent officials.

The first association formed was the California Public Health Association, which has held semi-annual meetings for three years. These have been full of interest, with many excellent papers and discussions. The greatest difficulty met with is to get the health officers in the more remote parts of the State to attend. This is not entirely from want of interest, although some health officers, like some others in official position, seek to get the honors and emoluments of their office with the minimum amount of labor. Most of them are busy practitioners and get but small pay for their services as health officer, and consequently can not afford the expense of a long journey to attend the meetings. To obviate this in a measure, the Board invited the health officers of the San Joaquin Valley counties to meet at Fresno during the last summer, and organized the Central California Health Officers' Association, and it is intended to organize others in the near future. This will bring them together more, but still many will not attend.

The absence of any of our health officers from these meetings is a distinct loss to the communities which they represent, for the subjects discussed are all pertinent and apply to every county and town in the State. The people would be the gainers if their health officers could attend and acquire knowledge which would be used in their several jurisdictions. In some of the Eastern States these associations are part of the State health organization, the same as teachers' institutes are part of the school system. This brings together each year all the health officers of the State, so that instruction can be given them, topics of general interest discussed, uniformity of action assured, and mutual assistance rendered.

We recommend that a law be enacted requiring each county and municipality to send a delegate from its health board to the meetings of the State association, his necessary expenses to be paid from the county or city treasury.

EXAMINATION OF SCHOOL CHILDREN.

There is no doubt that many children fail in school and in life because of a remediable defect in some organ or organs. That these defects should be allowed to go uncured or untreated and the children

become dependents on society does not speak well for the judgment of the State, but such is the fact in most parts of California as well as elsewhere. A start has been made, however, and we may soon expect to see every child in our schools regularly examined, not only for defects in sight and hearing, but also for others that may be equally as bad. The examinations should go further than to discover organic defects. The examiner should be expected to watch the general condition of the children and to judge as to their physical ability to continue a certain course of study. This should be done by the municipalities. The State is helping to educate several thousand orphans, and to these it owes the same care that the municipality should give its children. Indeed, the need is greater, for the circumstances under which these wards of the State have been reared are less fortunate. Arrangements should be made whereby each one of these unfortunate children could be carefully examined, and when found to be in a condition needing treatment such treatment should be furnished.

The following article by A. J. Pillsbury, Secretary of the State Board of Examiners, relating to these wards of the State, meets our hearty approval, and we respectfully recommend the enactment of effective laws carrying a sufficient appropriation for this purpose:

HELP FOR THE HANDICAPPED.

What farmer, if he have a scrawny, wobbly pig delivered with a litter, will not straightway take that pig to the house, fix up a nursing bottle for it and so attend to its health that it will soon be able to take its place with its fellows at the maternal repast and in the trough, squealing and struggling as lustily as its brothers and sisters? What chicken grower, if he find a weakling hatched out with a lusty brood, will not coddle the weakling against a warm brick behind the kitchen stove until it gains strength to struggle for its own existence with its downy companions?

I want the juvenile wards of the State of California as well looked after as though they were so many candidates for pork barrel and gridiron, and for a not very dissimilar reason: It pays.

In the main, with here and there a notable exception, the dependent classes are recruited from the ranks of the handicapped. These are they who fill the hospitals for the insane, the prisons and reformatories, the homes for feeble-minded and, in a very considerable number, the orphanages.

The young men, of college age, confined in Elmira Reformatory, New York, average in stature about the same as young women in a female seminary, or four inches shorter than college men of the same age. There have been instances where nature has packed fine, strong minds into craniums supported by small and badly nourished bodies, but these were nature's freaks and not her normal and usual product. As a blunt fact, the dwellers below the prosperity line are dwarfed in body and mind, defective in one or more organs and deficient in vitality.

I do not make these statements in aid and comfort of those devotees of the doctrine of heredity who are often as desirous of laying their own shortcomings at the doors of their ancestry as they are of holding the horrors of hereditary tendency up before the bleary eyes of their bibulous neighbors, the better to convict them of sin. There is a deal of truth in the doctrine of hereditary tendency, vital, appalling truth, but the mischief wrought by it is, in many if not in most cases, susceptible of being remedied by timely treatment and painstaking nurture.

Prof. George R. Leslie, Director of the Science Department of the city schools in Los

Angeles, has undertaken to make a physical examination of all applicants for entrance into the public schools of that city, and his investigations, so far as they have gone, show that twenty-five per cent of all applicants are physically defective in hurtful degrees—in degrees that, unless remedied, will handicap such children throughout their lives.

I have no doubt that the percentages of deficiencies among the State's orphanage wards will rank much higher. The public school children of Los Angeles come in the main from families whose standards of living are above the poverty line. The orphanage children all come from families below the poverty line, else they would not, or should not, be in an orphanage. They are the handicapped product of a handicapped parentage, and therefore doubly demand all that science and nurture can do for them.

What chance has a child to develop into a healthful and helpful citizen if a near-sightedness be permitted to contract its distinct vision to within a range of twenty inches, beyond which distance all things are seen as they are not instead of as they are? What chance has such a child for the forming of correct judgments and for seeing life as it is?

What chance has a child whose defective hearing makes it miss half that is said and heard by others, half that goes on in recitation and on the playground—the most valuable recitation room of all?

What chance has a child for developing a virile constitution when adenoid growths in its throat shut out half the breath from the lungs, leaving the blood scantily aerated, the chest half expanded?

What chance has a child for normal development when its teeth are permitted to so rot that it becomes as nearly toothless at fourteen as it should be at forty-five, when every mouthful of food sent to the stomach is tinctured with the poison of decay, and when every breath inhaled is as heavily laden with putridity as every breath breathed into the faces of his nauseated companions?

What chance has a child for developing a self-confident and courageous character when its bandy legs and knock knees make it the laughing stock of the playground, when its teeth are allowed to grow out like tusks, disfiguring the countenance, when the child has no strength with which to measure its playmates, no endurance to bear a robust part in their games, and when it has nerves which people dark corners with spooks and dark nights with goblins?

Fortunately for handicapped childhood, physical deficiencies are often if not generally remediable, if taken in time. The New York Foundling Hospital (Catholic) has gone at this work with a degree of enthusiasm and intelligence that is positively inspiring. Every child that comes into its custody is submitted to a rigid examination, and, if such examination develops the fact of remediable deficiency, those deficiencies are treated with the highest skill the great metropolis affords. Some of the most proficient surgeons in the city volunteer their services, bandy and bow legs are broken and set straight, tonsils removed, paralyzed nerves sutured, and all things done that science knows how to do to relieve the wards of the State of handicaps under which, otherwise, they must run their respective races of life in competition with other persons who are weighted down with no such burdens.

In many of the states east of the Rocky Mountains juvenile wards of the State are looked out for efficiently in this regard. In Iowa, members of the faculty of the medical department of the State university visit institutions, at the cost of their expenses only, for the purpose of making examinations, and hospital cases are taken to the university hospital for treatment. Michigan follows a similar policy, and the Massachusetts general hospital receives numberless cases coming under this classification.

I do not doubt that as many as one third of the more than five thousand dependent children in the orphanages of California are handicapped by physical deficiencies in one form or another, the greater part of which might be remedied by proper treatment, either surgical, medical or hygienic, and, if we include bad teeth, I think that the percentage of defectives will total one half.

The teeth of children are greatly neglected, not only in institutions, but in family life, and to the serious detriment of the children. Nature, in healthy children, absorbs the milk teeth from within the gum without decay, but if a child have a low vitality teeth decay from without. Decay is always poisonous, and a mouth full of rotten teeth

means malnutrition, malnutrition means a badly nourished brain, and a badly nourished brain means either a delinquent or a backward child, and generally a child that is both morally delinquent and intellectually backward.

As if physical deficiencies were not a sufficient handicap, it is a fact of common experience that the consciousness of inferiority, physical or intellectual, weighs down the spirits and gives rise to a morbidity of mind that is even more grievous to be borne than the handicaps themselves. Such a consciousness discounts enterprise, fosters the habit of brooding, turns the channels of thinking inward instead of outward, develops a mind full of all unhealthfulness, resulting in inefficient if not bad citizenship, and not infrequently in insanity.

To the credit of our orphanages be it said that they all have more or less of medical attendance and supervision, but, notwithstanding this fact, they are lacking in such a close and systematic medical attention as their wards require. If a child is sick a physician is summoned, and if a tooth aches it is pulled, but there is no such keen scrutiny into physical conditions as the situation demands.

The fact is that the ordinary medical practitioner does not rise to the full requirements demanded. No one less observing than a trained specialist in childish deficiencies will detect, or realize, the importance of deficiencies that are really serious, if not to life, at any rate to efficient living.

In my judgment the State of California should employ one or more experts in children's diseases, preferably a man and a woman, to devote themselves to the juvenile wards of the State in orphanages and in industrial schools. Each child should be stripped to the buff and examined in every particular, deficiencies diagnosed and treatment prescribed. Attention should also be given to sanitary conditions and to diet, to physical training and mental discipline in special cases.

To make this work effective it may be necessary to establish a small children's hospital in connection with the medical department of the State University, or else make proper arrangements for treating hospital cases at public expense in reputable institutions throughout the State.

The general service herein outlined might properly be performed under the guidance of the State Board of Health, or if there be fear of unwholesome political influences being brought to bear upon the work through that instrumentality, then let the service be required of the medical department of the State University. Whoever is made agent of the commonwealth for the performance of this function should be endowed with ample powers, not only for ascertaining what should be done, but also for doing the needful thing when it has been ascertained. Personally, I do not fear the prostitution of the office to political influence if confided to the State Board of Health, but the medical department of the State University would perhaps give greater promise of permanency and a continuing service.

I favor the State of California entering upon the service herein outlined, because it will pay the State to do it. There are humanitarian considerations which do, in fact, outweigh all other considerations, but the fact that it will pay, at once and roundly, is more likely to appeal to the practical mind. Criminality is enormously costly, and pauperism and insanity only less so, and it can not be denied that the ranks of criminality, pauperism, and insanity are mainly recruited from among those who are handicapped from birth by physical deficiencies and abnormalities, many if not most of which are, in the light of modern science and nursing, clearly remediable.

Furthermore, the State is the ultimate guardian of all of its wards, and it should either assert its power and authority more abundantly or abandon it altogether. A divided responsibility is always productive of inefficiency. The orphanage people throughout the State will be found ready to coöperate heartily and not unintelligently, but inasmuch as the State now pays only about three fifths of the cost of taking care of dependent children these institutions can not well be required to do more than they are now doing. This consists mainly in housing, feeding, and clothing their charges and imparting to them such lessons in industry, culture, and religious instruction as they are able to receive in their present physical and mental condition.

If the services outlined above shall come to be performed for the institutional wards of the State it will prove an object lesson of such incalculable value to childhood in

general that it will be no long time before all public school children will be given as good advantages in this respect as the State shall see fit to give to the children of the impoverished and the negligent. An aroused public conscience will not rest satisfied until, in California, everybody's children are as well cared for as nobody's children are cared for in that great institution in New York devoted to the care of the nameless product of unrestrained licentiousness.

A. J. PILLSBURY.

Secretary of State Board of Examiners.

SANITARY INSPECTION OF STATE BUILDINGS AND INSTITUTIONS.

The law requires that the State Board of Health shall have sanitary control of all buildings or places owned, leased, or controlled by the State, and that all plans and specifications, in so far as they relate to sanitary matters, must be approved by it. This has given the Board much extra work, there being no provision for an expert engineer to do these duties. The Board has, however, done the work to the best of its ability, and has been able to make suggestions whereby the sanitary condition of new buildings has been improved.

This is one of the most important duties of the State Board of Health, for besides the danger of unsanitary conditions in new buildings, there is annually a large expenditure for remodeling. There should be attached to the Board an expert sanitary engineer. We have two score of public institutions, and there is constant demand for more, and especially to increase the extent of those already in existence. Money would each year be saved the State were such an officer attached to the State Board of Health. It is impossible for a person not an expert to properly inspect plans and decide on their merits, and after this is once done, under the present system, the duty of seeing that the plans are carried out devolves on the architect. He is undoubtedly honest, but is sometimes long absent from the work, and experience has shown that the State has often suffered thereby. Reconstruction work is often done by the institution from its contingent funds, and the expense of getting some one to supervise the work is quite large. This could be saved by provision being made for such an officer as above recommended, and the saving would no doubt be equal to his salary. Besides this, there is a vast amount of service he would be able to render the smaller cities and towns which are seeking to improve their sanitary conditions but have no engineer. They naturally look to the State Board of Health for all the advice and aid they need. We invariably give the best we have, but having no engineer the Board can not possibly do all that should be done. Such an officer, by visiting the different towns and inspecting their sanitary conditions, would be able to make suggestions that would save the lives of many of the State's inhabitants, and we earnestly urge the creation of such an office.

Stockton State Hospital.

The general management of the institution is excellent, the halls and wards are clean, the food good and nourishing, and the patients in good condition. The toilets and bathtubs, however, are pretty nearly all they should not be. Put in many years ago they are well-worn relics of a former age, and with the plumbing should as soon as possible be replaced with modern fixtures.

We must call attention to the utter lack of modern modes and facilities, not only in this institution but in all others of the same kind, for treating and observing the acute insane. Observation pavilions should be erected for the purpose of watching the new cases as they come into the hospital. The treatment of to-day for the insane is the electric light and the hydrotherapeutic. At present there are absolutely no ways of giving these kinds of treatment. We recommend these improvements, knowing that they would be of great benefit to the patients and a vast saving to the State by quickly curing a great number of cases.

The female side of the hospital is worthy of special mention. The walls are hung with pictures, and potted plants in the halls give to them a freshness and homelike air that must be pleasant to the sick minds of the patients.

The new farm of 500 acres is a fine addition to the hospital facilities, and will make an excellent place for outside colonies of patients.

Mendocino State Hospital.

The general sanitary condition of this institution is good. The halls and wards are clean and free from odor, and the health of the inmates excellent. The septic tank which was instituted three years ago has worked night and day without attention or expense, and it is a complete success. The reservoir has been cleaned and enlarged, so that the supply of water is better than two years ago.

The dairy is still excellent, but the same need of new up-to-date dairy buildings exists, and we repeat the same recommendation made in our last report, for an appropriation sufficient for this improvement.

This was the first State hospital in California to install an outdoor department for any class of patients, and its success has been such that all the others should follow the example. This question is of such vital importance to the health of the patients that we quote extensively from the report of Dr. King, Superintendent of the Hospital:

"Tent Life at the Hospital.—The tent plant, which consisted originally of seven tents, has been enlarged by the addition of five wooden structures built of 2 by 3 surfaced studding covered with double-surfaced rustic so as to be painted on both sides. These wooden structures

are 9 feet high on the sides, the roof being shingled. They are built with ventilators of sufficient capacity so that when open the air of the room will be pure and fresh. One of these buildings we use for a sitting-room, one for a dining-room, one for a dormitory, one for a hospital, and one for the attendants.

"The wooden buildings are somewhat more costly, but they will last much longer than the canvas and are better adapted to the class of patients (chronic insane) which we have under treatment there. Around the whole we have a 6-foot smooth woven-wire fence, inclosing about $2\frac{1}{2}$ acres of ground. This camp is conveniently located near the hospital and is connected with our water, electric light, steam, and sewer systems. Food is furnished from the main kitchen. Within the inclosure are plenty of shade trees, sunlight, and pure fresh air.

"We have in this camp at present 69 patients, which is a little more than it was designed to hold. The results of treatment at this camp during the last year show that outdoor life is not only better for tubercular patients, but also for those who are mentally unsound, and I might add for the sane as well.

"Dr. R. A. Cushman, First Assistant Physician, who has had charge of this camp since it was opened, reports as follows: 'The general health of the outdoor patients has been better than that of those who sleep on the wards. No cases of lung or bronchial inflammation have so far occurred in camp, while our greatest mortality during the winter months on the wards is from pneumonia. This is not said to cast any reflection on the sanitary condition of the wards, for they are well kept and well ventilated, but rather to show that patients who spend most of their time out of doors are remarkably free from colds and from bronchial and lung diseases.'

"It has also been found that old men and the demented patients who are inclined to be filthy have markedly improved when given an opportunity to have a continuous outdoor life. Their general health is much improved, they are more cleanly in their habits, and are much more contented and happy than when confined to the wards.

"This camp, which can easily accommodate sixty patients, was built at a cost of \$3,600, or \$60 per bed, about one tenth of the cost of beds in ward buildings.

"Since the camp was opened three tubercular cases have become sane, and have been discharged. At the time of their discharge they had no fever, no cough, the chest dullness had practically disappeared, and they had increased in weight. At the present time we have three active tubercular cases and twelve tubercular cases improved. None of the improved cases have had any fever for several months; they have no cough, and most of them are gaining in weight. All the demented cases in camp have shown marked improvement, except the cases of

paresis, and we think that even in these cases their lives have been much prolonged.

"This tent plant, which was built for the accommodation of our male tuberculous cases, has proved of great value to that class. It has done more: it has demonstrated its value as a place for the care and treatment of a large class of our chronic insane, and I can see no reason why, with some modification, acute cases could not be cared for in the same manner and with advantage to the patients. In our California climate such buildings could be utilized for a farm colony of chronic cases and for epileptic colonies, with great benefit to the patients and economy to the State. In these tent colonies everything that reminds one of a prison is eliminated. The patients have more freedom; there is no lock except the one on the gate entrance, and this is simply to keep the old and demented patients from wandering away."

•

Napa State Hospital.

This hospital now contains 1,600 patients, the largest number it has ever had. The buildings are becoming crowded, and additions should be made thereto, as the prospects are that more and more patients are coming. The institution is kept right up to its best in every way. The food is excellent, the quarters are kept scrupulously clean, and the sanitary necessities are all that modern plumbing affords. The system of plumbing which was installed last year seems to be perfect. Dr. Stone has in contemplation the erection of detention and observation cottages, to which all new patients will be assigned for the purposes of observation and treatment. All modern appliances for the treatment of the insane, such as steam and hot-air baths, apparatus for electric and electric-light treatments, etc., are to be installed, and are recommended as an urgent necessity by this Board. The water supply will be much improved and increased when the new dam, which is now in process of construction, is completed. The dairy is in excellent condition and well taken care of. We recommend the isolation of tuberculous patients and their outdoor housing just as soon as it can possibly be accomplished.

Southern California State Hospital.

This hospital has been greatly improved since our last visit. A new administration building has been added, with the officers' rooms, superintendent's offices, trustees' rooms, visitors' waiting-rooms, library, officers' dining-room, etc., on the first floor; bacteriological laboratories and attachés' dining-rooms in the basement. The second floor is used for the sleeping apartments of the resident physicians and other officers, for guest chambers and bathrooms; the top story is given over entirely

to patients. The impression on entering this new building is a very pleasant one and takes away all feeling of entering an insane asylum; it is more like entering a beautiful country hotel.

This institution has improved very much under the management of Dr. Williamson, and bids fair to rival any of our State hospitals. There are now over 800 patients in the hospital and they are constantly on the increase. Like other institutions of this kind, the Southern California State Hospital is badly crowded and needs more room. When the tuberculous patients are housed in tents and open-air pavilions there will be more room in the buildings for other patients.

Detention and observation pavilions for the purpose of diagnosing and treating new cases are necessary for carrying on good work at this institution, and are recommended as important by this Board.

The septic tank has been a perfect success, it being practically odorless and its contents making an excellent fertilizer.

The hogpens deserve special mention. They contain about 400 hogs. The hogs and the pens are kept in perfect sanitary condition.

The dairy is still in a condition which might be improved upon.

State Hospital at Agnews.

This hospital was destroyed by the catastrophe of April 18, 1906, and will have to be entirely rebuilt. This should be done only after careful consideration of all the elements entering into the wellbeing of such an institution. The welfare of the patients is of the first consideration, expense second, and pride last. It is the belief of this Board that buildings intended for the care of the insane should be built far more simply than has been the practice in the past. In the tent ward at Ukiah, where the cost of structure is only \$60 per bed, better results are being obtained than in the large buildings that cost \$600. Manifestly there efficiency and economy go hand in hand, and only pride would suggest huge piles of brick or stone. It is not necessary to sacrifice taste and beauty, for they can go with more modest buildings, as cheapness does not indicate a want of taste. In small buildings, where the patients will be under less restraint, and where they can be better segregated, their mental sickness will more rapidly disappear and a saving be made to the State.

Home for Feeble-Minded Children.

This institution was badly damaged by the earthquake, but none of its inmates were seriously injured, and they are now being cared for in temporary barracks where they get a large supply of fresh air and light. Their health, as would be expected, is excellent, and is proof of the folly of erecting huge piles of brick and stone, where rooms and

halls get little air and less sunlight. From the standpoint of economy, as well as from that of sanitation and efficiency, the style of hospitals should be changed.

The general sanitary conditions are good. There is great need of more water, but when the new reservoir, now in process of construction, is completed this will be supplied.

In Stoneman Hall, where the lower grades of inmates are kept, there is great need of a covered platform, with sides of glass that could be removed in the summer season, where the unfortunates can play in the sun and air.

The sewer system is being improved. A septic tank was partially installed two years ago, but it was never completed. A small appropriation should be made to complete this work and make it perfect.

The dairy building has been improved since last report, but can never be made satisfactory. An entirely new milking-shed and milk-house should be built, so that the milk, which is the best food the children can have, can be kept pure and clean.

State Prison at Folsom.

The general high sanitary standard of this prison has been maintained since the last report, and there is little to criticise adversely or improvements to suggest.

State Prison at San Quentin.

With buildings old and dilapidated, with plumbing and drainage put in before sanitary science was developed, and with a limited water supply, that there is not more sickness than there is speaks well for the efficiency of the management. It is needless to go down the list of criticisms where there is so little good to be found, especially as complete reconstruction has been decided upon and commenced. The management has done everything possible for good sanitary conditions, but it is handicapped by old and wornout buildings.

State Capitol.

The last Legislature made a large appropriation for the purpose of remodeling this building, and it is now in process of reconstruction. When completed it will be well ventilated, well drained, and clean, and can be easily kept in a sanitary condition.

Whittier State School.

This school is in about the same condition we found it two years ago. A great many improvements could be made in the line of plumbing, furniture, interior comfort, gymnasiums, bathing facilities, swimming

tanks, etc., which would add to the utility of the institution. The girls' department seems to be very much superior in equipment to that of the boys. An ice plant is absolutely necessary. Although it was recommended in our last report, no steps toward establishing one have been taken. The temperature at Whittier is very high during the summer months, and milk, meat, vegetables, etc., decompose very rapidly, and an ice plant would be a great saving to the institution.

The sanitary conditions and appliances are pretty good, but could be improved upon. The septic tank disposes of the sewage to good satisfaction.

On our last visit we found that the boys had been taken to Catalina Island for a three weeks' outing, where they live in tents and are boating, swimming, and fishing all day. This outing takes place every year, and when the boys come home the girls are sent to the island.

Preston School of Industry.

Two years ago we earnestly recommended an ice plant and a septic tank for the school, and renew it with increased emphasis now. The ice plant from the standpoint of economy as well as of health, and the septic tank as a protection to life. The State should not violate its own laws nor poison its own people.

Institution for the Deaf and the Blind.

For cleanliness and order this institution can not be beaten anywhere, and from a sanitary standpoint no suggestions are needed. A septic tank to destroy the drainage from the stable is being considered, and if successful will remove the worst feature of the place. The dairy building is one of the best in the State, and by the installation of cement feed boxes, which could be flushed clean daily, would be about perfect.

State University.

The sanitary conditions of the State University at Berkeley have been materially improved since the last report. A new and complete sewer system has been put in and the old plumbing of the buildings is being gradually replaced with new.

Our recommendation of two years ago, that a hospital for the students be furnished, has been followed, and in a short time a complete one will be at their service, supported by a small fee charged to each. This, from the point of view of a health board, is a most important improvement.

California Polytechnic School, San Luis Obispo.

This is the latest State educational institution, and from a sanitary standpoint there is little to criticise.

Industrial Home of Mechanical Trades for Adult Blind.

This is perhaps as poorly equipped as any of the State institutions. The buildings are old and overcrowded, and the plumbing is very unsatisfactory. For the want of room, some of the inmates are obliged to sleep in halls that are almost without light and ventilation. While light is unnecessary for the blind in the matter of vision, it is absolutely necessary for health that every sleeping apartment have a goodly amount of sunlight. These halls have practically none. That the institution has little sickness among its inmates and no zymotic diseases, speaks exceedingly well for its management, but the time may come when even good management and care can not offset the want of nature's purifiers and disinfectants—air and light.

The new shops which are so greatly needed will be built shortly, when one great danger to the lives of the inmates will be done away with. There is great need for a new building, as the present ones are too full for healthful conditions, and the large waiting list requires that it be built.

Veterans' Home at Yountville.

There can be no adverse criticism on the management of this institution in sanitary matters. Every precaution is taken to guard the health of the old soldiers. The food is good and well cooked; the tables and barracks clean. The tubercular inmates are segregated and the hospital is well kept. While the dairy buildings are all of wood, they are kept scrupulously clean. The reserve water supply is not as large as it should be for the proper protection of the institution, and the dam should be enlarged. The sewage, while not a menace to the health of the inmates, is a source of danger to the people below, as it flows into a small stream which empties into the Napa River. This river is a source of domestic water supply, and typhoid fever has prevailed among those using it. There is an excellent location for a septic tank and filtration plant, and this should be installed at once. The State has no right to violate its own laws, and jeopardize the lives of its inhabitants. Already threats have been made to enjoin the State, and we recommend and insist that an appropriation be made to install such a plant.

State Normal School at San Francisco.

One good result of the fire in San Francisco was the destruction of the old Normal School building. A new one will soon take its place, and we will then have the satisfaction of knowing that teachers are being instructed in sanitary surroundings.

State Normal School at San Diego.

Sanitary conditions are good. Ventilation, drainage, light, and air are all we could desire.

State Normal School at San José.

This institution was so badly damaged by the earthquake of April 18 that it will have to be reconstructed.

State Normal School at Los Angeles.

The general sanitary conditions of the school are fair. The plumbing seems to be in good condition. The warm air that is used for heating the various rooms is drawn through several layers of coal that is kept damp, and in this manner the dust and other noxious materials are removed before the air enters the school rooms. The foul air is also removed from the rooms. The school has a well-organized gymnasium for the development of physical strength.

State Normal School at Chico.

The sanitary conditions are good and no appropriations are specially needed at the present time for this purpose.

Respectfully submitted.

MARTIN REGENSBURGER, M.D.,
President,

W. A. BRIGGS, M.D.,
Vice-President,

N. K. FOSTER, M.D.,
Secretary,

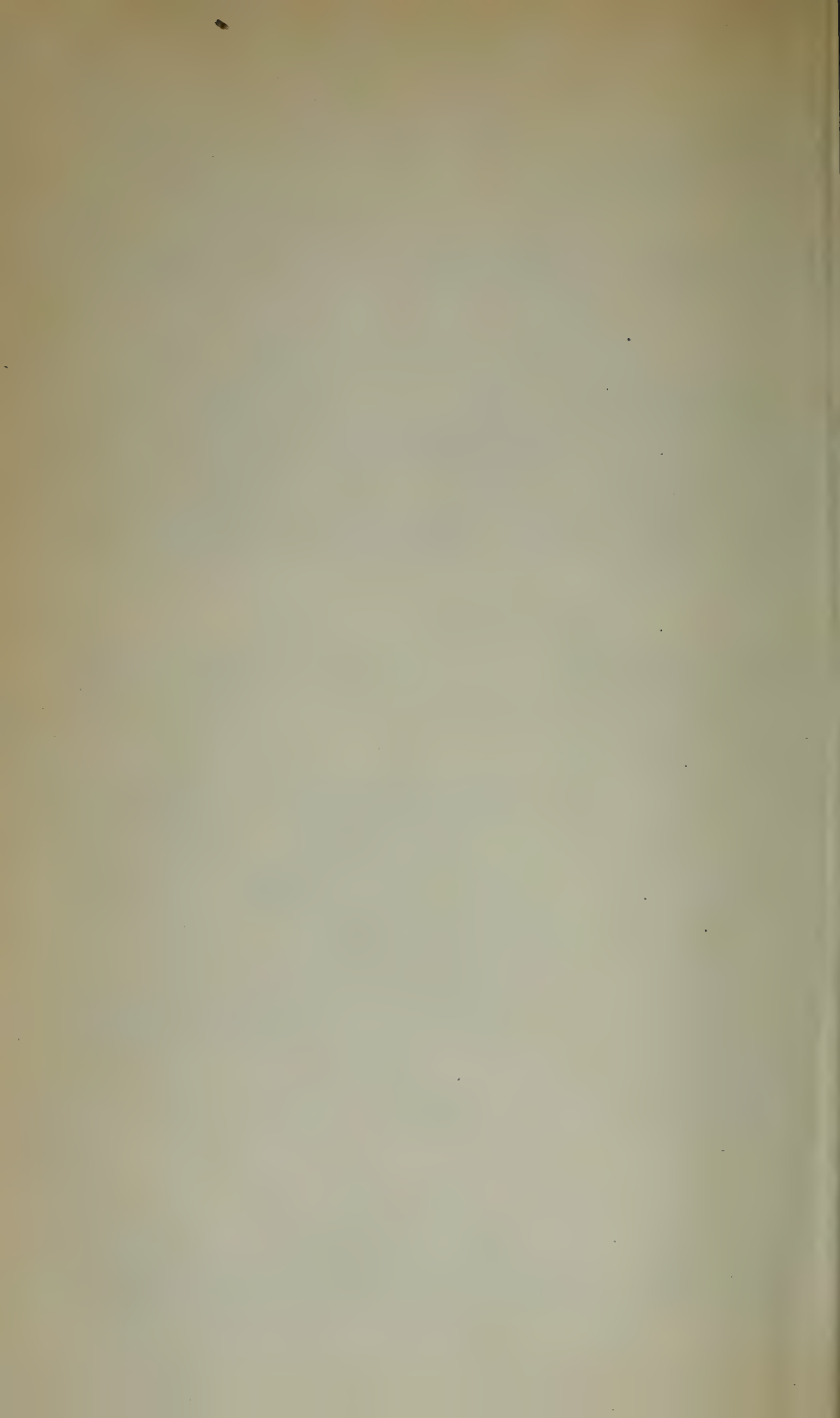
F. K. AINSWORTH, M.D.,

A. C. HART, M.D.,

O. STANSBURY, M.D.,

W. LE MOYNE WILLS, M.D.,

State Board of Health.



FINANCIAL STATEMENT.

FUND FOR TRAVELING AND CONTINGENT EXPENSES.

Statement Showing Condition of Appropriations for Traveling and Contingent Expenses of State Board of Health for Fifty-sixth and Fifty-seventh Fiscal Years.

FIFTY-SIXTH FISCAL YEAR.

By amount appropriated.....\$1,500 00
By balance, etc.....464 11

\$1,964 11

To warrants drawn in favor of State Board of Health, as follows:

No. Date—1904.	Amount.
360—July 7	\$10 30
462—July 13	7 75
631—July 21	28 55
632—July 21	12 95
682—July 26	4 90
1028—July 30	4 76
1495—Aug. 9	17 75
1552—Aug. 13	16 80
1690—Aug. 19	26 10
1726—Aug. 23	18 35
2388—Sept. 2	28 20
2389—Sept. 2	5 05
2586—Sept. 12	15 20
2746—Sept. 20	29 00
2747—Sept. 20	7 25
3710—Oct. 19	15 00
3837—Oct. 24	32 15
4405—Nov. 1	23 85
4461—Nov. 3	10 40
4585—Nov. 12	26 15
4858—Nov. 28	18 75
5471—Dec. 1	33 15
5704—Dec. 9	21 24
5894—Dec. 17	78 45
6122—Dec. 30	74 40

1905.

7834—Jan. 12	19 50
8683—Jan. 18	9 75
10055—Jan. 28	19 75
13140—Feb. 21	71 00
15949—Mar. 10	12 90
16775—Mar. 24	31 70
16995—Mar. 30	9 20
17756—April 8	73 79
17819—April 12	14 45
18126—April 27	118 72
18893—May 3	49 50
19096—May 10	23 25
19097—May 10	15 00
19114—May 12	101 75
19389—May 26	86 50
20174—June 7	115 40
20341—June 13	21 10
20401—June 17	29 70
20515—June 28	191 65
113—July 5*	345 90
769—July 28*	37 08

\$1,964 04

Balance07

\$1,964 11

FIFTY-SEVENTH FISCAL YEAR.

By amount appropriated.....\$2,500 00

To warrants drawn in favor of the State Board of Health, as follows:

No. Date—1905.	Amount.
205—July 11	\$20 90
565—July 20	19 40
1417—Aug. 5	105 75
1699—Aug. 14	46 43
1773—Aug. 16	10 10
1943—Aug. 29	21 75
2265—Aug. 31	100 90
2600—Sept. 6	16 60
2751—Sept. 14	30 50
2752—Sept. 14	10 00
2993—Sept. 22	99 55
3677—Oct. 4	30 40
3932—Oct. 11	20 50
3960—Oct. 13	25 10
4069—Oct. 18	22 10
4235—Oct. 27	15 25
4246—Oct. 31	100 50
4933—Nov. 4	18 80
5070—Nov. 10	26 65
5202—Nov. 14	15 30
5350—Oct. 27	25 80
5891—Nov. 29	119 75
6219—Dec. 11	44 84
6401—Dec. 18	24 40
6570—Dec. 28	24 65
6884—Dec. 30	85 00

1906.

7074—Jan. 5	2 50
7237—Jan. 9	26 95
7394—Jan. 11	23 73
7611—Jan. 19	18 20
8120—Jan. 31	18 25
8121—Jan. 31	106 80
8534—Feb. 7	6 95
8896—Feb. 24	28 00
9243—Feb. 28	85 00
9478—Mar. 1	39 30
9706—Mar. 8	39 90
9916—Mar. 26	25 25
10342—Mar. 31	118 40
10606—April 4	12 60
10859—April 17	38 31
10934—April 17	3 10
11609—May 2	85 00
11717—May 9	23 80
11817—May 16	6 85
11892—May 24	17 25
12257—May 31	143 00
12883—June 8	14 15
13606—June 19	30 15
13744—June 30	145 30

\$2,139 66

Balance360 34

\$2,500 00

*Contracted in fifty-sixth fiscal year, and paid in the fifty-seventh fiscal year from funds of the fifty-sixth fiscal year.

CONTAGIOUS DISEASE FUND.

Statement Showing Condition of Appropriation for Prevention of Contagious Diseases.

FIFTY-SIXTH FISCAL YEAR.			FIFTY-SEVENTH FISCAL YEAR.		
By balance of appropriation of			By balance of appropriation of		
March 20, 1903.....			March 20, 1903.....		
To warrants drawn as follows:			To warrants drawn as follows:		
No. Date—1904.		Amount.	No. Date—1905.		Amount.
624—July 20.....		\$40 00	1684—Aug. 12.....		\$134 25
1008—July 30.....		1,015 00	2596—Sept. 6.....		17 25
2142—Aug. 30.....		1,015 00	3681—Oct. 4.....		11 25
3104—Sept. 30.....		1,015 00	4234—Oct. 27.....		25 00
3838—Oct. 24.....		75 20	1906.		
4375—Nov. 1.....		1,015 00	8126—Jan. 31.....		75 00
4721—Nov. 17.....		48 95	9860—Mar. 20.....		15 40
5193—Nov. 30.....		1,015 00	10678—April 6.....		11 65
5584—Dec. 3.....		68 60	11567—May 2.....		36 25
6664—Dec. 31.....		1,027 50	11766—May 15.....		59 70
1905.			11925—May 28.....		12 50
10379—Jan. 31.....		1,108 92	12506—June 2.....		133 00
10407—Feb. 2.....		30 00			\$531 25
14194—Feb. 28.....		1,018 35	To balance.....		70,692 46
17298—Mar. 31.....		450 00			\$71,223 71
18169—April 29.....		437 83			
18892—May 4.....		185 00			
19753—May 31.....		445 00			
20402—June 17.....		65 65			
20895—June 30.....		235 00			
		\$10,311 00			
To balance.....		71,223 71			
		\$81,534 71			

PRINTING FUND.

Statement Showing Amount of Printing Done for State Board of Health during the Fifty-sixth Fiscal Year.

By appropriation for fifty-sixth fiscal year.....		\$750 00
By balance from fifty-fifth fiscal year.....		337 25
Total.....		\$1,087 25
1904—July—		
300 Monthly Bulletins for June.....	\$15 50	\$15 50
August—		
1,000 Envelopes, No. 9.....	\$5 00	
300 Monthly Bulletins for July.....	15 00	
		20 00
September—		
300 Monthly Bulletins for August.....	\$15 25	15 25
October—		
300 Monthly Bulletins for September.....	\$15 50	
150 Programs.....	7 50	
		23 00
November—		
250 Monthly Bulletins for October.....	\$5 50	5 50
December—		
2,000 Blank Sheets.....	\$1 00	
1,000 Biennial Reports.....	167 00	
300 Monthly Bulletins for November.....	6 00	
		174 00
1905—January—		
500 Monthly Bulletins for December..	\$7 25	7 25
February—		
500 Monthly Bulletins for January.....	\$9 75	9 75
March—		
300 Monthly Bulletins for February.....	\$8 00	8 00
April—		
150 Programs.....	\$6 50	
300 Monthly Bulletins for March.....	6 00	
		12 50
May—		
625 Letter Heads, Typewriter.....	\$3 50	
300 Monthly Bulletins for April.....	9 25	
500 Birth Certificates.....	12 50	
500 Supplemental Reports of Births.....	6 50	
500 Marriage Certificates.....	12 50	
1,000 Death Certificates, Original.....	17 25	
1,000 Death Certificates, Duplicate.....	11 75	
500 Reports of "No Deaths".....	5 25	
		78 50
June—		
2,500 Directions to Registrars of Deaths.....	\$26 50	
40 Board Covers.....	2 00	
120 Covers.....	8 75	
300 Monthly Bulletins for May.....	10 75	
4,000 Envelopes, No. 6½.....	12 00	
1,000 Envelopes, No. 9.....	5 00	
5 Forms for Vital Statistics (electros).....	47 00	
3,000 Registration Laws.....	55 00	
10,000 Chapters Health Laws.....	317 50	
500 Letter Heads, each member.....	18 00	
250 Envelopes, No. 6½, each member.....	10 75	
4,000 Envelopes, No. 6½.....	13 25	
1,000 Envelopes, No. 9.....	5 00	
2,000 Notices to Undertakers.....	12 00	
3,000 Rules.....	95 00	
2,000 Forms, Cause of Death.....	46 75	
1,000 Registered District Forms.....	31 25	
500 Letter Heads, Typewriter.....	1 50	
		718 00
		\$1,087 25

PRINTING FUND—Continued.

Statement Showing Amount of Printing Done for State Board of Health during the Fifty-seventh Fiscal Year.

By appropriation for fifty-seventh fiscal year	\$1,000 00	
1905—July—		
1,000 Reports of "No Deaths"	\$3 25	
1,000 Certificates of Death, Original	5 50	
500 Monthly Bulletins for June	15 25	
600 Manila Wrappers	50	
August—		\$24 50
2,000 Forms "Cause of Death," and Alterations	\$60 25	
1,000 Registered District Forms	23 00	
500 Cards, G. D. L.	3 00	
2,000 Letter Heads, and one-half furnished	4 25	
600 Manila Wrappers	50	
750 Monthly Bulletins for July	36 75	
1,000 Certificates of Birth	4 75	
1,000 Supplemental Reports of Births	3 75	
1,000 Certificates of Marriage	4 50	
150 Blank Sheets	2 00	
September—		142 75
2,000 Registrar's Accounts	\$12 50	
30,000 Index Cards	39 00	
2,000 Circular Letters, "Sec. 3077"	7 00	
1,000 Manila Wrappers	1 00	
750 Monthly Bulletins for August	35 50	
October—		95 00
1,000 Manila Wrappers	\$1 00	
800 Monthly Bulletins for September	34 50	
November—		35 50
1,000 Manila Wrappers	\$1 00	
800 Monthly Bulletins for October	36 75	
December—		37 75
240 Ruled Sheets (furnished)	\$0 75	
1,500 Health Officers' Reports	9 00	
1,000 Monthly Bulletins for November	36 75	
1906—January—		46 50
1,000 Manila Wrappers	\$0 75	
200 Blank Letter Heads, one half, Typewriter	75	
1,000 Monthly Bulletins for December	27 25	
February—		28 75
500 Letter Heads, Typewriter (furnished)	\$2 25	
500 Letter Heads, Typewriter (furnished)	2 25	
1,200 Monthly Bulletins for January	48 75	
March—		53 25
1,000 Monthly Bulletins for February	\$31 75	
150 Programs	1 75	
2,000 Certificates of Death, Original	9 00	
37 Death Certificates. Binding	37 00	
April—		79 50
1,000 Monthly Bulletins for March	\$28 00	
4,000 Certificates of Death, Duplicate	11 50	
4,000 Certificates of Death, Original	11 50	
May—		51 00
3,000 Certificates of Birth	\$9 50	
3,000 Supplemental Reports of Birth	7 75	
3,000 Certificates of Marriage	9 50	
500 Envelopes, No. 6 $\frac{1}{2}$, reg.	2 75	
600 Letter Heads, Typewriter, reg. (furnished)	2 50	
19 Death Certificates. Binding	19 00	
39 Birth Certificates. Binding	39 00	
1,000 Monthly Bulletins for April	25 50	
June—		115 50
29 Marriage Certificates. Binding	\$29 00	
1,000 Monthly Bulletins for May	25 50	
		54 50
		\$764 50
Balance in fund July 1, 1906		\$235 50

VITAL STATISTICS.

VITAL STATISTICS.

By GEORGE D. LESLIE.

SYNOPSIS OF REGISTRATION LAW.¹

The main points of interest to the general public in the present law for the registration of vital statistics in California may be summarized as follows:

The County Recorder is the sole local registrar for marriages. The local registrar of births is the City Health Officer in the few cities having freeholders' charters, and the County Recorder everywhere else. For deaths, the local registrar in cities having freeholders' charters is the City Health Officer; in other cities and incorporated towns, the City or Town Clerk; and for the remainder of each county, the County Recorder. When public convenience requires, the County Recorder as local registrar may, with the approval of the State Registrar, appoint subregistrars for designated portions of the county. Registrars are required to furnish without charge a sufficient number of copies of the proper certificate to each person upon whom is imposed the duty of certifying to a birth, marriage, or death. The chief duty of each local registrar and subregistrar, however, is to enforce the vital statistics law in his registration district.

The law applies particularly to clergymen, physicians, and undertakers. Every priest, minister of the gospel, justice, or judge who performs a marriage in this State, must within three days after the ceremony file with the County Recorder as local registrar a certificate properly filled out for the marriage performed by him.

Every physician, midwife, nurse, or other person assisting at a birth in California, must within five days thereafter file a certificate of birth with the local registrar, who is the County Recorder, except in the few cities having freeholders' charters, where the City Health Officer so acts. In case the child is not named when the certificate is filed, the local registrar will deliver to the person reporting the birth a supplemental blank for report of the given name, which must be filled out by the parents, next of kin, physician, or midwife, and returned as soon as the child shall be named, the name being then added by the local registrar to the certificate previously filed with him.

Every undertaker engaged for a funeral is held responsible for obtaining and filing a certificate of death with the local registrar or subregistrar, and securing a burial or removal permit prior to any disposition of the body. The local registrar for deaths is the City Health

¹Registration of Births and Marriages, Pol. C. §§3074-3083, as amended, Stats. 1905, Ch. CX, p. 103. Registration of Deaths, Stats. 1905, Ch. CXIX, p. 115, superseding Pol. C. §3084, repealed.

Officer in cities having freeholders' charters, the City or Town Clerk in other cities and incorporated towns, and the County Recorder for the remainder of each county, while subregistrars may also be appointed for designated portions of counties. Ordinarily the undertaker will obtain the personal and statistical particulars required over the signature (or name) and address of a relative or friend of the deceased, though the information may be given by any person, including the undertaker or physician, qualified to supply the facts. Besides the personal and statistical particulars, there is also the medical certificate of death, under which heading the physician certifies to the length of time the deceased received medical attendance, and also to the date and cause of death, including both the primary and immediate and the contributory causes, if any, and the duration of each. Special information is also required for hospitals, institutions, transients, or recent residents. In all cases where death occurs away from the former or usual residence, that residence must be given, together with the length of time at the place of death, and a statement of where the disease was contracted.

It is a misdemeanor for the State Registrar or for any clergyman, physician, undertaker, or other person, to fail, neglect, or refuse to perform any of the duties imposed upon him under the law for the registration of births, marriages, and deaths. It is also a misdemeanor for any local registrar, deputy registrar, or subregistrar to neglect or fail to enforce the provisions of the registration law in his district. At the instance of the State Registrar, the prosecuting attorney or other proper officer of any county or municipality shall forthwith initiate and promptly follow up the necessary court proceedings against parties responsible for alleged violations of the law.

STATISTICS OF BIRTHS: 1905-1906.

Summary.—For 1905-1906, the first year covered by the new birth registration law in California, there were reported a total of 20,909 living births.

San Francisco reported 5,250 births, or 25.1 per cent of all, followed by Los Angeles city, 3,128, and Oakland, 1,397, the cities with the next highest totals being Fresno, Sacramento, San José, Berkeley, Pasadena, and San Diego.

Among the counties, exclusive of freeholders' charter cities, the highest totals are for Santa Clara, 688, Los Angeles, 529, and Fresno, 429, followed by San Bernardino, Riverside, Orange, Tulare, Alameda, Butte, and San Joaquin.

For a State population of 1,784,521 in 1905, estimated conservatively by the Census Bureau method with slight modifications, the 20,909 births in 1905-1906 give a rate of 11.7 per 1,000 population.

The birth-rates are highest for the following cities: Fresno, 29.3; Santa Barbara, 26.9; Pasadena, 25.5; Santa Cruz, 25.0; Grass Valley, 23.7; Berkeley, 19.9, and San Bernardino, 18.6. The rates are also above 15.0 for the cities of Los Angeles, Napa, Watsonville, San José, Vallejo, and Oakland, as well as for the counties of Del Norte, Alpine, Riverside, Modoc, Tulare, Santa Clara, and Stanislaus.

The birth-rate is 14.1 for the twenty cities having freeholders' charters, against only 9.2 for all the rest of the State. Outside these cities where health officers are the registrars it is difficult to make physicians register births, but, nevertheless, several County Recorders as registrars for rural communities have secured complete returns.

The 20,909 babies included 10,835 boys and 10,074 girls, the per cent male being 51.8 and female 48.2. The white babies numbered 20,537, or 98.2 per cent of all, while there were 156 Japanese, 141 Chinese, 70 negroes, and 5 Indians.

No marked differences appear between localities, either in the proportion of the sexes or in the race distribution, though there are great differences in the nativity of the white mothers, especially between sections north and south of Tehachapi, and also between the metropolitan area and the rural counties.

The nativity of the 20,537 white mothers is as follows: Born in California, 7,683, or 37.4 per cent; born in other states (including 172, or 0.8 per cent, of unknown nativity), 7,478, or 36.4 per cent; and foreign born, 5,376, or 26.2 per cent.

South of Tehachapi the great bulk of the white mothers, 59.6 per cent of all, were born elsewhere in the United States than California. But north of Tehachapi, especially far north, the bulk were natives of

the Golden State, the per cent born here being 54.7 for Northern California and 43.2 for Central California.

In Northern and Central California, except in San Francisco and the other bay counties (Alameda, Contra Costa, Marin, and San Mateo), the per cent of white mothers born elsewhere in the United States than California is much greater than the per cent foreign born. For the metropolitan area, comprising San Francisco and the other bay counties, the per cents born in the Golden State and in other States are lower than for the rural counties of Northern and Central California. Conversely, the per cent foreign born among the white mothers is much higher for the metropolitan area than for the rural counties.

City and County Totals.—In accordance with the law of 1905, requiring all County Recorders and the Health Officers of the twenty cities having freeholders' charters, as ex officio local registrars, to transmit monthly to the State Registrar the original birth certificates filed with them, there have been registered in the State Bureau of Vital Statistics a total of 20,909 living births, 10,652 for the last half of 1905 and 10,257 for the first half of 1906. The destruction of over half a month's records for San Francisco in the fire of April 18-20, and the incomplete registration of births in the confused times succeeding this calamity caused the half-year total for that city to fall from 3,309 in 1905 to 1,941 in 1906, and also explains the slight falling off in the State total, the number of births registered outside the metropolis being considerably greater for the first six months of 1906 than for the last six months of 1905.

For births, the registration districts are cities having freeholders' charters, the rural portions of counties containing these cities, and rural counties without any such cities. Of the total 20,909 living births reported for the fiscal year 1905-1906, as many as 5,250, or 25.1 per cent of all, were registered in the City and County of San Francisco, notwithstanding the effects of the great fire in April. Among the freeholders' charter cities Los Angeles is second, with 3,128 living births for the year, and Oakland is third with 1,397. The next highest city totals reported to the State Bureau are: Fresno, 390; Sacramento, 389; San José, 379; Berkeley, 370; Pasadena, 287, and San Diego, 238. Between 100 and 200 living births were registered in Grass Valley, San Bernardino, Santa Barbara, Santa Cruz, Stockton, and Vallejo, and less than 100 for the year in Napa, Salinas, Santa Rosa, and Watsonville. Eureka is the only city having a freeholders' charter for which no vital statistics at all were reported in 1905-1906.

The highest totals for rural counties or the rural portions of counties with freeholders' charter cities are as follows: Santa Clara (outside San José), 688; Los Angeles (outside Los Angeles city and Pasadena), 529; Fresno (outside Fresno city), 429; San Bernardino (outside San Bernardino city), 349; Riverside, 341; Orange, 327; Tulare, 297; Alameda (outside Berkeley and Oakland), 288; Butte, 244, and San Joaquin (outside Stockton), 227. Between 100 and 200 living births were registered in the following rural counties or portions of counties: Calaveras, Contra Costa, El Dorado, Kern, Madera, Marin, Mendocino, Monterey (outside Salinas), Nevada (outside Grass Valley), Sacramento

(outside Sacramento city), San Luis Obispo, San Mateo, Santa Barbara (outside Santa Barbara city), Shasta, Siskiyou, Solano (outside Vallejo), Sonoma (outside Santa Rosa), Stanislaus, and Ventura.

In considering the rank of cities and counties in births reported, it should be understood that the returns are affected not only by the number of living births which actually occurred, but also by the proportion of those which occurred that have been duly registered as required by law. Comparison of the returns for various registration districts indicates that there are marked differences between the districts in the extent to which local registrars have secured a thorough enforcement of the registration law or in the extent to which physicians and midwives have obeyed the law by promptly registering all births.

Birth-rates.—This appears clearly when birth-rates are considered. In order to calculate rates the population of California in 1905 has been estimated conservatively according to the Census Bureau method by adding to the population in 1900 five tenths of the increase between 1890 and 1900, except that for the few counties showing decreases between the last two Federal censuses the population in 1900 has been taken for 1905. For the three principal cities arbitrary estimates have been made because of their exceptionally rapid growth, the estimate for San Francisco in 1905 being 450,000, for Los Angeles 180,000, and for Oakland 90,000. The variations from the standard method made by the Census Bureau in published estimates for Berkeley and San Diego have also been followed, while for other cities the same method of estimating population has been applied as explained above for counties.

For a State population, thus estimated, of 1,784,521 in 1905, the 20,909 living births reported for 1905-1906 give a birth-rate of 11.7 per 1,000 inhabitants. This is surpassed or equaled by the birth-rates for the thirty-one registration districts shown in the table below, the districts being arranged in descending order of birth-rates. The word "rural" after a county indicates that the figures relate to the county exclusive of its freeholders' charter city or cities. For the information of those interested in comparing birth-rates, or checking the calculations, the table gives the estimated population, 1905, and the living births, 1905-1906, as well as the birth-rate per 1,000 population.

TABLE 1.—*Registration Districts with Birth-rates above or equal to the State Average (11.7): 1905-1906.*

REGISTRATION DISTRICT.	Estimated Population: 1905.	Living Births: 1905-1906.	Birth-rate per 1,000 Population.
Fresno city	13,295	390	29.3
Santa Barbara city	6,949	187	26.9
Pasadena city	11,235	287	25.5
Santa Cruz city	5,681	142	25.0
Grass Valley city	4,801	114	23.7
Berkeley town	18,600	370	19.9
San Bernardino city	7,219	134	18.6
Del Norte county	2,408	43	17.9
Alpine county	509	9	17.7
Los Angeles city	180,000	3,128	17.4
Riverside county	20,140	341	16.9
Napa City	4,036	68	16.8
Modoc county	5,121	85	16.6
Watsonville city	4,218	69	16.4
San José city	23,220	379	16.3
Tulare county	18,375	297	16.2
Vallejo city	8,778	141	16.1
Santa Clara county, rural	43,102	688	16.0
Oakland city	90,000	1,397	15.5
Stanislaus county	9,550	147	15.4
Fresno county, rural	29,784	429	14.4
Orange county	22,750	327	14.4
San Bernardino county, rural	24,222	349	14.4
Butte county	17,117	244	14.3
Madera county	7,247	103	14.2
El Dorado county	8,986	124	13.8
Lake county	6,017	82	13.6
Santa Barbara county, rural	13,575	180	13.3
Sacramento city	30,732	389	12.7
San Diego city	18,900	238	12.6
San Francisco city	450,000	5,250	11.7

In addition to the districts ranked in the above table, the only ones with annual birth-rates of at least 10.0 are Santa Rosa city and the counties of Calaveras, Marin, San Benito, San Mateo, San Joaquin (outside Stockton), Sierra, and Sutter.

It will be observed that the registration districts with high birth-rates include nearly all the cities having freeholders' charters, Salinas with 9.8 and Stockton with 8.8 being the only cities with rates below 10.0, and Eureka being the only freeholders' charter city not reporting vital statistics. In fact, for the twenty freeholders' charter cities, with a total estimated population of 916,459, the 12,962 births give a birth-rate of 14.1 per 1,000 inhabitants. But for all the rest of the State, with an estimated population of 868,062, the 7,947 births give a birth-rate of only 9.2, or 4.9 less in each 1,000 than for the cities. As a rule, it is more difficult to secure complete registration of births in rural districts than in urban centers, though there are several counties where the Recorders as local registrars have obtained satisfactory returns of births.

Sex and Race.—The proportion of the sexes among the 20,909 children born in 1905-1906 is: Male, 10,835, or 51.8 per cent; and female, 10,074, or 48.2 per cent. The race distribution is: White, 20,537, or 98.2 per cent; Japanese, 156, or 0.8 per cent; Chinese, 141, or 0.7 per cent; negro, 70, or 0.3 per cent; Indian, 5, or less than one-tenth of 1 per cent. The per cents male and female are the same for the white as for all children, 51.8 and 48.2 per cent, respectively, but among the 372 non-Caucasians the males were 198, or 53.2 per cent, and the females 174, or 46.8 per cent.

No marked differences appear between various sections of California, either in the proportion of the sexes or in the race distribution. Thus, among the several geographic divisions into which the fifty-seven counties of the State have been grouped the per cent male varies only from 52.9 for the interior counties of Central California to 51.1 for the interior counties of Northern California and for the coast counties of Central California. Similarly, the per cent white ranges only from 99.1 for the six counties of Southern California other than Los Angeles to 97.1 for the City and County of San Francisco.

Table 2, below, gives the proportion of the sexes and also the race distribution, in detail, for each geographic division of the State described more particularly on page 86 of this Report, as well as for the metropolitan area in contrast with the rural counties north of Tehachapi.

TABLE 2.—*Living Births classified by Sex and by Race, with Per Cent Distributions, for Geographic Divisions: 1905-1906.*

Geographic Division.	Living Births: 1905-1906.	Male.	Female.	White.	Negro.	Indian.	Chinese.	Japanese.
NUMBERS.								
THE STATE.....	20,909	10,835	10,074	20,537	70	5	141	156
<i>Northern California</i>	2,060	1,058	1,002	2,038	1	4	9	8
Coast counties.....	690	358	332	681	-----	4	2	3
Interior counties....	1,370	700	670	1,357	1	-----	7	5
<i>Central California</i>	12,886	6,672	6,214	12,618	29	-----	120	119
San Francisco.....	5,250	2,695	2,555	5,098	5	-----	92	55
Other bay counties....	2,522	1,306	1,216	2,481	13	-----	5	23
Coast counties.....	1,786	912	874	1,752	2	-----	7	25
Interior counties....	3,328	1,759	1,569	3,287	9	-----	16	16
<i>Southern California</i>	5,963	3,105	2,858	5,881	40	1	12	29
Los Angeles.....	3,944	2,058	1,886	3,881	35	-----	9	19
Other counties.....	2,019	1,047	972	2,000	5	1	3	10
<i>Northern and Central California</i>	14,946	7,730	7,216	14,656	30	4	129	127
Coast counties.....	10,248	5,271	4,977	10,012	20	4	106	106
Interior counties....	4,698	2,459	2,239	4,644	10	-----	23	21
Metropolitan area....	7,772	4,001	3,771	7,579	18	-----	97	78
Rural counties.....	7,174	3,729	3,445	7,077	12	4	32	49
PER CENTS.								
THE STATE.....	100.0	51.8	48.2	98.2	0.3	*	0.7	0.8
<i>Northern California</i>	100.0	51.4	48.6	98.9	0.1	0.2	0.4	0.4
Coast counties.....	100.0	51.9	48.1	98.7	-----	0.6	0.3	0.4
Interior counties....	100.0	51.1	48.9	99.0	0.1	-----	0.5	0.4
<i>Central California</i>	100.0	51.8	48.2	98.0	0.2	-----	0.9	0.9
San Francisco.....	100.0	51.3	48.7	97.1	0.1	-----	1.8	1.0
Other bay counties....	100.0	51.8	48.2	98.4	0.5	-----	0.2	0.9
Coast counties.....	100.0	51.1	48.9	98.1	0.1	-----	0.4	1.4
Interior counties....	100.0	52.9	47.1	98.7	0.3	-----	0.5	0.5
<i>Southern California</i>	100.0	52.1	47.9	98.6	0.7	*	0.2	0.5
Los Angeles.....	100.0	52.2	47.8	98.4	0.9	-----	0.2	0.5
Other counties.....	100.0	51.9	48.1	99.1	0.2	*	0.2	0.5
<i>Northern and Central California</i>	100.0	51.7	48.3	98.1	0.2	*	0.9	0.8
Coast counties.....	100.0	51.4	48.6	97.7	0.2	0.1	1.0	1.0
Interior counties....	100.0	52.3	47.7	98.9	0.2	-----	0.5	0.4
Metropolitan area....	100.0	51.5	48.5	97.5	0.2	-----	1.3	1.0
Rural counties.....	100.0	52.0	48.0	98.6	0.2	0.1	0.4	0.7

sthan one tenth of 1 per cent.

Nativity of Mothers.—However, there are great differences between certain sections of the State in the nativity of the mothers of the white children. These differences are shown in the table below, giving the number and per cent of white mothers born in California, born in other states, and foreign born. The few of unknown nativity, numbering only 172, or 0.8 per cent of all in the entire State, have been included with those born elsewhere in the United States than California. Figures are shown for each of the geographic divisions of the State, and also for the metropolitan area, comprising San Francisco and the other bay counties (Alameda, Contra Costa, Marin, and San Mateo), in contrast with the rural counties of Northern and Central California.

TABLE 3.—*White Mothers classified by Nativity, with Per Cent Distributions, for Geographic Divisions: 1905-1906.*

Geographic Division.	Total White Mothers.	Born in Calif- ornia.	Born in Other States.	Foreign Born.	Per Cent.		
					Born in Calif- ornia.	Born in Other States.	Foreign Born.
THE STATE.....	20,537	7,683	7,478	5,376	37.4	36.4	26.2
<i>Northern California</i>	2,038	1,114	650	274	54.7	31.9	13.4
Coast counties.....	681	331	220	130	48.6	32.3	19.1
Interior counties.....	1,357	783	430	144	57.7	31.7	10.6
<i>Central California</i>	12,618	5,456	3,325	3,837	43.2	26.4	30.4
San Francisco.....	5,098	2,136	943	2,019	41.9	18.5	39.6
Other bay counties.....	2,481	1,039	723	719	41.9	29.1	29.0
Coast counties.....	1,752	782	548	422	44.6	31.3	24.1
Interior counties.....	3,287	1,499	1,111	677	45.6	33.8	20.6
<i>Southern California</i>	5,881	1,113	3,503	1,265	18.9	59.6	21.5
Los Angeles.....	3,881	598	2,360	923	15.4	60.8	23.8
Other counties.....	2,000	515	1,143	342	25.8	57.1	17.1
<i>Northern and Central California</i>	14,656	6,570	3,975	4,111	44.8	27.1	28.1
Coast counties.....	10,012	4,288	2,434	3,290	42.8	24.3	32.9
Interior counties.....	4,644	2,282	1,541	821	49.1	33.2	17.7
Metropolitan area.....	7,579	3,175	1,666	2,738	41.9	22.0	36.1
Rural counties.....	7,077	3,395	2,309	1,373	48.0	32.6	19.4

It appears from the preceding table that of the 20,537 white mothers bearing children in California in 1905-1906, 7,683, or 37.4 per cent, were natives of the Golden State; 7,478, or 36.4 per cent, were natives of other states, and 5,376, or 26.2 per cent, were foreign born. The per cents for Southern California, however, differ greatly from those for either Northern or Central California.

South of Tehachapi the great bulk of the white mothers, 59.6 per cent of all, were born in other states than California. In Los Angeles county the per cent foreign born is even greater than the per cent born in California, though in the other six counties south of Tehachapi the California born mothers at least outnumber the foreign born.

North of Tehachapi, especially far north, the bulk of the white mothers were natives of the Golden State, the per cent born here being

54.7 for Northern California and 43.2 for Central California. In each division of Northern and Central California, except only in San Francisco, the per cent born elsewhere in the United States than California is greater, and except for the other bay counties is much greater than the per cent foreign born.

In San Francisco, as in the rest of Northern and Central California, most of the white mothers were natives of the Golden State. In the metropolis, however, the native daughters bearing children are followed closely by the foreign born, the per cent being 41.9 for the former and 39.6 for the latter, while those born elsewhere in the United States than California comprise only 18.5 per cent of all the white mothers. In the other bay counties (Alameda, Contra Costa, Marin, and San Mateo), where, as in San Francisco, 41.9 per cent of the white mothers were born in California, the per cent born in other states is about the same as the per cent foreign born, 29.1 against 29.0.

For the metropolitan area, comprising San Francisco and the other bay counties, the per cents of white mothers born in California and in other states are lower than the corresponding per cents for the remaining rural counties north of Tehachapi. Conversely, the per cent foreign born is much higher for the metropolitan area than for the rural counties of Northern and Central California.

TABLE 4.—*Estimated Population (1905), Living Births, and Birth-rate per 1,000 Population, for Registration Districts arranged Geographically: 1905-1906.*

Registration District.	Estimated Population: 1905.	Living Births: 1905-1906.	Birth-rate per 1,000 Population.
THE STATE.....	1,784,521	20,909	11.7
<i>Northern California</i>	269,510	2,060	7.6
Coast counties.....	121,785	690	5.7
Del Norte.....	2,408	43	17.9
Humboldt, rural.....	20,360	28	1.4
Eureka city.....	8,562	—	—
Lake.....	6,017	82	13.6
Mendocino.....	21,892	144	6.6
Napa, rural.....	12,435	81	6.5
Napa City.....	4,036	68	16.8
Sonoma, rural.....	33,960	159	4.7
Santa Rosa city.....	7,400	74	10.0
Trinity.....	4,715	11	2.3
Interior counties.....	147,725	1,376	9.3
Butte.....	17,117	244	14.3
Colusa.....	7,364	73	9.9
Glenn.....	5,150	38	7.4
Lassen.....	4,647	46	9.9
Modoc.....	5,121	85	16.6
Nevada, rural.....	13,198	128	9.7
Grass Valley city.....	4,801	114	23.7
Placer.....	16,129	43	2.7
Plumas.....	4,657	38	8.2
Shasta.....	19,911	161	8.1
Sierra.....	4,017	45	11.2
Siskiyou.....	19,362	176	9.1
Sutter.....	6,095	61	10.0
Tehama.....	11,536	54	4.7
Yuba.....	8,620	64	7.4
<i>Central California</i>	1,105,090	12,886	11.7
San Francisco.....	450,000	5,250	11.7
Other bay counties.....	216,127	2,522	11.7
Alameda, rural.....	57,100	288	5.0
Berkeley town.....	18,600	370	19.9
Oakland city.....	90,000	1,397	15.5
Contra Costa.....	20,312	135	6.6
Marin.....	17,017	186	10.9
San Mateo.....	13,098	146	11.1
Coast counties.....	132,371	1,786	13.5
Monterey, rural.....	15,965	147	9.2
Salinas City.....	3,787	37	9.8
San Benito.....	6,744	73	10.8
San Luis Obispo.....	16,920	165	9.8
Santa Clara, rural.....	43,102	688	16.0
San José city.....	23,220	379	16.3
Santa Cruz, rural.....	12,734	86	6.8
Santa Cruz city.....	5,681	142	25.0
Watsonville city.....	4,218	69	16.4

TABLE 4.—*Estimated Population (1905), Living Births, and Birth-rate per 1,000 Population, for Registration Districts arranged Geographically: 1905-1906—Continued.*

Registration District.	Estimated Population: 1905.	Living Births 1905-1906.	Birth-rate per 1,000 Population.
<i>Central California—Continued:</i>			
Interior counties	306,592	3,328	10.9
Alpine	509	9	17.7
Amador	11,514	47	4.1
Calaveras	12,359	129	10.4
El Dorado	8,986	124	13.8
Fresno, rural	29,784	429	14.4
Fresno city	13,295	390	29.3
Inyo	4,794	30	6.3
Kern	19,816	161	8.1
Kings	12,044	77	6.4
Madera	7,247	103	14.2
Mariposa	5,187	23	4.4
Merced	9,780	57	5.8
Mono	2,250	6	2.7
Sacramento, rural	17,971	146	8.1
Sacramento city	30,732	389	12.7
San Joaquin, rural	19,818	227	11.5
Stockton city	19,046	168	8.8
Solano, rural	16,964	135	8.0
Vallejo city	8,778	141	16.1
Stanislaus	9,550	147	15.4
Tulare	18,375	297	16.2
Tuolumne	13,708	11	0.8
Yolo	14,085	82	5.8
<i>Southern California</i>	409,921	5,963	14.5
Los Angeles	259,000	3,944	15.2
Los Angeles, rural	67,765	529	7.8
Los Angeles city	180,000	3,128	17.4
Pasadena city	11,235	287	25.5
Other counties	150,921	2,019	13.4
Orange	22,750	327	14.4
Riverside	20,140	341	16.9
San Bernardino, rural	24,222	349	14.4
San Bernardino city	7,219	134	18.6
San Diego, rural	20,651	149	7.2
San Diego city	18,900	238	12.6
Santa Barbara, rural	13,575	180	13.3
Santa Barbara city	6,949	187	26.9
Ventura	16,515	114	6.9
<i>Northern and Central California</i>	1,374,600	14,946	10.9
Coast counties	920,283	10,248	11.1
Interior counties	454,317	4,698	10.3
Metropolitan area	666,127	7,772	11.7
Rural counties	708,473	7,174	10.1

TABLE 5.—*Living Births Classified by Sex, Race, and*

Registration District.	Living Births: 1905-1906.	Male.	Female.
THE STATE	20,909	10,835	10,074
Northern California	2,060	1,058	1,002
Coast counties	690	358	332
Del Norte	43	24	19
Humboldt, rural	28	14	14
Eureka city			
Lake	82	41	41
Mendocino	144	67	77
Napa, rural	81	45	36
Napa City	68	32	36
Sonoma, rural	159	84	75
Santa Rosa city	74	44	30
Trinity	11	7	4
Interior counties	1,370	700	670
Butte	244	122	122
Colusa	73	40	33
Glenn	38	14	24
Lassen	46	24	22
Modoc	85	47	38
Nevada, rural	128	60	68
Grass Valley city	114	54	60
Placer	43	27	16
Plumas	38	20	18
Shasta	161	82	79
Sierra	45	25	20
Siskiyou	176	88	88
Sutter	61	31	30
Tehama	54	33	21
Yuba	64	33	31
Central California	12,886	6,672	6,214
San Francisco	5,250	2,695	2,555
Other bay counties	2,522	1,306	1,216
Alameda, rural	288	150	138
Berkeley town	370	202	168
Oakland city	1,397	688	709
Contra Costa	135	78	57
Marin	186	103	83
San Mateo	146	85	61
Coast counties	1,786	912	874
Monterey, rural	147	73	74
Salinas City	37	15	22
San Benito	73	32	41
San Luis Obispo	165	77	88
Santa Clara, rural	688	345	343
San José city	379	212	167
Santa Cruz, rural	86	47	39
Santa Cruz city	142	75	67
Watsonville city	69	36	33

Nativity of Mothers, for Registration Districts: 1905-1906.

White.			Negro.	Indian.	Chinese.	Japa- nese.	White Mothers.			
Total.	Male.	Female.					Born in Cali- fornia.	Born in Other States.	For- eign Born.	Nativity Un- known.
20,537	10,637	9,900	70	5	141	156	7,683	7,306	5,376	172
2,038	1,043	995	1	4	9	8	1,114	617	274	33
681	351	330		4	2	3	331	210	130	10
43	24	19					14	25	4	
28	14	14					7	6	10	5
82	41	41					49	24	9	
139	63	76		4		1	87	35	16	1
81	45	36					34	17	29	1
68	32	36					37	23	8	
155	81	74			2	2	69	49	34	3
74	44	30					26	29	19	
11	7	4					8	2	1	
1,357	692	665	1		7	5	783	407	144	23
242	122	120			2		125	87	18	12
72	39	33			1		44	18	8	2
38	14	24					30	7	1	
46	24	22					29	14	2	1
85	47	38					48	33	4	
126	58	68			2		74	31	21	
114	54	60					67	22	23	2
38	23	15				5	22	12	3	1
38	20	18					23	6	9	
160	81	79	1				87	62	11	
45	25	20					37	6	2	
176	88	88					88	53	32	3
61	31	30					37	17	6	1
54	33	21					27	26		1
62	33	29			2		45	13	4	
12,618	6,527	6,091	29		120	119	5,456	3,244	3,837	81
5,098	2,612	2,486	5		92	55	2,136	921	2,019	22
2,481	1,279	1,202	13		5	23	1,039	716	719	7
286	149	137	1			1	126	66	93	1
365	199	166				5	148	139	78	
1,366	668	698	11		3	17	566	412	386	2
135	78	57					58	36	39	2
185	102	83			1		84	34	65	2
144	83	61	1		1		57	29	58	
1,752	895	857	2		7	25	782	530	422	18
135	66	69			2	10	72	24	39	
34	13	21			2	1	21	8	5	
72	32	40	1				45	15	12	
164	78	87			1		95	39	30	
685	344	341				3	248	225	197	15
376	210	166	1		2		161	116	96	3
83	45	38				3	41	28	14	
141	75	66				1	63	57	21	
62	33	29				7	36	18	8	

TABLE 5.—*Living Births Classified by Sex, Race, and Nativity*

Registration District.	Living Births: 1905-1906.	Male.	Female.
<i>Central California—Continued.</i>			
Interior counties	3,328	1,759	1,569
Alpine	9	5	4
Amador	47	26	21
Calaveras	129	70	59
El Dorado	124	63	61
Fresno, rural	429	225	204
Fresno city	390	202	188
Inyo	30	20	10
Kern	161	92	69
Kings	77	34	43
Madera	103	54	49
Mariposa	23	11	12
Merced	57	25	32
Mono	6	2	4
Sacramento, rural	146	74	72
Sacramento city	389	192	197
San Joaquin, rural	227	130	97
Stockton city	168	99	69
Solano, rural	135	68	67
Vallejo city	141	77	64
Stanislaus	147	87	60
Tulare	297	153	144
Tuolumne	11	9	2
Yolo	82	41	41
<i>Southern California</i>	5,963	3,105	2,858
Los Angeles	3,944	2,058	1,886
Los Angeles, rural	529	270	259
Los Angeles city	3,128	1,633	1,495
Pasadena city	287	155	132
Other counties	2,019	1,047	972
Orange	327	171	156
Riverside	341	188	153
San Bernardino, rural	349	188	161
San Bernardino city	134	69	65
San Diego, rural	149	67	82
San Diego city	238	130	108
Santa Barbara, rural	180	91	89
Santa Barbara city	187	85	102
Ventura	114	58	56
<i>Northern and Central California</i>	14,946	7,730	7,216
Coast counties	10,248	5,271	4,977
Interior counties	4,698	2,459	2,239
Metropolitan area	7,772	4,001	3,771
Rural counties	7,174	3,729	3,445

of Mothers, for Registration Districts: 1905-1906—Continued.

White.			Negro.	Indian.	Chinese.	Japa- nese.	White Mothers.			
Total.	Male.	Female.					Born in Cali- fornia.	Born in Other States.	For- eign Born.	Nativity Un- known.
3,287	1,741	1,546	9		16	16	1,499	1,077	677	34
9	5	4					7	2		
47	26	21					29	12	6	
129	70	59					101	14	14	
123	63	60			1		93	22	8	
426	223	203	2		1		116	189	120	1
384	200	184	4		1	1	131	155	96	2
30	20	10					15	13	2	
155	89	66			3	3	49	63	43	
76	34	42				1	27	36	12	1
103	54	49					43	33	19	8
23	11	12					18	3	1	1
57	25	32					24	9	24	
6	2	4					4	2		
141	71	70			3	2	69	32	37	3
379	187	192			4	6	177	106	81	15
226	130	96				1	108	74	43	1
165	99	66	1		2		108	36	21	
135	68	67					68	28	39	
138	75	63	2		1		71	24	43	
147	87	60					65	50	31	1
297	153	144					118	152	26	1
11	9	2					9		2	
80	40	40				2	49	22	9	
5,881	3,067	2,814	40	1	12	29	1,113	3,445	1,265	58
3,881	2,030	1,851	35		9	19	598	2,337	923	23
527	269	258	2				106	312	103	6
3,068	1,606	1,462	32		9	19	461	1,821	770	16
286	155	131	1				31	204	50	1
2,000	1,037	963	5	1	3	10	515	1,108	342	35
325	171	154	1			1	77	198	46	4
331	181	150	3	1		6	57	213	51	10
349	188	161					51	237	60	1
133	69	64	1				35	69	26	3
149	67	82					31	80	29	9
238	130	108					38	146	53	1
177	90	87			2	1	97	46	31	3
186	85	101			1		84	66	36	
112	56	56				2	45	53	10	4
14,656	7,570	7,086	30	4	129	127	6,570	3,861	4,111	114
10,012	5,137	4,875	20	4	106	106	4,288	2,377	3,290	57
4,644	2,433	2,211	10		23	21	2,282	1,484	821	57
7,579	3,891	3,688	18		97	78	3,175	1,637	2,738	29
7,077	3,679	3,398	12	4	32	49	3,395	2,224	1,373	85

PROPORTION OF CHILDREN: 1850 TO 1900.¹

Children to Potential Mothers.—The proportion of children to potential mothers, or women of child-bearing age, is the only index of the birth-rate available for past decades, since the registration of births for statistical purposes is comparatively recent either in the United States as a whole or in the single State of California. The proportion can be calculated from the figures of the Federal Census as far back as 1850, the year when California was admitted to the Union.

The following table shows the proportion of children under 5 years of age to women 15 to 49 years of age for continental United States and California at each census from 1850 to 1900:

	1900.	1890.	1880.	1870.	1860.	1850.
United States	474	485	559	572	634	626
California	340	378	504	620	716	479

In California, as in the entire country, the proportion of children rose somewhat between 1850 and 1860, but declined steadily in each succeeding decade. Conditions in California were so exceptional in 1850 that the figures for that census should be disregarded. In the forty years from 1860 to 1900, when the proportion for the United States fell from 634 to 474, or a drop of 160 in the 1,000, there was a drop of 376 in the 1,000 for California, the proportion falling from 716 to 340. Although the proportion of children to women was much greater for the Golden State than for the entire country in 1860 and 1870, this superiority no longer continues, the proportion having been less for California than for the United States at the censuses from 1880 to the one last taken.

Comparisons between this State and the whole country are best confined to figures for whites alone, since the negro population of the South has an appreciable effect upon the totals for the United States. In the table below, therefore, corresponding figures are given for merely the white population of continental United States and California:

	1900.	1890.	1880.	1870.	1860.	1850.
United States	465	473	537	562	627	613
California	338	379	513	643	764	484

The exceptional figures for 1850 being disregarded, it appears that the proportion of white children under 5 to white women 15 to 49 in California was much greater than in the United States at the censuses before 1880, but that it has been less, and increasingly so, at the censuses since then. In 1860 the proportion for the Golden State exceeded

¹ Figures drawn mainly from article on Proportion of Children, in Supplementary Analysis of Twelfth Census, Washington, D. C., 1906.

that for the whole country by 137 in the 1,000, and in 1870 by 81. In 1880, however, this had shifted to an excess of 26 in the proportion for the United States over that for California, which rose to 94 in 1890 and 127 in 1900. The excess of 137 in the proportion for California in 1860 changed to an excess of 127 in the proportion for the United States in 1900. While the proportion of white children to white women 15 to 49 years of age in the United States in 1900 was still about three fourths as great as the maximum for 1860, the proportion for California in 1900 was less than half as great as that in 1860.

The age groups employed in the early censuses made it necessary to calculate the proportion of children with respect to women 15 to 49 years of age, though 15 to 44 is usually regarded as the period of fecundity. The proportion of children under 5 to women of the usual child-bearing age, 15 to 44 years, is obtainable for each census since 1870, and the figures for the total and white population are as follows for continental United States and California, respectively:

TOTAL.	1900.	1890.	1880.	1870.
United States	518	529	609	620
California	372	414	552	661
WHITE.				
United States	508	517	586	610
California	371	415	562	687

Attention is best fixed on the proportion of white children under 5 to white women 15 to 44 years of age. In 1870 the proportion for California exceeded that for the United States by 77, but at every census thereafter the excess was on the side of the United States, the proportion exceeding that for California by 44 in 1880, 102 in 1890, and 137 in 1900. The proportion of white children to white women of child-bearing age in the country as a whole fell from 610 in 1870 to 508 in 1900, a decline of 102 or one sixth in the thirty years. The decline in the proportion for the Golden State alone, however, was much more rapid, the change being from 687 in 1870 to only 371 in 1900, a drop of 316 or nearly half in the thirty-year period.

Cities and Rural Districts.—For the decade 1890–1900 contrasts can be drawn between the proportion of children to women in cities having at least 25,000 inhabitants on one hand and smaller cities and rural districts on the other. The figures for the total and white population of continental United States and California are as follows:

	Total.		White.	
	1900.	1890.	1900.	1890.
UNITED STATES.				
Cities of 25,000	390	401	399	407
Rural districts	572	574	559	559
CALIFORNIA.				
Cities of 25,000	294	329	293	331
Rural districts	427	470	425	471

In the country as a whole the proportion of children decreased between 1890 and 1900 only in cities having at least 25,000 inhabitants,

and even there by only about one fortieth. The proportion in California, however, decreased by approximately one tenth not only for such cities as a class, but also for the rural districts outside them as well.

The following table gives corresponding figures for the principal cities of this State:

City.	Total.		White.	
	1900.	1890.	1900.	1890.
San Francisco.....	297	322	296	324
Los Angeles.....	280	352	279	354
Oakland.....	304	349	306	349
Sacramento.....	286	320	285	320

At the last census the proportion of children to women of child-bearing age was highest for Oakland, next for San Francisco and Sacramento, and lowest for Los Angeles, where also the decrease was most marked, Los Angeles having had the highest proportion at the preceding census in 1890.

The analysis may be extended further by considering the proportion of children under 5 to white women 15 to 44 distinguished as native and foreign-born. This is done by comparing the proportion of native white children having native mothers per 1,000 native white women with the proportion of native white children having foreign mothers per 1,000 foreign-born white women. The results of the calculations appear in the following table for the cities of 25,000 population and the rural districts of continental United States and California at the last two censuses:

	Native.		Foreign.	
	1900.	1890.	1900.	1890.
UNITED STATES.....	462	475	710	666
Cities of 25,000.....	296	309	612	565
Rural districts.....	522	522	841	776
CALIFORNIA.....	308	352	610	575
Cities of 25,000.....	220	241	505	485
Rural districts.....	365	414	726	678

This table shows that the proportion of children, or the apparent birth-rate, decreased in the decade only for native white women. For the United States as a whole the decrease appeared only in cities having at least 25,000 inhabitants, but for California the proportion decreased for native white women not only in the principal cities, but also outside them. The increase in the proportion of children to foreign-born white women, whether in city or country, was only slightly less marked for California than for the United States. In all cases the proportion of children to women of child-bearing age in cities of 25,000 population as a class is considerably less than in the smaller cities and rural districts grouped together.

The corresponding figures for the principal California cities are as follows:

City.	Native.		Foreign.	
	1900.	1890.	1900.	1890.
San Francisco	208	217	512	487
Los Angeles	237	313	448	455
Oakland	238	275	518	481
Sacramento	237	254	548	546

The proportion of children to native white women was lowest at each census for San Francisco, where, however, there was only a slight decrease between 1890 and 1900. The proportion was about the same in 1900 for each of the three remaining cities, though the decrease in the decade was greatest for Los Angeles and least for Sacramento. Los Angeles is also the only one of the four cities of 25,000 population in California to show any decrease in the proportion of children to foreign-born white women. This proportion increased most in 1890-1900 in Oakland and next in San Francisco. Though there was only a slight increase for Sacramento, the State capital has the distinction of being the city where the proportion of children to foreign women was decidedly highest at each census.

Children to Married Women.—The closest approximation to a birth-rate obtainable from the Federal Census is found by comparing the children under 5 with the married women of child-bearing age, 15 to 44 years. The proportions for the total and white population respectively are shown herewith as far as the published data permit the calculations to be carried:

	Total.		White.	
	1900.	1890.	1900.	1890.
UNITED STATES	929	957	908	934
Cities of 100,000	773	811	787	822
Rest of country	967	985	941	958
CALIFORNIA	692	764	692	768
Cities of 100,000	582	655	582	662
San Francisco	598	655	599	662
Los Angeles	534	---	532	---
Rest of State	743	801	743	804

In the United States as a whole, the proportion of children to married women of child-bearing age decreased considerably more in 1890-1900 for cities having at least 100,000 inhabitants than for the rest of the country, but in California the decrease in the decade was only slightly more for such cities as a class than for all the rest of the State. The rise of Los Angeles above the 100,000 limit of population between 1890 and 1900 had the effect of reducing the proportion of children to married women for this class of cities in California, as the proportion was much lower in 1900 for Los Angeles than for San Francisco. In California as in the United States the proportion of children to married women is very much less in cities of 100,000 population than outside them.

Corresponding proportions may also be calculated for married white women distinguished as native and foreign-born, as follows:

	Native.		Foreign.	
	1900.	1890.	1900.	1890.
UNITED STATES -----	862	894	1,058	1,024
Cities of 100,000 -----	643	691	963	934
Rest of country -----	902	923	1,128	1,075
CALIFORNIA -----	618	708	891	861
Cities of 100,000 -----	477	533	780	772
San Francisco -----	478	533	795	772
Los Angeles -----	476	---	709	---
Rest of State -----	674	750	969	916

The table shows that the proportion of children to native white married women decreased in 1890-1900 both for the Golden State and the entire nation, and that while the decrease for the United States was most marked in cities of 100,000 population, that for California was most marked outside them. On the other hand, the proportion of children to foreign-born white married women increased appreciably in the decade, the increase for both State and nation being particularly great outside cities of 100,000 population, especially in California.

Conclusion.—The conclusions drawn from the statistics of the Federal Census may now be summarized. Although the proportion of children under 5 to women 15 to 49 in California was above the average for the United States in 1860 and 1870, it fell somewhat below the general average in 1880 and was still further below in 1890 and 1900. While the number of children per 1,000 white women of the age specified decreased by one fourth for the United States in the forty years, 1860-1900, it decreased by about half for California. Similarly in the thirty-year period, 1870-1900, when the proportion of children to white women 15 to 44 years old declined by one sixth for the entire country, it declined by nearly half for this State alone. The decrease in the proportion of children, or the fall in the approximate birth-rate, in the decade 1890-1900 was confined to cities of 25,000 population in the United States as a whole, but in California appeared also among the inhabitants of rural districts outside such cities. The proportion is invariably less in cities of 25,000 population as a class than in smaller cities and rural districts grouped together. The fall in the birth-rate is limited to native white women, both in State and nation and in cities and rural districts. Increases appear in the proportion of children to foreign-born white women, and the increases in California, whether for city or country, are almost as great as for the whole United States. Generally speaking, the proportion of children has fallen not only with respect to all women of child-bearing age, but also in comparison with merely the married women of this age. The decrease appears both in cities of 100,000 population and outside them, whether for State or nation, but as before is limited to native white married women, the proportion of children to the married as to all foreign-born white women having increased in the decade 1890-1900. The decrease in the proportion of children to native white married women in the United States

was mainly in cities of 100,000 population, but in California was somewhat more marked outside than within such cities. The increase in the proportion for married women of foreign birth, for both State and nation, was particularly great outside cities of 100,000 population, the relative increase being even greater for California than for the United States.

Of the principal cities in the Golden State, Oakland, in 1900, had the highest proportion of children to women of child-bearing age, San Francisco and Sacramento the next highest, and Los Angeles the lowest. Los Angeles, however, had the highest proportion in 1890, the decrease for this city in the decade having been very rapid. The proportion of children to native white women was lowest both in 1900 and 1890 for San Francisco, and at the last census was not far from the same for each of the three remaining cities. Los Angeles alone shows a decrease in the proportion of children per 1,000 foreign-born white women. This proportion increased most between 1890 and 1900 in Oakland and next in San Francisco, but nevertheless was decidedly highest at each census in Sacramento. The proportion of children under 5 to married women 15 to 44, whether native or foreign born, was less for Los Angeles than for San Francisco in 1900.

The relatively low and decreasing proportion of children to women of child-bearing age shown for Los Angeles suggests a partial explanation for the fact that the proportion for California has fallen even more rapidly than that for the United States. The population of California, instead of growing only by excess of births over deaths, increases largely by adult migration from Eastern states and foreign countries. The arrival in the State of many adults seldom accompanied by young children adds greatly to the number of potential mothers without making any corresponding increase in the number of children recently born, and so tends to depress the apparent birth-rate as measured roughly by the proportion of children under 5 years old to women of child-bearing age. As the center for much migration of this kind from Eastern states, Los Angeles shows a particularly marked decrease in the proportion of children.

However, even if allowance were made for the influence of the factor mentioned, the figures would still probably show that the proportion of children to women has declined in the Golden State no less than in the entire country because of an actual decrease in the birth-rate. Though "race suicide" does not prevail in the foreign-born white population of either California or the United States, it evidently exists to some extent in the native white population living here as elsewhere. Whether the birth-rate, or the proportion of children, is higher or lower for California-born women than for other natives of the United States can not be determined from the present figures of the Federal Census, but only from a future analysis of statistical data obtained in the registration of births as now required by the State law.

STATISTICS OF MARRIAGES: 1905-1906.

Summary.—Altogether 17,932 marriages were reported to the California State Bureau of Vital Statistics in 1905-1906, the first year covered by the new law requiring marriages to be registered.

San Francisco reported 4,230 marriages, or 23.6 per cent of the State total, despite the loss of records in April, 1906.

There were also over 2,000 marriages for the year in Los Angeles and Alameda counties; between 600 and 1,000 in Santa Clara, Sacramento, and Marin; and between 400 and 500 in Fresno, San Diego, San Joaquin, San Bernardino, and Orange.

For an estimated State population of 1,784,521 in 1905 the 17,932 marriages in 1905-1906 give a rate of 10.0 per 1,000 population, though complete returns from Los Angeles county for the year would make the State rate 11.1 instead.

The marriage-rate is higher for the seven counties of Southern California than for the fifty north of Tehachapi. The rate is also higher for the metropolitan area, comprising San Francisco and the other bay counties, than for the rural counties of Northern and Central California.

Among the individual counties, Marin shows the highest marriage-rate, 36.4 per 1,000 population, followed by Orange 18.5, San Mateo 17.9, Sacramento 17.0, and Los Angeles 15.6 (corrected rate). The marriage-rates are also above the State average, 10.0, for the following counties: San Bernardino, Santa Clara, Alameda, Riverside, San Diego, San Joaquin, Fresno, Tulare, Santa Barbara, Stanislaus, and San Luis Obispo.

The statistics indicate that there is a decided tendency for persons living in rural counties to be married at the largest city easily accessible. This seems the readiest explanation of the relatively high marriage-rates not only for the metropolitan area in Northern and Southern California and for Los Angeles county in Southern California, but also for the counties containing such cities as Sacramento, San José, Stockton, Fresno, Visalia, Modesto, and San Luis Obispo.

There is also a counter movement by which residents of very large cities, like San Francisco or Los Angeles, prefer to be married in suburban counties. Thus it happens that the marriage-rates are much higher for Marin, San Mateo, and Alameda counties than for the metropolis itself, and that in Southern California the rate is highest for Orange rather than for Los Angeles county. This movement is particularly marked on San Francisco Bay, where San Rafael, in Marin county, is a veritable Gretna Green, especially, as shown later, for divorcees.

In 13,182 of the 17,932 marriages in 1905-1906, or 73.5 per cent of all cases, the marriage was the first for both parties. The per cent of first marriages is highest, 76.8, for the coast counties of Northern California, followed by 76.2 for the interior counties of Central California and 76.0 for San Francisco.

While 1,958 single men were married to widowed or divorced women, only 1,450 single women were married to widowed or divorced men. In fact, only nine of the fifty-seven counties show exceptions to the

rule that there are more unions of bachelors with widows than of maids with widowers.

In 1,342 instances, or 7.5 per cent of all, the marriage was the second or over of both parties. The per cent of marriages where both parties had been married before is particularly high for Southern California, especially outside Los Angeles, and for the bay counties other than San Francisco. Though among the eight minor geographic divisions, San Francisco has the lowest per cent of such marriages, yet the per cent is somewhat higher for the metropolitan area than for the rural counties of Northern and Central California.

Altogether 15,140 or 84.4 per cent of the grooms were single, 1,655 widowed, and 1,137 divorced; while of the brides 14,632 or 81.6 per cent were single, 1,891 widowed, and 1,409 divorced. The widows outnumber the widowers by 236 or 14.3 per cent, and among the divorced the women exceed the men by 272 or 23.9 per cent.

The per cent of widowers is particularly high only in Southern California, especially outside Los Angeles, but the per cent of widows is relatively high, not only in Southern California, but also in both the coast and interior counties of Northern California.

The per cent divorced, both among grooms and brides, is highest for the bay counties other than San Francisco, and next for Southern California, especially outside Los Angeles, being highest south of Tehachapi in Orange county.

Though the per cent of divorced brides is 7.9 for all California and only 7.4 for San Francisco, it is 8.9 for Alameda, 9.0 for Contra Costa, 14.1 for San Mateo, and 15.5 for Marin. It appears, therefore, that the tendency for residents of the metropolis to be married in suburban counties is particularly strong among divorcees.

County Totals.—Under the law of 1905 requiring County Recorders as local registrars to transmit to the State Registrar the original marriage certificates filed with them each month, 17,932 marriages were registered in the California State Bureau of Vital Statistics for 1905–1906. The total for the last half of 1905 was 8,338, against 9,594 for the first half of 1906.

Table 1, below, shows the counties for which at least 100 marriages were reported to the State Bureau of Vital Statistics in 1905–1906:

TABLE 1.—*Rank of Counties with at Least 100 Marriages: 1905–1906.*

Rank.	County.	Marriages: 1905–1906.	Rank.	County.	Marriages: 1905–1906.
	THE STATE.....	17,932	17.	Tulare	205
1.	San Francisco ...	4,230	18.	Mendocino	181
2.	Los Angeles.....	*2,241	19.	San Luis Obispo.....	179
3.	Alameda	2,221	20.	Humboldt	170
4.	Santa Clara	921	21.	Napa	159
5.	Sacramento	826	22.	Solano	158
6.	Marin	619	23.	Contra Costa.....	155
7.	Fresno	491	24.	Monterey	153
8.	San Diego	480	25.	Kern	140
9.	San Joaquin.....	456	26.	Ventura	137
10.	San Bernardino ..	453	27.	Shasta	132
11.	Orange	421	28.	Nevada	118
12.	Riverside	266	29.	Kings	112
13.	Sonoma	237	30.	Siskiyou	111
14.	San Mateo	235	31.	Stanislaus	104
15.	Santa Barbara	226	32.	Butte	103
16.	Santa Cruz	225		Remaining 25 counties.....	1,067

*Returns incomplete.

Despite the destruction of certificates for more than one half of April, 1906, and incomplete registration in the confusion following the great fire, San Francisco with 4,230 marriages properly registered contributes 23.6 per cent of the State total. The returns for Los Angeles cover little over half a year, the first certificates received having been for December, 1905. Complete returns for the whole twelve months would have made the total for Los Angeles county nearer that for San Francisco. In Alameda county, as well as San Francisco and Los Angeles, over 2,000 marriages were registered in 1905-1906.

With regard to the number of marriages registered, the counties fall into several groups. First, there is a group of 3 counties, each with over 2,000 marriages in the year; next comes another group of 3 counties, each with between 600 and 1,000 marriages in the year; then a group of 5, each with from 400 to 500 marriages; then a group of 6, with from 200 to 300 marriages; and then a group of 15 with from 100 to 200 marriages.

In addition to the 32 counties ranked in Table 1, there were 9 with from 50 to 100 marriages in the year, viz.: Amador, Calaveras, El Dorado, Merced, San Benito, Tehama, Tuolumne, Yolo, and Yuba; 10 with from 25 to 50 marriages, viz.: Colusa, Glenn, Inyo, Lake, Lassen, Madera, Modoc, Placer, Plumas, and Sutter; and 6 with less than 25 marriages each, viz.: Alpine, Del Norte, Mariposa, Mono, Sierra, and Trinity.

Marriage-rates.—For the purpose of calculating marriage-rates, the population of California in 1905 has been estimated conservatively according to the Census Bureau method by adding to the population in 1900 five tenths of the increase between 1890 and 1900, except that for the few counties showing decreases between the last two Federal censuses the population in 1900 has been taken for 1905, and for the three principal cities arbitrary estimates have been made because of their exceptionally rapid growth. The estimate for San Francisco in 1905 is 450,000, for Los Angeles, 180,000, and for Oakland, 90,000. As a bulk of the marriage returns for 1905-1906 were not affected by the public calamity in April, 1906, no estimates have been changed on account of temporary readjustments of population caused by the San Francisco fire. For convenience in tabulation, the fifty-seven counties of California have been grouped in three main and eight minor geographic divisions, which appear in Table 2, the counties in each group being arranged alphabetically for the sake of ready reference. Marriage-rates are also shown for the metropolitan area, comprising San Francisco and the other bay counties (Alameda, Contra Costa, Marin, and San Mateo) in contrast with the rural counties of Northern and Central California.

TABLE 2.—*Estimated Population (1905), Marriages, and Marriage-rate per 1,000 Population, for Counties arranged Geographically: 1905-1906.*

County.	Estimated Population: 1905.	Marriages: 1905-1906.	Marriage- rate per 1,000 Population.
THE STATE.....	1,784,521	17,932	*10.0
<i>Northern California</i>	269,510	1,693	6.3
Coast counties.....	121,785	806	6.6
Del Norte.....	2,408	15	6.2
Humboldt.....	28,922	170	5.9
Lake.....	6,017	32	5.3
Mendocino.....	21,892	181	8.3
Napa.....	16,471	159	9.7
Sonoma.....	41,360	237	5.7
Trinity.....	4,715	12	2.5
Interior counties.....	147,725	887	6.0
Butte.....	17,117	103	6.0
Colusa.....	7,364	38	5.2
Glenn.....	5,150	35	6.8
Lassen.....	4,647	30	6.5
Modoc.....	5,121	44	8.6
Nevada.....	17,999	118	6.6
Placer.....	16,129	41	2.5
Plumas.....	4,657	30	6.4
Shasta.....	19,911	132	6.6
Sierra.....	4,017	16	4.0
Siskiyou.....	19,362	111	5.7
Sutter.....	6,095	35	5.7
Tehama.....	11,536	81	7.0
Yuba.....	8,620	73	8.5
<i>Central California</i>	1,105,090	12,015	10.9
San Francisco.....	450,000	4,230	9.4
Other bay counties.....	216,127	3,230	14.9
Alameda.....	165,700	2,221	13.4
Contra Costa.....	20,312	155	7.6
Marin.....	17,017	619	36.4
San Mateo.....	13,098	235	17.9
Coast counties.....	132,371	1,544	11.7
Monterey.....	19,752	153	7.7
San Benito.....	6,744	66	9.8
San Luis Obispo.....	16,920	179	10.6
Santa Clara.....	66,322	921	13.9
Santa Cruz.....	22,633	225	9.9
Interior counties.....	306,592	3,011	9.8
Alpine.....	509	1	2.0
Amador.....	11,514	56	4.9
Calaveras.....	12,359	51	4.1
El Dorado.....	8,986	56	6.2
Fresno.....	43,079	491	11.4
Inyo.....	4,794	30	6.3
Kern.....	19,816	140	7.1
Kings.....	12,044	112	9.3
Madera.....	7,247	40	5.5
Mariposa.....	5,187	11	2.1
Merced.....	9,780	75	7.7
Mono.....	2,250	5	2.2
Sacramento.....	48,703	826	17.0
San Joaquin.....	38,864	456	11.7
Solano.....	25,742	158	6.1
Stanislaus.....	9,550	104	10.9
Tulare.....	18,375	205	11.2
Tuolumne.....	13,708	99	7.2
Yolo.....	14,085	95	6.7

TABLE 2.—*Estimated Population (1905), Marriages, and Marriage-rate per 1,000 Population, for Counties arranged Geographically: 1905-1906—Continued.*

County.	Estimated Population: 1905.	Marriages: 1905-1906.	Marriage- rate per 1,000 Population.
<i>Southern California</i>	409,921	4,224	*10.3
Los Angeles	259,000	2,241	*8.7
Other counties	150,921	1,983	13.1
Orange	22,750	421	18.5
Riverside	20,140	266	13.2
San Bernardino	31,441	453	14.4
San Diego	39,551	480	12.1
Santa Barbara	20,524	226	11.0
Ventura	16,515	137	8.3
<i>Northern and Central California</i>	1,374,600	13,708	10.0
Coast counties	920,283	9,810	10.7
Interior counties	454,317	3,898	8.6
Metropolitan area	666,127	7,460	11.2
Rural counties	708,473	6,248	8.8

* The 2,241 marriages for Los Angeles County include only 191 for 1905, against 2,050 for 1906, so that the registration is short by 1,800 or more. Corrected for this omission, the rate would be 11.1 for the State, 14.7 for Southern California, and 15.6 for Los Angeles.

It appears from Table 2 that for an estimated State population of 1,784,521 in 1905, the 17,932 marriages registered in 1905-1906 give a marriage-rate of 10.0 per 1,000 population, though complete returns for Los Angeles county would make the State rate 11.1 instead. The marriage-rate is higher for Southern California than for Northern and Central California together. In Northern as well as Central California the rate is higher for the coast counties than for the interior counties. The rate is also considerably higher for the metropolitan area, comprising San Francisco and the other bay counties, than for the rural counties north of Tehachapi.

Among the individual counties, Marin shows the highest marriage-rate, 36.4 per 1,000 population, followed by Orange 18.5, San Mateo 17.9, and Sacramento 17.0. The corrected rate for Los Angeles county, 15.6, would place it next in rank, followed by San Bernardino 14.4, Santa Clara 13.9, Alameda 13.4, Riverside, 13.2, San Diego 12.1, San Joaquin 11.7, Fresno, 11.4, Tulare 11.2, Santa Barbara 11.0, Stanislaus, 10.9, and San Luis Obispo 10.6, these being the counties with marriage-rates above the State average.

The fact that the marriage-rate is higher for the metropolitan area than for the rural counties of Northern and Central California and that the corrected rate for Los Angeles is above that for the rest of Southern California, indicates that marriages usually take place at urban centers. Moreover, the counties named as having marriage-rates above the State average will be readily recognized as counties having large cities. As a rule, too, in each geographic division the counties with rates above the average for the group are counties with important cities or towns. It seems, therefore, that there is a decided tendency for those about to marry to slip away from their homes in rural counties to be married at an important city in some other county.

At the same time there is a counter movement by which couples residing in great cities like San Francisco and Los Angeles go to a suburban county when they wish to be married. This counter movement is shown by the fact that at San Francisco bay the marriage-rates are much higher for Marin, San Mateo, and Alameda counties than for the metropolis itself, and in Southern California the marriage-rate for Orange county is considerably higher even than the corrected rate for Los Angeles.

Number in Order.—Table 3, below, gives the number in order of marriages, with per cents, for the three main and eight minor geographic divisions, including certain other groups of counties.

TABLE 3.—*Marriages classified by Number in Order, with Per Cent Distributions, for Geographic Divisions: 1905-1906.*

Geographic Division.	Total Marriages.	Number of Marriage.				Per Cent of Marriages.			
		1st of Both Parties.	1st of Groom Only.	1st of Bride Only.	2d or Over of Both.	1st of Both Parties.	1st of Groom Only.	1st of Bride Only.	2d or Over of Both.
THE STATE.....	17,932	13,182	1,958	1,450	1,342	73.5	10.9	8.1	7.5
Northern California.....	1,693	1,278	194	110	111	75.5	11.5	6.5	6.5
Coast counties.....	806	619	89	49	49	76.8	11.0	6.1	6.1
Interior counties.....	887	659	105	61	62	74.3	11.8	6.9	7.0
Central California.....	12,015	8,900	1,331	933	851	74.1	11.1	7.7	7.1
San Francisco.....	4,230	3,217	456	312	245	76.0	10.8	7.4	5.8
Other bay counties.....	3,230	2,241	415	282	292	69.4	12.9	8.7	9.0
Coast counties.....	1,544	1,147	145	141	111	74.3	9.4	9.1	7.2
Interior counties.....	3,011	2,295	315	198	203	76.2	10.5	6.6	6.7
Southern California.....	4,224	3,004	433	407	380	71.1	10.3	9.6	9.0
Los Angeles.....	2,241	1,630	216	205	190	72.7	9.6	9.2	8.5
Other counties.....	1,983	1,374	217	202	190	69.3	10.9	10.2	9.6
Northern and Central California.....	13,708	10,178	1,525	1,043	962	74.3	11.1	7.6	7.0
Coast counties.....	9,810	7,224	1,105	784	697	73.6	11.3	8.0	7.1
Interior counties.....	3,898	2,954	420	259	265	75.8	10.8	6.6	6.8
Metropolitan area.....	7,460	5,458	871	594	537	73.1	11.7	8.0	7.2
Rural counties.....	6,248	4,720	654	449	425	75.5	10.5	7.2	6.8

Of the 17,932 marriages registered in 1905-1906, 13,182 or 73.5 per cent were first marriages for both parties, neither groom nor bride having ever been married before. The per cent of marriages with both parties single is highest for the coast counties of Northern California, 76.8, the interior counties of Central California, 76.2, and for San Francisco, 76.0. It is lowest, 69.3, for Southern California outside Los Angeles, and next lowest, 69.4, for the bay counties other than San Francisco. The per cent of marriages where neither party was married before is higher for Northern and Central California than for Southern California and north of Tehachapi is higher for the rural counties than for the metropolitan area.

In 1,958 cases, or 10.9 per cent of all, the marriage was the first of the groom only, and in 1,450 cases, or 8.1 per cent, it was the first of the bride only. As a rule, the number of single men marrying widowed or

divorced women is greater than the number of single women marrying widowed or divorced men. No geographical division shows a variation from this rule, and exceptions to the rule appear for only nine counties, Plumas, Siskiyou, Monterey, San Benito, San Luis Obispo, Santa Cruz, Kings, Riverside, and Santa Barbara.

In no more than 1,342 instances, or 7.5 per cent of the total number, was the marriage the second or over of both the groom and the bride, each party having been married once or more before. The per cent of marriages where both parties had been previously married is highest, 9.6, for the six counties of Southern California other than Los Angeles, followed by 9.0 for the bay counties other than San Francisco and by 8.5 for Los Angeles. The per cent of marriages where neither party was single is lowest of all, 5.8, for San Francisco, next, 6.1, for the coast counties of Northern California, and next, 6.7, for the interior counties of Central California. The per cent of such marriages is somewhat higher for the metropolitan area than for the rural counties of Northern and Central California, being 7.2 for the former, against 6.8 for the latter.

Status of Parties.—Table 4 shows for each geographic division the civil status or marital condition of both grooms and brides—whether single, widowed, or divorced—at the time of marriage.

TABLE 4.—*Grooms and Brides classified by Marital Condition, with Per Cent Distributions, for Geographic Divisions: 1905-1906.*

Geographic Division.	Totals.	Grooms.			Brides.		
		Single.	Widow'd	Divorced.	Single.	Widow'd.	Divorced.
NUMBERS.							
THE STATE	17,932	15,140	1,655	1,137	14,632	1,891	1,409
Northern California	1,693	1,472	156	65	1,388	203	102
Coast counties	806	708	71	27	668	96	42
Interior counties.....	887	764	85	38	720	107	60
Central California	12,015	10,231	1,001	783	9,833	1,194	988
San Francisco	4,230	3,673	311	246	3,529	388	313
Other bay counties.....	3,230	2,656	304	270	2,523	366	341
Coast counties	1,544	1,292	144	108	1,288	138	118
Interior counties.....	3,011	2,610	242	159	2,493	302	216
Southern California.....	4,224	3,437	498	289	3,411	494	319
Los Angeles	2,241	1,846	240	155	1,835	246	160
Other counties	1,983	1,591	258	134	1,576	248	159
Northern and Central Cali- fornia	13,708	11,703	1,157	848	11,221	1,397	1,090
Coast counties	9,810	8,329	830	651	8,008	988	814
Interior counties.....	3,898	3,374	327	197	3,213	409	276
Metropolitan area	7,460	6,329	615	516	6,052	754	654
Rural counties	6,248	5,374	542	332	5,169	643	436

TABLE 4.—*Grooms and Brides classified by Marital Condition, with Per Cent Distributions, for Geographic Divisions: 1905-1906—Continued.*

Geographic Division.	Totals.	Grooms.			Brides.		
		Single.	Widow'd	Divorced.	Single.	Widow'd	Divorced.
PER CENTS.							
THE STATE	100.0	84.4	9.2	6.4	81.6	10.5	7.9
Northern California	100.0	87.0	9.2	3.8	82.0	12.0	6.0
Coast counties	100.0	87.8	8.8	3.4	82.9	11.9	5.2
Interior counties	100.0	86.1	9.6	4.3	81.2	12.0	6.8
Central California	100.0	85.4	8.3	6.5	81.8	10.0	8.2
San Francisco	100.0	86.8	7.4	5.8	83.4	9.2	7.4
Other bay counties	100.0	82.2	9.4	8.4	78.1	11.3	10.6
Coast counties	100.0	83.7	9.3	7.0	83.4	8.9	7.7
Interior counties	100.0	86.7	8.0	5.3	82.8	10.0	7.2
Southern California	100.0	81.4	11.8	6.8	80.7	11.7	7.6
Los Angeles	100.0	82.4	10.7	6.9	81.9	11.0	7.1
Other counties	100.0	80.2	13.0	6.8	79.5	12.5	8.0
Northern and Central Cali- fornia	100.0	85.4	8.4	6.2	81.9	10.2	7.9
Coast counties	100.0	84.9	8.5	6.6	81.6	10.1	8.3
Interior counties	100.0	86.6	8.4	5.0	82.4	10.5	7.1
Metropolitan area	100.0	84.8	8.3	6.9	81.1	10.1	8.8
Rural counties	100.0	86.0	8.7	5.3	82.7	10.3	7.0

It appears from Table 4 that 15,140 or 84.4 per cent of the grooms were single, 1,655 or 9.2 per cent were widowed, and 1,137 or 6.4 per cent were divorced. Among the brides the single numbered 14,632 or 81.6 per cent, the widowed 1,891 or 10.5 per cent, and the divorced 1,409 or 7.9 per cent. The widows outnumber the widowers by 236 or 14.3 per cent, and the number of divorced women exceeds that of divorced men by 272 or 23.9 per cent.

The per cent of widowers is particularly high (11.8) in Southern California, being 10.7 for Los Angeles and 13.0 for the other six counties. The per cent of widows is also highest (12.5) for the six counties of Southern California other than Los Angeles, and is next highest, 12.0 and 11.9 respectively, for the interior and coast counties of Northern California.

The per cent divorced, both among grooms and brides, is highest for the bay counties other than San Francisco, and next for Southern California, especially outside Los Angeles. While the per cent of divorced grooms is only 6.4 for the State, it is 8.4 for the four counties adjoining San Francisco, 6.9 for Los Angeles and 6.8 for the other six counties of Southern California, being 8.3 for Orange county. Similarly, as compared with 7.9 for the State, the per cent of divorced brides is 10.6 for the four counties suburban to San Francisco, and 8.0 for the six counties of Southern California other than Los Angeles, being 10.0 for Orange against 7.1 for Los Angeles. Though the per cent of divorced brides is only 7.4 for San Francisco, it is 8.9 for Alameda, 9.0 for Contra Costa, 14.1 for San Mateo, and 15.5 for Marin. But as heretofore explained, residents of the metropolis often prefer to be married in the suburbs and this seems to be especially the case among divorced persons.

TABLE 5.—Marriages classified by Number in Order and Marital Condition of Parties,

County.	Total Marriages.	Number of Marriage.				Groom.		
		1st of Both Parties.	1st of Gro'm Only.	1st of Bride Only.	2d or Over of Both.	Single.	Wid-owed.	Di-vorc'd
THE STATE	17,932	13,182	1,958	1,450	1,342	15,140	1,655	1,187
<i>Northern California</i>	1,693	1,278	194	110	111	1,472	156	65
Coast counties	806	619	89	49	49	708	71	27
Del Norte	15	12	2	1	---	14	1	---
Humboldt	170	136	18	10	6	154	12	4
Lake	32	27	1	1	3	28	3	1
Mendocino	181	134	22	13	12	156	20	5
Napa	159	114	21	10	14	135	15	9
Sonoma	237	186	23	14	14	209	20	8
Trinity	12	10	2	---	---	12	---	---
Interior counties	887	659	105	61	62	764	85	38
Butte	103	75	14	8	6	89	8	6
Colusa	38	30	3	3	2	33	2	3
Glenn	35	25	6	1	3	31	3	1
Lassen	30	20	4	3	3	24	5	1
Modoc	44	38	5	1	---	43	1	---
Nevada	118	82	18	7	11	100	11	7
Placer	41	30	6	2	3	36	1	4
Plumas	30	26	1	2	1	27	3	---
Shasta	132	87	20	11	14	107	16	9
Sierra	16	13	2	1	---	15	---	1
Siskiyou	111	84	8	9	10	92	15	4
Sutter	35	28	5	2	---	33	2	---
Tehama	81	64	8	7	2	72	8	1
Yuba	73	57	5	4	7	62	10	1
<i>Central California</i>	12,015	8,900	1,331	933	851	10,231	1,001	783
San Francisco	4,230	3,217	456	312	245	3,673	311	246
Other bay counties	3,230	2,241	415	282	292	2,656	304	270
Alameda	2,221	1,611	238	179	193	1,849	210	162
Contra Costa	155	110	22	12	11	132	16	7
Marin	619	368	116	66	69	484	55	80
San Mateo	235	152	39	25	19	191	23	21
Coast counties	1,544	1,147	145	141	111	1,292	144	108
Monterey	153	110	14	20	9	124	14	15
San Benito	66	56	3	4	3	59	5	2
San Luis Obispo	179	140	14	18	7	154	17	8
Santa Clara	921	681	95	76	69	776	83	62
Santa Cruz	225	160	19	23	23	179	25	21

with Per Cents Distributions, for Counties arranged Geographically: 1905-1906.

Bride.			Per Cent of Marriages.				Per Cent of Grooms.			Per Cent of Brides.		
Single.	Wid- owed.	Di- vorced.	1st of Both Par- ties.	1st of Gro'm Only.	1st of Bride Only.	2d or Over of Both.	Single.	Wid- owed.	Di- vorced	Single	Wid- owed.	Di- vorced
14,632	1,891	1,409	73.5	10.9	8.1	7.5	84.4	9.2	6.4	81.6	10.5	7.9
1,388	203	102	75.5	11.5	6.5	6.5	87.0	9.2	3.8	82.0	12.0	6.0
668	96	42	76.8	11.0	6.1	6.1	87.8	8.8	3.4	82.9	11.9	5.2
13	1	1	80.0	13.3	6.7	---	93.3	6.7	---	86.6	6.7	6.7
146	17	7	80.0	10.6	5.9	3.5	90.6	7.1	2.3	85.9	10.0	4.1
28	3	1	84.4	3.1	3.1	9.4	87.5	9.4	3.1	87.5	9.4	3.1
147	24	10	74.0	12.2	7.2	6.6	86.2	11.0	2.8	81.2	13.3	5.5
124	26	9	71.7	13.2	6.3	8.8	84.9	9.4	5.7	78.0	16.3	5.7
200	24	13	78.5	9.7	5.9	5.9	88.2	8.4	3.4	84.4	10.1	5.5
10	1	1	83.3	16.7	---	---	100.0	---	---	83.4	8.3	8.3
720	107	60	74.3	11.8	6.9	7.0	86.1	9.6	4.3	81.2	12.0	6.8
83	13	7	72.8	13.6	7.8	5.8	86.4	7.8	5.8	80.6	12.6	6.8
33	4	1	78.9	7.9	7.9	5.3	86.8	5.3	7.9	86.8	10.5	2.7
26	6	3	71.4	17.1	2.9	8.6	88.5	8.6	2.9	74.3	17.1	8.6
23	6	1	66.7	13.3	10.0	10.0	80.0	16.7	3.3	76.7	20.0	3.3
39	4	1	86.3	11.4	2.3	---	97.7	2.3	---	88.6	9.1	2.3
89	19	10	69.5	15.3	5.9	9.3	84.8	9.3	5.9	75.4	16.1	8.5
32	6	3	73.2	14.6	4.9	7.3	87.8	2.4	9.8	78.1	14.6	7.3
28	2	---	86.7	3.3	6.7	3.3	90.0	10.0	---	93.3	6.7	---
98	19	15	65.9	15.7	8.3	10.6	81.1	12.1	6.8	74.2	14.4	11.4
14	1	1	81.3	12.5	6.2	---	93.8	6.2	---	87.5	6.3	6.2
93	9	9	75.7	7.2	8.1	9.0	82.9	13.5	3.6	83.8	8.1	8.1
30	1	4	80.0	14.3	5.7	---	94.3	5.7	---	85.7	2.9	11.4
71	7	3	79.0	9.9	8.6	2.5	88.9	9.9	1.2	87.7	8.6	3.7
61	10	2	78.1	6.8	5.5	9.6	84.9	13.7	1.4	83.6	13.7	2.7
9,833	1,194	988	74.1	11.1	7.7	7.1	85.4	8.3	6.5	81.8	10.0	8.2
3,529	388	313	76.0	10.8	7.4	5.8	86.8	7.4	5.8	83.4	9.2	7.4
2,523	366	341	69.4	12.9	8.7	9.0	82.2	9.4	8.4	78.1	11.3	10.6
1,790	233	198	72.5	10.7	8.1	8.7	83.2	9.5	7.3	80.6	10.5	8.9
122	19	14	71.0	14.2	7.7	7.1	85.2	10.3	4.5	78.7	12.3	9.0
434	89	96	59.5	18.7	10.7	11.1	78.2	8.9	12.9	70.1	14.4	15.5
177	25	33	64.7	16.6	10.6	8.1	81.3	9.8	8.9	75.3	10.6	14.1
1,288	138	118	74.3	9.4	9.1	7.2	83.7	9.3	7.0	83.4	8.9	7.7
130	11	12	71.9	9.1	13.1	5.9	81.1	9.1	9.8	85.0	7.2	7.8
60	2	4	84.9	4.5	6.1	4.5	89.4	7.6	3.0	90.9	3.0	6.1
158	15	6	78.2	7.8	10.1	3.9	86.0	9.5	4.5	88.3	8.4	3.3
757	89	75	73.9	10.3	8.3	7.5	84.3	9.0	6.7	82.2	9.7	8.1
183	21	21	71.1	8.5	10.2	10.2	79.6	11.1	9.3	81.4	9.3	9.3

TABLE 5.—Marriages classified by Number in Order and Marital Condition of Parties.

County.	Total Mar-riages.	Number of Marriage.				Groom.		
		1st of Both Parties.	1st of Gro'm Only.	1st of Bride Only.	2d or Over of Both.	Single.	Wid-owed.	Di-vorc'd
<i>Central California—Continued.</i>								
Interior counties	3,011	2,295	315	198	203	2,610	242	159
Alpine	1	1				1		
Amador	56	44	8	3	1	52	4	
Calaveras	51	42	4	3	2	46	2	3
El Dorado	56	54	1	1		55	1	
Fresno	491	390	38	31	32	428	46	17
Inyo	30	28	1	1		29	1	
Kern	140	95	26	10	9	121	10	9
Kings	112	95	4	8	5	99	9	4
Madera	40	35	3	1	1	38	1	1
Mariposa	11	11				11		
Merced	75	60	9	3	3	69	4	2
Mono	5	5				5		
Sacramento	826	585	108	63	70	693	71	62
San Joaquin	456	325	52	43	36	377	43	36
Solano	158	122	15	9	12	137	14	7
Stanislaus	104	84	8	6	6	92	8	4
Tulare	205	165	17	10	13	182	15	8
Tuolumne	99	77	11	4	7	88	8	3
Yolo	95	77	10	2	6	87	5	3
<i>Southern California</i>	4,224	3,004	433	407	380	3,437	498	289
Los Angeles	2,241	1,630	216	205	190	1,846	240	155
Other counties	1,983	1,374	217	202	190	1,591	258	134
Orange	421	284	46	39	52	330	56	35
Riverside	266	193	24	25	24	217	32	17
San Bernardino	453	339	42	40	32	381	51	21
San Diego	480	307	61	61	51	368	75	37
Santa Barbara	226	147	29	30	20	176	35	15
Ventura	137	104	15	7	11	119	9	9
<i>Northern and Central California</i> ..	13,708	10,178	1,525	1,043	962	11,703	1,157	848
Coast counties	9,810	7,224	1,105	784	697	8,329	830	651
Interior counties	3,898	2,954	420	259	265	3,374	327	197
Metropolitan area	7,460	5,458	871	594	537	6,329	615	516
Rural counties	6,248	4,120	654	449	425	5,374	542	332

with Per Cents Distributions, for Counties arranged Geographically: 1905-1906—Continued.

Bride.			Per Cent of Marriages.				Per Cent of Grooms.			Per Cent of Brides.		
Single.	Wid- owed.	Di- vorced.	1st of Both Par- ties.	1st of Gro'm Only.	1st of Bride Only.	2d or Over of Both.	Single.	Wid- owed.	Di- vorced	Single.	Wid- owed.	Di- vorced
2,493	302	216	76.2	10.5	6.6	6.7	86.7	8.0	5.3	82.8	10.0	7.2
1			100.0				100.0			100.0		
47	7	2	78.6	14.3	5.3	1.8	92.9	7.1		83.9	12.5	3.6
45	1	5	82.4	7.8	5.9	3.9	90.2	3.9	5.9	88.2	2.0	9.8
55		1	96.4	1.8	1.8		98.2	1.8		98.2		1.8
421	50	20	79.4	7.8	6.3	6.5	87.2	9.4	3.4	85.7	10.2	4.1
29	1		93.4	3.3	3.3		96.7	3.3		96.7	3.3	
105	22	13	67.9	18.6	7.1	6.4	86.4	7.2	6.4	75.0	15.7	9.3
103	7	2	84.8	3.6	7.1	4.5	88.4	8.0	3.6	92.0	6.2	1.8
36	3	1	87.5	7.5	2.5	2.5	95.0	2.5	2.5	90.0	7.5	2.5
11			100.0				100.0			100.0		
63	5	7	80.0	12.0	4.0	4.0	92.0	15.3	2.7	84.0	6.7	9.3
5			100.0				100.0			100.0		
648	92	86	70.8	13.1	7.6	8.5	83.9	8.6	7.5	78.5	11.1	10.4
368	49	39	71.3	11.4	9.4	7.9	82.7	9.4	7.9	80.7	10.7	8.6
131	14	13	77.2	9.5	5.7	7.6	86.7	8.9	4.4	82.9	8.9	8.2
90	10	4	80.7	7.7	5.8	5.8	88.4	7.7	3.9	86.5	9.6	3.9
175	16	14	80.5	8.3	4.9	6.3	88.8	7.3	3.9	85.4	7.8	6.8
81	15	3	77.8	11.1	4.0	7.1	88.9	8.1	3.0	81.8	15.2	3.0
79	10	6	81.1	10.5	2.1	6.3	91.6	5.3	3.1	83.2	10.5	6.3
3,411	494	319	71.1	10.3	9.6	9.0	81.4	11.8	6.8	80.7	11.7	7.6
1,835	246	160	72.7	9.6	9.2	8.5	82.4	10.7	6.9	81.9	11.0	7.1
1,576	248	159	69.3	10.9	10.2	9.6	80.2	13.0	6.8	79.5	12.5	8.0
323	56	42	67.5	10.9	9.3	12.3	78.4	13.3	8.3	76.7	13.3	10.0
218	26	22	72.6	9.0	9.4	9.0	81.6	12.0	6.4	81.9	9.8	8.3
379	49	25	74.8	9.3	8.8	7.1	84.1	11.3	4.6	83.7	10.8	5.5
368	68	44	64.0	12.7	12.7	10.6	76.7	15.6	7.7	76.7	14.2	9.1
177	32	17	65.1	12.8	13.3	8.8	77.9	15.5	6.6	78.3	14.2	7.5
111	17	9	75.9	11.0	5.1	8.0	86.8	6.6	6.6	81.0	12.4	6.6
11,221	1,397	1,090	74.3	11.1	7.6	7.0	85.4	8.4	6.2	81.9	10.2	7.9
8,008	988	814	73.6	11.3	8.0	7.1	84.9	8.5	6.6	81.6	10.1	8.3
3,213	409	276	75.8	10.8	6.6	6.8	86.6	8.4	5.0	82.4	10.5	7.1
6,052	754	654	73.1	11.7	8.0	7.2	84.8	8.3	6.9	81.1	10.1	8.8
5,169	643	436	75.5	10.5	7.2	6.8	86.0	8.7	5.3	82.7	10.3	7.0

CENSUS STATISTICS ON MARITAL CONDITION: 1900 AND 1890.

Summary.—Census statistics on marital condition show that of the male population at least 15 years of age in California in 1900, 48.8 per cent were single; 44.9 per cent married, 4.7 per cent widowed, and 0.6 per cent divorced, 1.0 per cent being unknown. Of the female population of the same age, 31.1 per cent were single, 55.2 per cent married, 12.5 per cent widowed, and 0.9 per cent divorced, 0.3 per cent being unknown. The proportion single was greater and the proportion married less among males in California than in the United States, though the per cents single and married among females were not far from the same for this State as for the whole country. Between 1890 and 1900 the proportion of married men increased greatly in California on account of the growing equalization in the proportion of the sexes.

The per cent widowed among both males and females was substantially the same for California as for the United States in 1900 as well as 1890, but the per cent divorced for each sex was about twice as great for the Golden State as for the entire country at each census.

The proportion married among men is somewhat higher for cities of 25,000 population than for rural districts, including smaller cities, and is highest of all in California in Los Angeles and next in Oakland. The proportion married among women is considerably higher for rural districts than for the principal cities as a group, and is highest among the cities in Los Angeles and next in Sacramento.

Among the four principal cities Sacramento has the highest per cent of widowers and San Francisco has the highest per cent of widows. Sacramento also has the highest per cent divorced, both among men and women.

The maximum per cent married among males is at the age period 45 to 54 years—82.2 for the United States and 65.8 for California. The maximum per cent married among females, however, is at the next earlier age period, 35 to 44 years—79.5 for the entire country and 77.5 for the Golden State.

The maximum per cent widowed for each sex in both the United States and California is at the highest age period distinguished, 65 years and over.

The per cent divorced, however, is at its maximum for males at the age periods 45 to 54 and 55 to 64, and for females at still earlier age periods, 30 to 34 and 35 to 44.

The maximum per cent married among males is higher for cities of 100,000 population than for the rest of California, but the maximum per cent married among females is higher outside the two leading cities than within them. The maximum per cents married, among both men and women, are higher for Los Angeles than for San Francisco.

The maximum per cent of both widowers and widows is higher for

cities of 100,000 population than for the rest of the State, and is also higher for San Francisco than for Los Angeles.

In all cases the maximum per cent divorced appears later in life among men than among women.

For each sex in both the United States and California the proportion married is considerably higher for foreign-born than for native whites, but is nevertheless lower for descendants of foreigners than for persons of purely native stock. The same holds as to the proportions widowed. The per cent divorced for both sexes, however, is highest for native whites of native parentage, and is about the same for native whites of foreign parentage as for foreign-born whites themselves.

Generally speaking, what has just been said about the proportions married, widowed, and divorced in the United States and California holds true likewise for the two cities of 100,000 population and the rest of the Golden State.

As for the total population, so for each element of the white population, the maximum per cent married among males is at the age period 45 to 54, and among females at the age period 35 to 44, though in California the maximum per cent married among foreign-born white females is at an even earlier age period, 30 to 34 years. In all cases the maximum per cent widowed is at the age period 65 years and over, being about the same for each element. In every instance, also, the maximum per cent divorced is at a higher age period for males than for females.

United States and California.—Statistics of the Federal Census show the civil status or marital condition of the population—whether single, married, widowed, or divorced—at the dates when the last two censuses were taken in 1890 and 1900, respectively. Since practically all persons under 15 years of age are single this discussion is restricted throughout to the population at least 15 years of age, and, moreover, since marriage is essentially a sex relation the facts are considered not for both sexes together but always for males and females separately. The following table summarizes the data on marital condition for California in comparison with continental United States (the mainland south of the Canadian boundary) for 1900 and 1890:

TABLE 1.—*Population at Least 15 Years of Age classified by Sex and Marital Condition, with Per Cents, for United States and California: 1900 and 1890.*

	Total.	Single.	Married.	Widowed.	Divorced.	Unknown.
NUMBERS.						
UNITED STATES.						
Males— 1900	25,620,399	10,297,940	13,955,650	1,177,976	84,230	104,603
1890	20,777,872	8,655,711	11,205,205	815,437	49,100	52,419
Females—1900	24,249,191	7,566,530	13,810,057	2,717,715	114,647	40,242
1890	19,602,178	6,233,316	11,124,785	2,154,598	71,883	17,596
CALIFORNIA.						
Males— 1900	623,708	304,284	280,007	29,385	4,066	5,966
1890	533,145	288,343	216,029	19,222	2,586	6,965
Females—1900	471,514	146,754	260,277	59,048	4,268	1,167
1890	345,585	110,217	194,613	37,665	2,393	697

TABLE 1.—*Population at Least 15 Years of Age classified by Sex and Marital Condition, with Per Cents, for United States and California: 1900 and 1890—Continued.*

	Total.	Single.	Married.	Widowed.	Divorced.	Unknown.
PER CENTS.						
UNITED STATES.						
Males— 1900	100.0	40.2	54.5	4.6	0.3	0.4
1890	100.0	41.7	53.9	3.9	0.2	0.3
Females—1900	100.0	31.2	56.9	11.2	0.5	0.2
1890	100.0	31.8	56.7	11.0	0.4	0.1
CALIFORNIA.						
Males— 1900	100.0	48.8	44.9	4.7	0.6	1.0
1890	100.0	54.1	40.5	3.6	0.5	1.3
Females—1900	100.0	31.1	55.2	12.5	0.9	0.3
1890	100.0	31.9	56.3	10.9	0.7	0.2

Noticing only the per cents, one observes from the preceding table that at each census the proportion single was considerably greater and the proportion married was considerably less among males in California than in the United States, the differences being much smaller, however, in 1900 than in 1890. Among females, on the other hand, the per cents single and married were not far from the same for the Golden State as for the entire country at each census. Between 1890 and 1900 the per cent married increased slightly for both males and females in the United States and also increased greatly for males in California while decreasing somewhat for females. The notable increase in the proportion married among men in California is explained by the growing equalization of the sexes, the per cent male in the population of this State having fallen from 57.9 in 1890 to 55.3 in 1900. Thus the excess in the per cent married among women over that for men fell from 15.8 to 10.3 between 1890 and 1900, and similarly the excess in the per cent of males in the population over that for females dropped from 15.8 to 10.8 in the decade.

The per cent widowed was substantially the same in California as in the United States among males at each census and among females in 1890. The exceptional decrease in the per cent married among females in this State, noted above, is due to a considerable increase in the per cent widowed between 1890 and 1900. The per cent divorced, both among males and females, was about twice as great in California as in the United States at each census. In this State, as in the whole country, a larger proportion of women than of men are reported by the census as being widowed as well as divorced.

Cities and Rural Districts.—The Federal Census publishes statistics on marital condition not only for states and territories, but also for cities having at least 25,000 inhabitants. At the censuses of 1890 and 1900 there were four such cities in California—San Francisco, Los Angeles, Oakland, and Sacramento. The statistics at both censuses for each of these cities as well as for all four in contrast with the rural districts of the State appear in Table 2. Under "rural districts" are included all cities having less than 25,000 inhabitants, as well as country districts proper.

TABLE 2.—Population at Least 15 Years of Age classified by Sex and Marital Condition, with Per Cents, for Cities of 25,000 Inhabitants and Rural Districts of California: 1900 and 1890.

		Total.	Single.	Married.	Widowed.	Divorced.	Unknown.
NUMBERS.							
CITIES OF 25,000.							
Males—	1900	220,495	103,150	103,622	9,239	1,234	3,250
	1890	183,305	99,074	75,235	5,699	626	2,674
Females—	1900	192,919	64,646	98,192	27,607	1,800	674
	1890	136,175	47,142	70,713	17,109	989	222
<i>San Francisco.</i>							
Males—	1900	145,785	72,621	63,820	6,100	748	2,496
	1890	133,861	75,912	51,244	4,097	407	2,201
Females—	1900	118,553	40,984	58,932	17,261	1,011	365
	1890	93,818	33,689	47,464	11,871	627	167
<i>Los Angeles.</i>							
Males—	1900	37,777	14,519	21,066	1,539	269	384
	1890	19,430	8,226	10,319	641	99	145
Females—	1900	38,883	12,111	20,807	5,396	406	163
	1890	17,211	5,212	9,726	2,108	145	20
<i>Oakland.</i>							
Males—	1900	24,495	9,975	13,138	1,049	137	196
	1890	17,821	7,911	9,173	561	66	110
Females—	1900	25,314	8,435	13,019	3,566	250	44
	1890	17,081	5,681	9,180	2,071	121	28
<i>Sacramento.</i>							
Males—	1900	12,438	6,035	5,598	551	80	174
	1890	12,193	7,025	4,499	400	54	215
Females—	1900	10,169	3,116	5,434	1,384	133	102
	1890	8,065	2,560	4,343	1,059	96	7
RURAL DISTRICTS.							
Males—	1900	403,213	201,134	176,385	20,146	2,832	2,716
	1890	349,840	189,269	140,794	13,523	1,960	4,294
Females—	1900	278,595	82,108	162,085	31,441	2,468	493
	1890	209,410	63,075	123,900	20,556	1,404	475
PER CENTS.							
CITIES OF 25,000.							
Males—	1900	100.0	46.8	47.0	4.2	0.5	1.5
	1890	100.0	54.1	41.0	3.1	0.3	1.5
Females—	1900	100.0	33.5	50.9	14.3	0.9	0.4
	1890	100.0	34.6	51.9	12.6	0.7	0.2
<i>San Francisco.</i>							
Males—	1900	100.0	49.8	43.8	4.2	0.5	1.7
	1890	100.0	56.7	38.3	3.1	0.3	1.6
Females—	1900	100.0	34.6	49.7	14.6	0.8	0.3
	1890	100.0	35.9	50.6	12.6	0.7	0.2
<i>Los Angeles.</i>							
Males—	1900	100.0	38.4	55.8	4.1	0.7	1.0
	1890	100.0	42.3	53.1	3.3	0.5	0.8
Females—	1900	100.0	31.2	53.5	13.9	1.0	0.4
	1890	100.0	30.3	56.5	12.3	0.8	0.1
<i>Oakland.</i>							
Males—	1900	100.0	40.7	53.6	4.3	0.6	0.8
	1890	100.0	44.4	51.5	3.1	0.4	0.6
Females—	1900	100.0	33.3	51.4	14.1	1.0	0.2
	1890	100.0	33.3	53.7	12.1	0.7	0.2
<i>Sacramento.</i>							
Males—	1900	100.0	48.5	45.0	4.4	0.7	1.4
	1890	100.0	57.6	36.9	3.3	0.4	1.8
Females—	1900	100.0	30.7	53.4	13.6	1.3	1.0
	1890	100.0	31.7	53.9	13.1	1.2	0.1
RURAL DISTRICTS.							
Males—	1900	100.0	49.9	43.7	5.0	0.7	0.7
	1890	100.0	54.1	40.2	3.9	0.6	1.2
Females—	1900	100.0	29.4	58.2	11.3	0.9	0.2
	1890	100.0	30.1	59.2	9.8	0.7	0.2

Examination of the per cents in Table 2, relating to cities of 25,000 inhabitants and the rural districts of California, shows that the increase in the per cent married among males, heretofore noted, appeared in each of the four principal cities as well as in the rural districts of the State. The increase was considerably greater for the four cities together than for the rural districts, while among the individual cities the increase was greatest for Sacramento and next for San Francisco. The decrease in the per cent married among females, which likewise appeared in each city as well as in the rural districts, was the same for the four cities together as for the rural districts, and among the individual cities was greatest for Los Angeles and next for Oakland. The proportion married among men is somewhat higher in cities than in rural districts, being highest of all in Los Angeles and next in Oakland. On the other hand, the proportion married among women is considerably higher in rural districts than in cities of 25,000 population, being highest among the cities in Los Angeles and next in Sacramento.

Between 1890 and 1900 the per cents widowed and divorced, both among males and females, increased in each of the four principal cities as well as in the rural districts. The per cent of widowers is somewhat less for cities of 25,000 inhabitants than for rural districts, while the per cent of widows is considerably greater in these cities than in the rural districts. Among the cities the highest per cent of widowers is in Sacramento, and of widows in San Francisco. There is little variance between urban and rural districts in the per cent divorced among men, and none at all in the per cent divorced among women. The per cent divorced, among men as well as women, is highest in Sacramento.

Age.—Age is an important factor in connection with marriage. To facilitate comparisons for the eight age periods distinguished by the Federal Census, the statistical data herewith presented are limited to per cent distributions, the first table showing the facts for the United States in contrast with California in 1900.

TABLE 3.—*Per Cent Distribution, by Marital Condition, of Population at Least 15 Years of Age, classified by Sex and Age Periods, for United States and California: 1900.*

PER CENT DISTRIBUTION BY MARITAL CONDITION.										
	15 Years and Over.	15 to 19 Years.	20 to 24 Years.	25 to 29 Years.	30 to 34 Years.	35 to 44 Years.	45 to 54 Years.	55 to 64 Years.	65 Years and Over.	Age Un- known
UNITED STATES.										
<i>Males.</i>										
Single.....	40.2	98.8	77.6	45.8	27.6	16.9	10.3	7.6	5.7	28.6
Married.....	54.5	1.0	21.6	52.5	69.8	78.8	82.2	79.7	67.1	28.5
Widowed.....	4.6	*	0.4	1.2	2.0	3.6	6.8	11.9	26.4	3.5
Divorced.....	0.3	*	0.1	0.2	0.4	0.5	0.6	0.6	0.5	0.3
Unknown.....	0.4	0.2	0.3	0.3	0.2	0.2	0.1	0.2	0.3	39.1
<i>Females.</i>										
Single.....	31.2	88.7	51.6	27.5	16.6	11.1	7.8	6.6	6.0	24.6
Married.....	56.9	10.9	46.5	68.9	78.0	79.5	73.9	60.5	34.2	40.1
Widowed.....	11.2	0.2	1.4	2.9	4.6	8.6	17.6	32.3	59.3	15.7
Divorced.....	0.5	0.1	0.4	0.6	0.7	0.7	0.6	0.5	0.3	0.7
Unknown.....	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	18.9

*Less than one tenth of 1 per cent.

TABLE 3.—*Per Cent Distribution, by Marital Condition, of Population at Least 15 Years of Age, classified by Sex and Age Periods, for United States and California: 1900—Continued.*

PER CENT DISTRIBUTION BY MARITAL CONDITION.										
	15 Years and Over.	15 to 19 Years.	20 to 24 Years.	25 to 29 Years.	30 to 34 Years.	35 to 44 Years.	45 to 54 Years.	55 to 64 Years.	65 Years and Over.	Age Un- known
CALIFORNIA.										
<i>Males.</i>										
Single	48.8	99.4	88.4	64.4	45.7	34.4	26.8	23.7	20.4	31.1
Married	44.9	0.4	10.8	34.0	51.8	61.5	65.8	63.3	54.7	19.5
Widowed	4.7	*	0.1	0.7	1.5	2.9	6.0	11.5	23.3	1.9
Divorced	0.6	*	0.1	0.4	0.6	0.8	1.1	1.2	1.1	0.2
Unknown	1.0	0.2	0.6	0.5	0.4	0.4	0.3	0.3	0.5	47.3
<i>Females.</i>										
Single	31.1	92.2	60.0	32.9	18.7	11.2	6.3	4.8	4.2	22.0
Married	55.2	7.5	38.3	63.3	75.1	77.5	71.4	58.1	35.7	40.3
Widowed	12.5	0.1	0.9	2.6	4.8	9.8	21.0	36.4	59.4	13.2
Divorced	0.9	0.1	0.6	1.1	1.3	1.4	1.2	0.7	0.5	0.7
Unknown	0.3	0.1	0.2	0.1	0.1	0.1	0.1	*	0.2	23.8

* Less than one tenth of 1 per cent.

The preceding table shows that the per cent single invariably decreases at successive age periods, but that the per cent married, after increasing through the prime of life, then decreases with the rise in the per cent widowed among old-aged persons. The age period, 45 to 54 years, shows the maximum per cent married among males—82.2 in the United States and 65.8 in California. The maximum per cent married among females, however, is at the next earlier age period, 35 to 44 years, being 79.5 for the entire country and 77.5 for the Golden State. Among males as well as females, and in both the United States and California, the per cent widowed rises at successive age periods to the maximum at the highest period distinguished, 65 years and over. On the other hand, the per cent divorced, like the per cent married, first rises and then falls. The per cent divorced among males is highest at the age periods 45 to 54 and 55 to 64, being 0.6 in each case for the United States, and 1.1 and 1.2, respectively, for California. The maximum per cent divorced among females, however, appears at earlier age periods, 30 to 34 and 35 to 44, the per cent being 0.7 in both instances for the entire country, and 1.3 and 1.4, respectively, for the Golden State.

Corresponding figures for the cities of 100,000 inhabitants, San Francisco and Los Angeles, in contrast with the rest of California, appear in Table 4, on page 78. The returns for cities of less than 100,000 population in 1900 were not tabulated by the Federal Census, so that Oakland and Sacramento can not be shown separately, but must be included in the rest of the State outside the two leading cities, San Francisco and Los Angeles.

TABLE 4.—*Per Cent Distribution, by Marital Condition, of Population at Least 15 Years of Age, classified by Sex and Age Periods, for Cities of 100,000 Inhabitants and Rest of California: 1900.*

	PER CENT DISTRIBUTION BY MARITAL CONDITION.									
	15 Years. and Over.	15 to 19 Years.	20 to 24 Years.	25 to 29 Years.	30 to 34 Years.	35 to 44 Years.	45 to 54 Years.	55 to 64 Years.	65 Years and Over.	Age Un- known.
CITIES OF 100,000.										
<i>Males.</i>										
Single	47.5	99.4	87.6	63.9	44.1	32.4	23.0	18.3	15.6	36.0
Married	46.2	0.5	11.1	34.2	53.3	63.6	69.6	68.0	58.4	14.4
Widowed	4.2	*	0.1	0.7	1.4	2.8	6.0	12.5	24.9	1.0
Divorced	0.5	---	0.1	0.3	0.5	0.8	1.0	1.0	0.8	0.1
Unknown	1.6	0.1	1.1	0.9	0.7	0.4	0.4	0.2	0.3	48.5
<i>Females.</i>										
Single	33.7	93.6	64.7	37.6	22.1	13.8	7.9	6.3	5.9	23.9
Married	50.7	6.1	33.7	58.1	70.3	71.8	63.9	49.3	27.8	30.2
Widowed	14.4	0.1	1.0	3.1	6.2	12.9	27.1	43.8	65.6	11.9
Divorced	0.9	0.1	0.5	1.1	1.3	1.4	1.0	0.6	0.4	0.7
Unknown	0.3	0.1	0.1	0.1	0.1	0.1	0.1	*	0.3	33.3
SAN FRANCISCO.										
<i>Males.</i>										
Single	49.8	99.4	88.4	65.9	46.6	35.2	25.3	20.4	17.6	37.6
Married	43.8	0.5	10.2	32.2	50.8	60.8	67.2	65.3	55.5	13.4
Widowed	4.2	*	0.1	0.6	1.4	2.8	6.3	13.2	25.9	0.7
Divorced	0.5	---	0.1	0.3	0.4	0.8	0.9	0.9	0.7	0.1
Unknown	1.7	0.1	1.2	1.0	0.8	0.4	0.3	0.2	0.3	48.2
<i>Females.</i>										
Single	34.6	93.8	65.3	38.5	22.4	14.2	7.8	6.5	6.5	26.1
Married	49.7	5.9	33.1	57.5	70.1	70.9	62.7	47.1	26.1	28.5
Widowed	14.6	0.1	1.0	2.9	6.2	13.4	28.5	45.8	66.9	12.9
Divorced	0.8	0.1	0.5	1.0	1.2	1.4	1.0	0.6	0.3	0.8
Unknown	0.3	0.1	0.1	0.1	0.1	0.1	*	*	0.2	31.7
LOS ANGELES.										
<i>Males.</i>										
Single	38.4	99.2	83.7	54.5	33.5	21.8	15.0	11.9	9.0	21.5
Married	55.8	0.6	15.5	43.8	64.1	74.0	78.0	76.7	68.0	23.0
Widowed	4.1	*	0.2	0.7	1.6	2.7	5.2	10.0	21.5	3.2
Divorced	0.7	---	0.1	0.4	0.5	0.9	1.2	1.2	1.2	0.8
Unknown	1.0	0.2	0.5	0.6	0.3	0.6	0.6	0.2	0.3	51.5
<i>Females.</i>										
Single	31.2	92.9	62.3	34.5	20.9	12.7	8.2	5.7	4.4	16.8
Married	53.5	6.8	35.6	60.2	70.9	74.2	67.2	55.4	32.3	35.9
Widowed	13.9	0.1	1.3	3.6	6.5	11.5	23.3	38.2	61.9	8.4
Divorced	1.0	0.1	0.6	1.5	1.5	1.5	1.3	0.6	0.6	0.4
Unknown	0.4	0.1	0.2	0.2	0.2	0.1	*	0.1	0.8	38.5
REST OF CALIFORNIA.										
<i>Males.</i>										
Single	49.3	99.3	88.8	64.7	46.5	35.4	28.3	25.4	21.7	25.7
Married	44.3	0.4	10.6	33.9	51.0	60.5	64.4	61.8	53.7	25.3
Widowed	5.0	*	0.1	0.7	1.6	3.0	6.1	11.2	22.9	2.9
Divorced	0.7	*	0.1	0.4	0.6	0.8	0.9	1.2	1.2	0.3
Unknown	0.7	0.3	0.4	0.3	0.3	0.3	0.3	0.4	0.5	45.8
<i>Females.</i>										
Single	29.8	91.6	57.5	30.2	16.9	10.0	5.5	4.1	3.5	20.8
Married	57.5	8.0	40.8	66.3	77.8	80.4	75.1	62.0	38.8	47.1
Widowed	11.6	0.1	0.9	2.4	4.0	8.2	18.0	33.0	57.0	14.0
Divorced	0.9	0.1	0.6	1.0	1.2	1.4	1.3	0.8	0.5	0.6
Unknown	0.2	0.2	0.2	0.1	0.1	*	0.1	0.1	0.2	17.5

* Less than one tenth of 1 per cent.

Table 4 shows that, as before, the maximum per cent married among males is at the age period 45 to 54, and among females at the preceding period, 35 to 44 years. The maximum per cent married among males is higher for cities of 100,000 inhabitants than for the rest of California, and is also higher for Los Angeles than for San Francisco. Among females, however, the maximum per cent married is higher outside the two leading cities than within them, but as in the case of males it is higher for the City of Angels than for the City by the Golden Gate. As for the United States and California, so for the two cities of 100,000 inhabitants and the rest of the State the per cent of widowers and widows reaches its maximum at the age period 65 years and over. The maximum per cent of widowers is higher for cities of 100,000 population than for the rest of the State, and is likewise higher for San Francisco than for Los Angeles. Similarly, the maximum per cent of widows is greater within these two cities than outside them and is also greater in San Francisco than in Los Angeles. As heretofore shown for the entire country and the Golden State, so in the two cities of 100,000 population and the rest of California the maximum per cent divorced appears later in life among men than among women.

Race, Nativity, and Parentage.—Race as well as age is important with respect to marriage. Since the population of the United States, especially California, is predominantly of the white or Caucasian race, study of the effect of race upon marriage must be extended to an analysis of the statistical data according to the nativity of the whites and the parentage of the native whites. This is done in the following table for the United States and California in 1900, both numbers and per cents being shown:

TABLE 5.—Population at Least 15 Years of Age, classified by Sex, Race, Nativity, Nativity of Parents, and Marital Condition, with Per Cents, for United States and California: 1900.

	Total.	Single.	Married.	Widowed.	Divorced.	Un-known.
NUMBERS.						
UNITED STATES.						
<i>Males.</i>						
White	22,808,628	9,173,430	12,455,858	1,020,387	72,761	86,192
Native, native parents	13,088,058	5,195,263	7,193,922	587,894	47,993	62,986
Native, foreign parents	4,463,211	2,432,374	1,906,380	106,055	11,422	6,980
Foreign-born	5,257,359	1,545,793	3,355,556	326,438	13,346	16,226
Non-Caucasian	2,811,771	1,124,510	1,499,792	157,589	11,469	18,411
<i>Females.</i>						
White	21,483,052	6,747,306	12,319,767	2,291,872	91,737	32,370
Native, native parents	12,561,813	3,893,417	7,251,375	1,332,334	62,585	22,102
Native, foreign parents	4,475,907	1,985,289	2,212,946	256,953	16,634	4,085
Foreign-born	4,445,332	868,600	2,855,446	702,585	12,518	6,183
Non-Caucasian	2,766,139	819,224	1,490,290	425,843	22,910	7,872
CALIFORNIA.						
<i>Males.</i>						
White	563,694	271,156	255,965	27,955	4,000	4,618
Native, native parents	237,666	108,884	111,099	12,287	1,977	3,419
Native, foreign parents	138,437	86,762	46,961	3,549	825	340
Foreign-born	187,591	75,510	97,905	12,119	1,198	859
Non-Caucasian	60,014	33,128	24,042	1,430	66	1,348
<i>Females.</i>						
White	459,612	143,897	253,251	57,208	4,162	1,094
Native, native parents	203,174	62,961	112,450	24,863	2,142	758
Native, foreign parents	135,918	61,291	64,416	8,864	1,174	173
Foreign-born	120,520	19,645	76,385	23,481	846	163
Non-Caucasian	11,902	2,857	7,026	1,840	106	73

TABLE 5.—*Population at Least 15 Years of Age, classified by Sex, Race, Nativity, Nativity of Parents, and Marital Condition, with Per Cents, for United States and California: 1900—Continued.*

	Total.	Single.	Married.	Widowed.	Divorced.	Un- known.
PER CENTS.						
UNITED STATES.						
<i>Males.</i>						
White	100.0	40.2	54.6	4.5	0.3	0.4
Native, native parents	100.0	39.7	54.9	4.5	0.4	0.5
Native, foreign parents	100.0	54.5	42.7	2.4	0.2	0.2
Foreign-born	100.0	29.4	63.8	6.2	0.3	0.3
Non-Caucasian	100.0	40.0	53.3	5.6	0.4	0.7
<i>Females.</i>						
White	100.0	31.4	57.3	10.7	0.4	0.2
Native, native parents	100.0	31.0	57.7	10.6	0.5	0.2
Native, foreign parents	100.0	44.4	49.4	5.7	0.4	0.1
Foreign-born	100.0	19.6	64.2	15.8	0.3	0.1
Non-Caucasian	100.0	29.6	53.9	15.4	0.8	0.3
CALIFORNIA.						
<i>Males.</i>						
White	100.0	48.1	45.4	5.0	0.7	0.8
Native, native parents	100.0	45.8	46.8	5.2	0.8	1.4
Native, foreign parents	100.0	62.7	33.9	2.6	0.6	0.2
Foreign-born	100.0	40.2	52.2	6.5	0.6	0.5
Non-Caucasian	100.0	55.2	40.1	2.4	0.1	2.2
<i>Females.</i>						
White	100.0	31.3	55.1	12.5	0.9	0.2
Native, native parents	100.0	31.0	55.3	12.2	1.1	0.4
Native, foreign parents	100.0	45.1	47.4	6.5	0.9	0.1
Foreign-born	100.0	16.3	63.4	19.5	0.7	0.1
Non-Caucasian	100.0	24.0	59.0	15.5	0.9	0.6

Table 5 shows that among males as well as females and in both the United States and California the per cent married is highest for foreign-born whites. In all cases, however, the per cent married is higher for native whites having both parents native than for those with one or both parents foreign-born. In short, the proportion married is considerably higher for foreign-born than for native whites, but is nevertheless lower for descendants of foreigners than for persons of purely native stock. The per cent of widowers and widows is highest for foreign-born whites, and is higher for native whites of native parentage than for those of foreign parentage. The per cent divorced, however, both among males and females, is highest for native whites having native parents and is about the same for native whites with foreign-born parents as for foreign-born whites themselves.

Since the non-Caucasian population of the United States consists almost wholly of negroes, while that of California includes mainly Chinese and Japanese, no important conclusions can be drawn from differences in the per cents married, widowed, etc., among non-Caucasians in the United States and California.

Similar figures for San Francisco and Los Angeles, as compared with the rest of California, are shown in Table 6.

TABLE 6.—Population at Least 15 Years of Age classified by Sex, Race, Nativity, Nativity of Parents, and Marital Condition, with Per Cents, for Cities of 100,000 Inhabitants and Rest of California: 1900.

	Total	Single	Married	Widowed	Divorced	Unknown	PER CENT.				
							Single	Married	Widowed	Divorced	Unknown
CITIES OF 100,000.											
Males.											
White	167,445	79,869	76,714	7,424	996	2,442	47.7	45.8	4.4	0.6	1.5
Native, nat. parents	49,927	22,725	22,673	2,120	381	2,028	45.5	45.4	4.2	0.8	4.1
Native, for'n parents	50,424	31,851	17,168	1,042	265	98	63.2	34.0	2.1	0.5	0.2
Foreign-born	67,094	25,293	36,873	4,262	350	316	37.7	55.0	6.3	0.5	0.5
Non-Caucasian	16,117	7,271	8,172	215	21	438	45.1	50.7	1.4	0.1	2.7
Females.											
White	154,156	52,180	77,859	22,209	1,386	522	33.9	50.5	14.4	0.9	0.3
Native, nat. parents	46,705	15,735	23,102	6,921	573	374	33.7	49.5	14.8	1.2	0.8
Native, for'n parents	55,385	26,457	24,454	3,955	458	61	47.8	44.2	7.1	0.8	0.1
Foreign-born	52,066	9,988	30,303	11,333	355	87	19.2	58.2	21.7	0.7	0.2
Non-Caucasian	3,280	915	1,880	448	31	6	27.9	57.3	13.7	0.9	0.2
SAN FRANCISCO.											
Males.											
White	132,474	66,476	57,164	5,936	738	2,160	50.2	43.2	4.5	0.5	1.6
Native, nat. parents	31,194	15,494	12,312	1,323	246	1,789	49.7	39.5	4.3	0.8	5.7
Native, for'n parents	43,238	28,324	13,768	848	212	86	65.5	31.8	2.0	0.5	0.2
Foreign-born	58,042	22,658	31,054	3,765	280	285	39.0	53.5	6.5	0.5	0.5
Non-Caucasian	13,311	6,145	6,656	164	10	336	46.2	50.0	1.2	0.1	2.5
Females.											
White	116,172	40,286	57,555	16,975	994	362	34.7	49.5	14.6	0.9	0.3
Native, nat. parents	25,865	9,156	12,225	3,890	352	242	35.4	47.3	15.0	1.4	0.9
Native, for'n parents	46,437	22,891	19,943	3,191	361	51	49.3	42.9	6.9	0.8	0.1
Foreign-born	43,870	8,239	25,387	9,894	281	69	18.8	57.9	22.5	0.6	0.2
Non-Caucasian	2,381	698	1,377	286	17	3	29.3	57.9	12.0	0.7	0.1
LOS ANGELES.											
Males.											
White	34,971	13,393	19,550	1,488	258	282	38.3	55.9	4.3	0.7	0.8
Native, nat. parents	18,733	7,231	10,331	797	135	239	38.6	55.1	4.3	0.7	1.3
Native, for'n parents	7,186	3,527	3,400	194	53	12	49.1	47.3	2.7	0.7	0.2
Foreign-born	9,052	2,635	5,819	497	70	31	29.1	64.3	5.5	0.8	0.3
Non-Caucasian	2,806	1,126	1,516	51	11	102	40.2	54.0	1.8	0.4	3.6
Females.											
White	37,984	11,894	20,304	5,234	392	160	31.3	53.5	13.8	1.0	0.4
Native, nat. parents	20,440	6,579	10,877	3,031	221	132	31.6	52.2	14.5	1.1	0.6
Native, for'n parents	8,948	3,566	4,511	764	97	10	39.9	50.4	8.5	1.1	0.1
Foreign-born	8,196	1,749	4,916	1,439	74	18	21.3	60.0	17.6	0.9	0.2
Non-Caucasian	899	217	503	162	14	3	24.1	56.0	18.0	1.6	0.3
REST OF CALIFORNIA.											
Males.											
White	396,249	191,287	179,251	20,531	3,004	2,176	48.3	45.2	5.2	0.8	0.5
Native, nat. parents	187,739	86,159	88,426	10,167	1,596	1,391	45.9	47.1	5.4	0.9	0.7
Native, for'n parents	88,013	54,911	29,793	2,507	560	242	62.4	33.9	2.8	0.6	0.3
Foreign-born	120,497	50,217	61,032	7,857	848	543	41.7	50.7	6.5	0.7	0.4
Non-Caucasian	43,897	25,857	15,870	1,215	45	910	58.9	36.1	2.8	0.1	2.1
Females.											
White	305,456	91,717	175,392	34,999	2,776	572	30.0	57.4	11.5	0.9	0.2
Native, nat. parents	156,469	47,226	89,348	17,942	1,569	384	30.2	57.1	11.5	1.0	0.2
Native, for'n parents	80,533	34,834	39,962	4,909	716	112	43.3	49.6	6.1	0.9	0.1
Foreign-born	68,454	9,657	46,082	12,148	491	76	14.1	67.3	17.8	0.7	0.1
Non-Caucasian	8,622	1,942	5,146	1,392	75	67	22.5	59.7	16.1	0.9	0.8

It appears from Table 6 that, as heretofore noted for California, the per cents married and widowed among males, as well as females, are highest for foreign-born whites, and are higher for native whites of native parentage than for those of foreign parentage in both cities of 100,000 population and in the rest of the State. Generally speaking,

the per cent divorced, among both males and females, is highest for native whites of native parentage, and is about the same for native whites of foreign parentage as for foreign-born whites both within and outside the two cities of 100,000 population, the principal exception being that among males in Los Angeles the per cent divorced is slightly higher for foreign-born whites than for native whites of either native or foreign parentage.

Race and Age.—Table 7 has been prepared to facilitate analysis of the marital condition of males and females classified by race, nativity, and parentage at successive age periods. For convenience, as before, only the per cent distribution is shown, and the data presented are also limited to the State of California in 1900. Corresponding figures for continental United States may be found in the Abstract of the Twelfth Census, 1900, Tables 24 and 25, pages 20–23.

TABLE 7.—*Per Cent Distribution, by Marital Condition, of Population at Least 15 Years of Age, classified by Sex, Race, Nativity, Nativity of Parents, and Age Periods, for California: 1900.*

	PER CENT DISTRIBUTION BY MARITAL CONDITION.									
	15 Years and Over.	15 to 19 Years.	20 to 24 Years.	25 to 29 Years.	30 to 34 Years.	35 to 44 Years.	45 to 54 Years.	55 to 64 Years.	65 Years and Over.	Age Un- known.
MALES.										
<i>White.</i>										
Single	48.1	99.5	88.7	64.1	44.9	32.2	23.9	21.7	19.8	33.8
Married	45.4	0.3	10.6	34.4	52.6	63.5	68.2	64.6	35.1	16.6
Widowed	5.0	*	0.1	0.7	1.5	3.1	6.5	12.2	23.6	1.6
Divorced	0.7	*	0.1	0.4	0.6	0.9	1.2	1.3	1.1	0.2
Unknown	0.8	0.2	0.5	0.4	0.4	0.3	0.2	0.2	0.4	47.8
<i>Native white, native par'nts</i>										
Single	45.8	99.4	86.5	58.8	40.1	27.8	19.3	17.6	16.8	24.3
Married	46.8	0.4	12.3	39.2	56.8	67.1	72.2	68.8	58.6	12.4
Widowed	5.2	*	0.2	0.8	1.8	3.6	6.8	11.8	22.9	0.9
Divorced	0.8	*	0.1	0.5	0.7	1.2	1.5	1.5	1.3	0.3
Unknown	1.4	0.2	0.9	0.7	0.6	0.3	0.2	0.3	0.4	62.1
<i>Native white, for'gn par'nts</i>										
Single	62.7	99.6	90.9	67.5	47.6	34.4	26.8	24.6	22.0	42.2
Married	33.9	0.2	8.6	31.2	49.9	61.1	64.9	59.8	52.4	29.1
Widowed	2.6	*	0.1	0.7	1.5	3.2	6.8	13.8	23.9	0.9
Divorced	0.6	---	0.1	0.4	0.8	1.1	1.3	1.6	1.4	0.4
Unknown	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.3	27.4
<i>Foreign-born white.</i>										
Single	40.2	99.2	89.4	68.3	48.1	35.3	26.9	24.6	22.8	53.5
Married	52.2	0.6	10.2	30.8	50.0	61.3	65.7	61.9	51.5	24.2
Widowed	6.5	*	0.1	0.5	1.3	2.6	6.2	12.2	24.3	3.2
Divorced	0.6	---	*	0.1	0.3	0.6	0.9	1.0	0.9	0.1
Unknown	0.5	0.2	0.3	0.3	0.3	0.2	0.3	0.3	0.5	19.0
<i>Non-Caucasian.</i>										
Single	55.2	97.5	84.8	68.5	54.8	49.9	45.1	41.6	34.2	21.5
Married	40.1	1.9	13.6	29.7	42.8	47.2	51.4	51.9	47.2	29.9
Widowed	2.4	*	0.2	0.8	1.0	1.7	2.4	5.3	17.5	3.1
Divorced	0.1	---	0.1	0.1	0.2	0.1	0.1	0.1	0.2	0.1
Unknown	2.2	0.6	1.3	0.9	1.2	1.1	1.0	1.1	0.9	45.4

* Less than one tenth of 1 per cent.

TABLE 7.—*Per Cent Distribution, by Marital Condition, of Population at Least 15 Years of Age, classified by Sex, Race, Nativity, Nativity of Parents, and Age Periods, for California: 1900—Continued.*

	PER CENT DISTRIBUTION BY MARITAL CONDITION.									
	15 Years and Over.	15 to 19 Years.	20 to 24 Years.	25 to 29 Years.	30 to 34 Years.	35 to 44 Years.	45 to 54 Years.	55 to 64 Years.	65 Years and Over.	Age Un- known
FEMALES.										
<i>White.</i>										
Single	31.3	92.6	60.5	33.2	18.8	11.3	6.3	4.8	4.2	22.2
Married	55.1	7.1	37.9	63.1	75.1	77.5	71.5	58.1	35.7	36.4
Widowed	12.5	0.1	0.9	2.5	4.7	9.7	20.9	36.3	59.4	12.4
Divorced	0.9	0.1	0.6	1.1	1.3	1.4	1.2	0.7	0.5	0.4
Unknown	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	28.6
<i>Native white, native par'nts</i>										
Single	31.0	92.1	57.0	30.1	17.4	10.8	5.8	4.1	3.3	20.9
Married	55.3	7.6	41.1	65.7	76.0	78.0	73.2	61.2	37.4	34.0
Widowed	12.2	0.1	1.0	2.8	4.9	9.4	19.4	33.8	58.5	7.2
Divorced	1.1	0.1	0.7	1.3	1.6	1.7	1.5	0.8	0.6	0.6
Unknown	0.4	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.2	37.3
<i>Native white, for'gn par'nts</i>										
Single	45.1	94.2	66.1	39.4	23.7	14.2	7.4	5.2	4.5	45.7
Married	47.4	5.5	32.6	57.0	70.0	73.9	70.3	56.0	34.0	32.8
Widowed	6.5	*	0.7	2.4	5.0	10.3	21.1	38.0	60.9	7.5
Divorced	0.9	0.1	0.5	1.1	1.2	1.6	1.2	0.8	0.2	---
Unknown	0.1	0.2	0.1	0.1	0.1	*	---	*	0.4	14.0
<i>Foreign-born white.</i>										
Single	16.3	87.0	54.2	27.0	14.7	9.5	6.4	5.3	5.1	17.9
Married	63.4	12.6	44.3	70.1	80.3	80.1	70.2	55.6	34.0	43.2
Widowed	19.5	0.2	0.9	2.1	4.2	9.6	22.4	38.4	60.3	26.6
Divorced	0.7	*	0.5	0.7	0.7	0.8	1.0	0.6	0.4	0.2
Unknown	0.1	0.2	0.1	0.1	0.1	*	*	0.1	0.2	12.1
<i>Non-Caucasian.</i>										
Single	24.0	77.8	42.3	24.0	13.6	7.2	5.6	5.7	4.2	21.5
Married	59.0	21.3	53.0	68.0	77.0	77.6	67.7	53.8	35.2	55.8
Widowed	15.5	0.7	3.3	6.7	8.1	13.8	25.3	39.3	58.9	15.9
Divorced	0.9	0.1	0.8	0.9	1.1	1.1	1.0	0.8	1.0	1.6
Unknown	0.6	0.1	0.6	0.4	0.2	0.3	0.4	0.4	0.7	5.2

* Less than one tenth of 1 per cent.

Table 7 shows that in California the maximum per cent married among males is at the age period 45 to 54 years for native whites of native and foreign parentage as well as for foreign-born whites. Among females, however, the maximum per cent married is at the preceding age period, 35 to 44, for native whites of native and foreign parentage, and even earlier, 30 to 34 years, for foreign-born whites. In all cases the maximum per cent of widowers and widows is at the highest age period distinguished, 65 years and over, the maximum per cents being not far from the same for each element of the population. In every instance, also, the maximum per cent divorced is found at a higher age period among men than among women.

STATISTICS OF DEATHS: 1905-1906.

Summary.—In the first year covered by the new law requiring the proper registration of deaths prior to the issuance of burial permits, returns from all fifty-seven counties of California give a total of 27,026 deaths, exclusive of stillbirths, 12,385 being for the last half of 1905 and 14,641 for the first half of 1906.

For an estimated State population of 1,784,521 in 1905, the 27,026 deaths in 1905-1906 give a rate of 15.1 per 1,000 population.

The death-rate is 11.5 for Northern California, 15.1 for Central California, and 17.6 for Southern California.

The death-rates are only 12.0 and 11.1, respectively, for the coast and interior counties of Northern California, but the returns were not particularly complete for some counties in this part of the State.

The death-rate is highest, 17.9, for Los Angeles, and next, 17.1, for the other six counties of Southern California, being swollen in each case by the many deaths of recent residents, especially from tuberculosis.

The death-rate is also above the State average for the coast counties of Central California, 16.4, and for San Francisco, 15.6, where fatalities in the April earthquake and fire increased the mortality appreciably.

The rate is below the State average, 15.1, not only for the coast and interior counties of Northern California, but also for the bay counties other than San Francisco (14.5), and for the interior counties from Yolo, Sacramento, and El Dorado to and including Kern (14.4).

The rate is 15.2 for the metropolitan area, against 13.6 for the rural counties north of Tehachapi.

The principal cause of death in California is tuberculosis, which caused 15.5 per cent of the total deaths. The death-rate for tuberculosis of the lungs and other organs is 234.4 per 100,000 population.

Next to tuberculosis come diseases of the circulatory, respiratory, and nervous systems, which caused respectively 12.6, 10.8, and 9.8 per cent of the total deaths. Or, from another point of view, the death-rate per 100,000 population, is 191.3 for diseases of the circulatory system, heart disease, etc., 163.6 for pneumonia and other diseases of the respiratory system, and 147.8 for meningitis and other diseases of the nervous system.

The proportions are next highest for diseases of the digestive system (diarrhea and enteritis, etc.), violence other than suicide or public calamity, cancer, Bright's disease, and early infancy.

The most fatal epidemic disease was typhoid fever, causing 425 deaths, or 1.6 per cent of the State total. Next were diphtheria and croup, influenza, whooping-cough, measles, malarial fever, scarlet fever, and smallpox.

There are 709 deaths known to have resulted directly or indirectly from earthquake and fire, distributed as follows: San Francisco, 463; Santa Clara, 141; Sonoma, 72; Alameda, 12, and other counties, 21.

The deaths in Santa Clara county were mainly at Agnews State Hospital, and in Sonoma county mainly in Santa Rosa city. Most of the deaths in Alameda and other counties occurred among refugees from San Francisco suffering from fright or exposure.

Analysis of causes of death in different localities reveals marked contrasts between the several geographic divisions in the relative prevalence of various diseases.

In the coast counties of both Northern and Central California, as well as in the six counties of Southern California other than Los Angeles, relatively high proportions of all deaths are due to diseases of the nervous system, the explanation being the presence of State hospitals in these three geographic divisions.

The interior counties of both Northern and Central California have high proportions of total deaths due to malarial fever, typhoid fever, and other epidemic diseases. The present low death-rates for these geographic divisions could be further reduced by stricter enforcement of the health laws.

In San Francisco, and to a less extent in the other bay counties, the proportion is very high for diseases of the circulatory system, heart disease and kindred complaints.

In Los Angeles, as well as the other counties of Southern California, the proportions are very high for tuberculosis, on account of the many deaths occurring among newcomers from the East.

Tuberculosis caused 4,183 deaths, or 15.5 per cent of the State total. The per cent ranges from 22.2 for Los Angeles, and 20.8 for the other counties south of Tehachapi, to 11.9 for the bay counties other than San Francisco, and only 10.6 for the interior counties of Northern California.

However, deaths from tuberculosis in Southern California occur largely among newly arrived consumptives. Thus, 27.8 per cent of the tuberculosis victims in Southern California had lived in the State less than a year, and altogether 58.2 per cent had lived here less than ten years, the corresponding per cents for the entire State being 13.3 and 33.2, and for Northern and Central California together being 4.6 and 18.2 respectively. In fact, of all who died of tuberculosis in Southern California, 3.5 per cent had been in the State less than a month, altogether 10.8 per cent less than three months, and altogether 18.4 per cent less than six months.

In Northern and Central California, on the other hand, considerable numbers of native Californians and old-time residents fall victims to the "great white plague." The per cent of native Californians among tuberculosis victims is 37.3 for Northern California, and 36.9 for Central California, as compared with only 14.1 for Southern California, and 28.4 for the State as a whole. Similarly, the per cent who had lived here at least ten years is 33.7 for both Northern and Central California, against 19.5 for Southern California, and 28.4 for the entire State.

Of the 27,026 deaths, 16,681, or 61.7 per cent, were male and 10,345, or 38.3 per cent, were female. The per cent male is highest for the interior counties of Northern California, and is lowest for Los Angeles.

The white decedents numbered 25,463, or 94.2 per cent of all, while the Chinese were 731, the negroes 400, the Japanese 319, and the Indians 113.

The per cent white is highest for the six counties of Southern California other than Los Angeles and is lowest for the interior counties of Central California.

The per cents Chinese and Japanese are highest for the interior counties of Central California. The per cent negro is highest for Los Angeles, and the per cent Indian is highest for the coast counties of Northern California.

Of the white decedents, 8,993, or 35.3 per cent, were born in other states than California; 8,155, or 32.0 per cent, were foreign born; 7,193, or 28.3 per cent, were born in California; and 1,122, or 4.4 per cent, were of unknown nativity.

The per cent born in California is highest for San Francisco and the other bay counties, and is lowest for Los Angeles. Conversely, the per cent born in other states is highest for Los Angeles and the other counties south of Tehachapi, but is lowest for San Francisco. The per cent foreign born, however, is highest for the metropolis and lowest for Southern California outside Los Angeles.

The deaths by age periods were as follows: 15 to 64 years, or the "productive ages," 14,213 or 52.6 per cent; 65 years and over, or old age, 7,324 or 27.1 per cent; under 1 year, or early infancy, 2,953 or 10.9 per cent; 1 to 4 years, or childhood, 1,212 or 4.5 per cent; 5 to 14 years, or youth, 891 or 3.3 per cent; and age unknown, 433 or 1.6 per cent.

The per cent of deaths in early infancy is highest for the bay counties other than San Francisco and next for the metropolis itself.

The per cent of deaths in childhood is highest for the six counties of Southern California other than Los Angeles.

The per cent of deaths in youth is highest for Los Angeles and for both the coast and interior counties of Northern California.

The per cent of deaths at the productive ages is highest for Los Angeles and next for San Francisco.

The per cent of deaths at old age is highest for the interior and coast counties of Northern California.

Geographic Divisions.—For convenience in tabulation the fifty-seven counties of California have been grouped in three main and eight minor geographic divisions. The three main divisions are Northern, Central, and Southern California. The line between Northern and Central California has been drawn at the southern boundary of Placer, Sutter, Colusa, Napa, and Sonoma counties, or the northern boundary of El Dorado, Sacramento, Yolo, and Marin counties. This dividing line extends irregularly from Lake Tahoe to the Pacific Ocean somewhat north of San Francisco Bay. The line between Central and Southern California has been drawn at the southern boundary of Inyo, Kern, and San Luis Obispo counties, or the northern boundary of San Bernardino, Los Angeles, Ventura, and Santa Barbara counties. This line is familiarly located by Tehachapi pass.

In both Northern and Central California, divisions have been made between the coast and the interior counties. In each case the coast counties include some counties not actually contiguous to the Pacific Ocean but yet on the westward side of the Coast Ranges. Moreover, in Central California, San Francisco, and the other bay counties (Alameda, Contra Costa, Marin, and San Mateo) have been made minor geographic divisions. Similarly, in Southern California, Los Angeles has been made a minor geographic division in contrast with the other six counties south of Tehachapi.

The three main and eight minor geographic divisions are as follows, the counties in each group being arranged alphabetically for the sake of ready reference:

Main and Minor Geographic Divisions of California, with Counties included in each.

NORTHERN CALIFORNIA.

Coast Counties.

Del Norte
Humboldt

Lake
Mendocino

Napa
Sonoma

Trinity

Interior Counties.

Butte
Colusa
Glenn
Lassen

Modoc
Nevada
Placer
Plumas

Shasta
Sierra
Siskiyou

Sutter
Tehama
Yuba

CENTRAL CALIFORNIA.

San Francisco

(City and County)

Other Bay Counties.

Alameda

Contra Costa

Marin

San Mateo

Coast Counties.

Monterey
San Benito

San Luis Obispo

Santa Clara

Santa Cruz

Interior Counties.

Alpine
Amador
Calaveras
El Dorado
Fresno

Inyo
Kern
Kings
Madera
Mariposa

Merced
Mono
Sacramento
San Joaquin
Solano

Stanislaus
Tulare
Tuolumne
Yolo

SOUTHERN CALIFORNIA.

Los Angeles.

Other Counties.

Orange
Riverside

San Bernardino
San Diego

Santa Barbara

Ventura

Death-rates.—Under the law of 1905 requiring the proper registration of deaths prior to the issuance of burial permits, returns of varying completeness were received in the fiscal year 1905-1906 from all the fifty-seven counties in the State. In order to calculate death-rates the population of California in 1905 has been estimated conservatively according to the Census Bureau method by adding to the population in 1900 five tenths of the increase between 1890 and 1900, except that for the few counties showing decreases between the last two Federal censuses the population in 1900 has been taken for 1905, and for the three principal cities arbitrary estimates have been made because of their exceptionally rapid growth. The estimate for San Francisco in 1905 is 450,000, for Los Angeles 180,000, and for Oakland 90,000.

The following table shows the population as thus estimated in 1905, the deaths, exclusive of stillbirths, reported for 1905-1906, and the death-rate per 1,000 population, for each geographic division indicated above as well as for certain combinations of these divisions:

TABLE 1.—*Estimated Population (1905), Deaths, and Death-rate per 1,000 Population, for Geographic Divisions: 1905-1906.*

Geographic Division.	Estimated Population: 1905.	Deaths: 1905-1906.	Death-rate per 1,000 Population.
THE STATE	1,784,521	27,026	15.1
Northern California	269,510	3,093	11.5
Coast counties	121,785	1,457	12.0
Interior counties	147,725	1,636	11.1
Central California	1,105,090	16,720	15.1
San Francisco	450,000	7,010	15.6
Other bay counties	216,127	3,133	14.5
Coast counties	132,371	2,176	16.4
Interior counties	306,592	4,401	14.4
Southern California	409,921	7,213	17.6
Los Angeles	259,000	4,638	17.9
Other counties	150,921	2,575	17.1
Northern and Central California	1,374,600	19,813	14.4
Coast counties	920,283	13,776	15.0
Interior counties	454,317	6,037	13.3
Metropolitan area	666,127	10,143	15.2
Rural counties	708,473	9,670	13.6

It appears from Table 1 that for an estimated State population of 1,784,521 in 1905, the 27,026 deaths in 1905-1906 give a rate of 15.1 per 1,000 population.

Of the main geographic divisions, Northern California shows the lowest death-rate, 11.5, and Southern California the highest, 17.6, the rate for Central California being the same as for the State, 15.1.

Of the minor divisions, both the coast and interior counties of Northern California have death-rates, 12.0 and 11.1 respectively, which are considerably below the State average. In explanation of these low death-rates, however, it should be noted that the returns were not particularly complete for several counties in Northern California.

The death-rate is highest, 17.9, for Los Angeles and next, 17.1, for the other six counties of Southern California. The relatively high death-rates in this part of the State are due largely to the many deaths of recent residents, especially from tuberculosis.

The death-rate is also above the State average for the coast counties of Central California, 16.4, as well as for San Francisco, 15.6. In each of these geographic divisions, however, the death-rate was increased materially by the excessive mortality in April, 1906, resulting from a seismic disturbance.

The rate is below the State average, 15.1, not only for the coast and interior counties of Northern California, but also for the bay counties other than San Francisco (Alameda, Contra Costa, Marin and San Mateo), as well as for the interior counties of Central California, extending from Yolo, Sacramento and El Dorado on the north, to and including Kern on the south. The death-rate is 14.5 for the bay counties other than San Francisco and 14.4 for the group of interior counties just described.

For Northern and Central California together the death-rate is only 14.4, as compared with 17.9 for Southern California. The rate for the coast counties from Del Norte to San Luis Obispo inclusive is 15.0, against 13.3 for the interior counties from Siskiyou and Modoc to and including Kern. That the death-rate is higher for the coast than for the interior counties is due mainly to the relatively great mortality usual in a metropolis like San Francisco. Thus, the death-rate is 15.2 for the metropolitan area, comprising San Francisco and the other bay counties, against only 13.6 for the rural counties of Northern and Central California.

Causes of Death.—The following table gives the number of deaths in California in 1905–1906 from certain principal causes, as well as the proportion from each cause per 1,000 total deaths and also the death-rate per 100,000 estimated population (1,784,521):

TABLE 2.—Deaths from Certain Principal Causes, with Proportion per 1,000 Total Deaths and Death-rate per 100,000 Population, for California: 1905–1906.

Cause of Death.	Deaths: 1905–1906.	Proportion per 1,000 Total Deaths.	Death- rate per 100,000 Pop- ulation.
ALL CAUSES	27,026	1,000.0	1,514.5
Typhoid fever	425	15.7	23.8
Malarial fever	90	3.3	5.0
Smallpox	27	1.0	1.5
Measles	128	4.7	7.2
Scarlet fever	45	1.7	2.5
Whooping-cough	174	6.4	9.8
Diphtheria and croup	234	8.7	13.1
Influenza	217	8.0	12.2
Other epidemic diseases	193	7.2	10.8
Tuberculosis of lungs	3,622	134.0	203.0
Tuberculosis of other organs	561	20.8	31.4
Cancer	1,428	52.8	80.0
Other general diseases	1,020	37.7	57.2
Meningitis	448	16.6	25.1
Other diseases of nervous system	2,190	81.0	122.7
Diseases of circulatory system	3,413	126.3	191.3
Pneumonia and broncho-pneumonia	2,153	79.7	120.6
Other diseases of respiratory system	767	28.4	43.0
Diarrhea and enteritis, under 2 years	700	25.9	39.2
Diarrhea and enteritis, 2 years and over	278	10.3	15.6
Other diseases of digestive system	1,427	52.8	80.0
Bright's disease and nephritis	1,407	52.1	78.8
Childbirth	262	9.7	14.7
Early infancy	851	31.5	47.7
Suicide	474	17.5	26.6
Earthquake and fire	709	26.2	39.7
Other violence	1,955	72.3	109.6
All other causes	1,828	67.7	102.4

Tuberculosis is the principal cause of death in California. Over one seventh (15.5 per cent) of all deaths were due to this disease, 13.4 per cent of all deaths being caused by tuberculosis of the lungs and 2.1 per cent by tuberculosis of other organs. The death-rate is 234.4 per 100,000 population for all forms of tuberculosis.

Next to tuberculosis come diseases of the circulatory system, heart disease, etc. These diseases caused one eighth (12.6 per cent) of all deaths and have a death-rate of 191.3 per 100,000 population.

Next come diseases of the respiratory system, which caused nearly one ninth (10.8 per cent) of all deaths in the State, pneumonia and broncho-pneumonia causing 8.0 per cent and other diseases of the respiratory system 2.8 per cent of all deaths. The death-rate for all diseases of the respiratory system is 163.6 per 100,000 population.

Following pneumonia and other diseases of the respiratory system come meningitis and other diseases of the nervous system. These diseases caused nearly one tenth (9.8 per cent) of all deaths and have a death-rate of 147.8 per 100,000 population.

The proportions are next highest for diseases of the digestive system (diarrhea and enteritis, etc.), 8.9 per cent; violence other than suicide or earthquake and fire, 7.2 per cent; cancer, 5.3 per cent; Bright's disease and nephritis, 5.2 per cent; and early infancy, 3.2 per cent.

Of the epidemic diseases, typhoid fever was by far the most fatal, causing 425 deaths, or 1.6 per cent of the State total for the year. The number of deaths from other important epidemic diseases in 1905-1906 was as follows: diphtheria and croup, 234; influenza, 217; whooping-cough, 174; measles, 128; malarial fever, 90; scarlet fever, 45; and smallpox, 27. The deaths from smallpox were only 1 in each 1,000 from all causes and represent a death-rate of no more than 1.5 per 100,000 population.

Altogether, 709 deaths, or 2.6 per cent of all for the year 1905-1906, are charged against the earthquake and fire of April, 1906. The number given includes only the deaths known to have resulted from this public calamity, and may perhaps understate the loss of life resulting from this seismic disturbance. However, the total does include several deaths resulting only indirectly from earthquake and fire, as deaths of aged persons from fright or heart disease and deaths of infants from exposure.

The 709 deaths resulting directly or indirectly from earthquake and fire occurred in the following counties: San Francisco, 463; Santa Clara, 141; Sonoma, 72; Alameda, 12; Santa Cruz, 6; San Benito and Sacramento, 3 each; Mendocino, Napa, and Solano, 2 each; and Glenn, Nevada, and Los Angeles, 1 each. The bulk of the deaths in Santa Clara county were at the State Hospital at Agnews, and nearly all in Sonoma county were in Santa Rosa city. Most of the deaths in the other counties named occurred among refugees from San Francisco suffering from fright or exposure.

Table 3 gives for the three main geographic divisions the number of deaths from certain principal causes, and also the proportion from each cause per 1,000 total deaths. The death-rates for each disease per 100,000 population are not shown for geographic divisions, because the registration of deaths was not equally complete throughout the State.

TABLE 3.—Deaths from Certain Principal Causes, with Proportion per 1,000 Total Deaths, for Main Geographic Divisions: 1905-1906.

Cause of Death.	The State.	Division.		
		Northern.	Central.	Southern.
DEATHS: 1905-1906.				
ALL CAUSES	27,026	3,093	16,720	7,213
Typhoid fever.....	425	55	278	92
Malarial fever.....	90	39	41	10
Smallpox.....	27	4	22	1
Measles.....	128	7	69	52
Scarlet fever.....	45	5	29	11
Whooping-cough.....	174	34	87	53
Diphtheria and croup.....	234	31	132	71
Influenza.....	217	50	102	65
Other epidemic diseases.....	193	40	107	46
Tuberculosis of lungs.....	3,622	309	1,893	1,420
Tuberculosis of other organs.....	561	56	358	147
Cancer.....	1,428	136	903	389
Other general diseases.....	1,020	121	638	261
Meningitis.....	448	46	284	118
Other diseases of nervous system.....	2,190	347	1,265	578
Diseases of circulatory system.....	3,413	344	2,282	787
Pneumonia and broncho-pneumonia.....	2,153	250	1,405	498
Other diseases of respiratory system.....	767	92	479	196
Diarrhea and enteritis, under 2 years.....	700	47	487	166
Diarrhea and enteritis, 2 years and over.....	278	24	185	69
Other diseases of digestive system.....	1,427	173	897	357
Bright's disease and nephritis.....	1,407	115	864	428
Childbirth.....	262	27	166	69
Early infancy.....	851	62	553	236
Suicide.....	474	49	317	108
Earthquake and fire.....	709	78	630	1
Other violence.....	1,955	255	1,140	560
All other causes.....	1,828	297	1,107	424
PROPORTION PER 1,000 TOTAL DEATHS.				
ALL CAUSES	1,000.0	1,000.0	1,000.0	1,000.0
Typhoid fever.....	15.7	17.8	16.6	12.8
Malarial fever.....	3.3	12.6	2.5	1.4
Smallpox.....	1.0	1.3	1.3	0.1
Measles.....	4.7	2.3	4.1	7.2
Scarlet fever.....	1.7	1.6	1.7	1.5
Whooping-cough.....	6.4	11.0	5.2	7.4
Diphtheria and croup.....	8.7	10.0	7.9	9.8
Influenza.....	8.0	16.2	6.1	9.0
Other epidemic diseases.....	7.2	12.9	6.4	6.4
Tuberculosis of lungs.....	134.0	99.9	113.2	196.9
Tuberculosis of other organs.....	20.8	18.1	21.4	20.4
Cancer.....	52.8	44.0	54.0	53.9
Other general diseases.....	37.7	39.1	38.2	36.2
Meningitis.....	16.6	14.9	17.0	16.4
Other diseases of nervous system.....	81.0	112.2	75.7	80.1
Diseases of circulatory system.....	126.3	111.2	136.5	109.1
Pneumonia and broncho-pneumonia.....	79.7	80.8	84.0	69.0
Other diseases of respiratory system.....	28.4	29.8	28.6	27.2
Diarrhea and enteritis, under 2 years.....	25.9	15.2	29.1	23.0
Diarrhea and enteritis, 2 years and over.....	10.3	7.8	11.1	9.6
Other diseases of digestive system.....	52.8	55.9	53.6	49.5
Bright's disease and nephritis.....	52.1	37.2	51.7	59.3
Childbirth.....	9.7	8.7	9.9	9.6
Early infancy.....	31.5	20.1	33.1	32.7
Suicide.....	17.5	15.8	19.0	15.0
Earthquake and fire.....	26.2	25.2	37.7	0.1
Other violence.....	72.3	82.4	68.2	77.6
All other causes.....	67.7	96.0	66.2	58.8

Table 3 shows that the various epidemic diseases cause rather large proportions of all deaths in Northern California, the proportion for this division being higher than the State average in the case of every epidemic disease except measles and scarlet fever. In Northern California, also, the proportion is high for diseases of the nervous system other than meningitis, being 112.2 here against a general average of only 81.0. Central California excels particularly in the proportion of all deaths caused by diseases of the circulatory system (heart disease, etc.), the proportion for such diseases per 1,000 total deaths being 136.5 for this division, against only 126.3 for the State. Southern California leads especially in the proportion of all deaths due to tuberculosis, the proportion for tuberculosis of the lungs being 196.9 per 1,000 total deaths for the seven counties south of Tehachapi, as compared with only 134.0 for the State as a whole. In Southern California, too, the proportion is high for measles, being 7.2 here against a State average of 4.7 per 1,000 total deaths.

Table 4 presents similar figures for the eight minor geographic divisions.

TABLE 4.—Deaths from Certain Principal Causes, with Proportion per 1,000 Total Deaths, for Minor Geographic Divisions: 1905-1906.

Cause of Death.	The State	Northern California.		Central California.				Southern California.	
		Coast Counties.	Interior Counties.	San Francisco	Other Bay Counties.	Coast Counties.	Interior Counties.	Los Angeles.	Other Counties.
DEATHS: 1905-1906.									
ALL CAUSES	27,026	1,457	1,636	7,010	3,133	2,176	4,401	4,638	2,575
Typhoid fever	425	19	36	83	37	33	125	59	33
Malarial fever	90	4	35	6	2	3	30	5	5
Smallpox	27	1	3	11	5		1	1	
Measles	128	5	2	38	15	4	12	23	18
Scarlet fever	45	2	3	10	7	2	10	9	2
Whooping-cough	174	14	20	30	24	19	14	34	19
Diphtheria and croup	234	12	19	49	29	18	36	43	23
Influenza	217	19	31	27	17	25	33	32	33
Other epidemic diseases	193	18	22	45	16	13	33	30	16
Tuberculosis of lungs	3,622	156	153	792	303	262	536	934	486
Tuberculosis of other organs	561	35	21	147	69	50	92	97	50
Cancer	1,428	69	67	380	189	118	216	278	111
Other general diseases	1,020	45	76	275	109	67	187	183	78
Meningitis	448	22	24	110	67	26	81	68	50
Other diseases of nervous system	2,190	220	127	414	245	221	385	319	259
Diseases of circulatory system	3,413	152	192	1,052	448	271	511	542	245
Pneumonia and bronchopneumonia	2,153	107	143	649	281	131	344	343	155
Other diseases of respiratory system	767	42	50	213	102	61	103	136	60
Diarrhea and enteritis, under 2 years	700	21	26	215	103	57	112	99	67
Diarrhea and enteritis, 2 years and over	278	14	10	52	36	33	64	45	24
Other diseases of digestive system	1,427	72	101	379	175	99	244	256	101
Bright's disease and nephritis	1,407	53	62	388	201	110	165	281	147
Childbirth	262	9	18	50	34	34	48	44	25
Early infancy	851	22	40	244	120	43	146	175	61
Suicide	474	26	23	160	59	39	59	76	32
Earthquake and fire	769	76	2	463	12	150	5	1	
Other violence	1,955	94	161	372	217	136	415	284	276
All other causes	1,828	128	169	356	211	151	389	220	204

TABLE 4.—Deaths from Certain Principal Causes, with Proportion per 1,000 Total Deaths, for Minor Geographic Divisions: 1905-1906—Continued.

Cause of Death.	The State	Northern California.		Central California.				Southern California.	
		Coast Counties.	Interior Counties.	San Francisco	Other Bay Counties.	Coast Counties.	Interior Counties.	Los Angeles.	Other Counties.
PROPORTION PER 1,000 TOTAL DEATHS.									
ALL CAUSES	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0
Typhoid fever	15.7	13.0	22.0	11.8	11.8	15.2	28.4	12.7	12.8
Malarial fever	3.3	2.8	21.4	0.9	0.6	1.4	6.8	1.1	2.0
Smallpox	1.0	0.7	1.8	1.6	1.6	.....	1.4	0.2	.....
Measles	4.7	3.4	1.2	5.4	4.8	1.8	2.7	8.4	5.1
Scarlet fever	1.7	1.4	1.8	1.4	2.2	0.9	2.3	1.9	0.8
Whooping-cough	6.4	9.6	12.2	4.3	7.7	8.7	3.2	7.3	7.4
Diphtheria and croup	8.7	8.2	11.6	7.0	9.3	8.3	8.2	10.4	8.9
Influenza	8.0	13.0	19.0	3.8	5.4	11.5	7.5	6.9	12.8
Other epidemic diseases	7.2	12.4	13.4	6.4	5.1	6.0	7.5	6.5	6.2
Tuberculosis of lungs	134.0	107.1	93.5	113.0	96.7	120.4	121.8	201.4	188.7
Tuberculosis of other organs	20.8	24.0	12.8	21.0	22.0	23.0	20.9	20.9	19.4
Cancer	52.8	47.4	41.0	54.2	60.3	54.2	49.1	59.9	43.1
Other general diseases	37.7	30.9	46.5	39.2	34.8	30.8	42.5	39.5	30.3
Meningitis	16.6	15.1	14.7	15.7	21.4	11.9	18.4	14.7	19.4
Other diseases of nervous system	81.0	151.0	77.6	59.1	78.2	101.6	87.5	68.8	100.6
Diseases of circulatory system	126.3	104.3	117.4	150.1	143.0	124.5	116.1	116.9	95.2
Pneumonia and broncho-pneumonia	79.7	73.4	87.4	92.6	89.7	60.2	78.2	74.0	60.2
Other diseases of respiratory system	28.4	28.8	30.6	30.4	32.6	28.0	23.4	29.3	23.3
Diarrhea and enteritis, under 2 years	25.9	14.4	15.9	30.7	32.9	26.2	25.5	21.3	26.0
Diarrhea and enteritis, 2 years and over	10.3	9.6	6.1	7.4	11.5	15.2	14.6	9.7	9.3
Other diseases of digestive system	52.8	49.4	61.7	54.1	55.9	45.5	55.4	55.2	39.2
Bright's disease and nephritis	52.1	36.4	37.9	55.3	64.2	50.6	37.5	60.6	57.1
Childbirth	9.7	6.2	11.0	7.1	10.8	15.6	10.9	9.5	9.7
Early infancy	31.5	15.1	24.5	34.8	38.3	19.8	33.2	37.7	23.7
Suicide	17.5	17.8	14.1	22.8	18.8	17.9	13.2	16.4	12.4
Earthquake and fire	26.2	52.2	1.2	66.0	3.8	68.9	1.1	0.2	.....
Other violence	72.3	64.5	98.4	53.1	69.3	62.5	94.3	61.2	107.2
All other causes	67.7	87.9	103.3	50.8	67.3	69.4	88.4	47.4	79.2

It appears from Table 4 that the coast counties of Northern California have a very high proportion of deaths due to diseases of the nervous system other than meningitis. This is accounted for by the fact that many of the deaths reported for this geographic division occurred at the Mendocino and Napa State Hospitals.

The interior counties of Northern California have high proportions for various epidemic diseases. Thus, the proportion for this division as compared with the average for the State is 21.4 against 3.3 for malarial fever, 19.0 against 8.0 for influenza, 12.2 against 6.4 for whooping-cough, 22.0 against 15.7 for typhoid fever, and 11.6 against 8.7 for diphtheria and croup.

In San Francisco the proportion is particularly high for diseases of the circulatory system, being 150.1 here against 126.3 for the State. The proportions for San Francisco are also considerably above the State averages for pneumonia and broncho-pneumonia, 92.6 against 79.7; for diarrhea and enteritis among children under 2 years of age, 30.7 against 25.9; and for suicide, 22.8 for the metropolis, against 17.5 for the State.

In the other bay counties, as in the metropolis itself, the proportion of all deaths caused by diseases of the circulatory system is very high,

being 143.0 for this group of suburban counties, against only 126.3 for the State as a whole.

The coast counties of Central California, like the coast counties of Northern California, have a high proportion for diseases of the nervous system other than meningitis (101.6 against 81.0), and the explanation is that the returns for this division include numerous deaths at the Agnews State Hospital.

The interior counties of Central California, like the interior counties of Northern California, have high proportions for certain epidemic diseases. The proportion of all deaths caused by malarial fever is 6.8 for this division, against 3.3 for the State, and the proportion due to typhoid fever is 28.4 for the division, against 15.7 for the State.

Los Angeles has a very high proportion of deaths due to tuberculosis of the lungs. The proportion for Los Angeles is no less than 201.4, as compared with only 134.0 for the State. Los Angeles also has a high proportion for measles and for diphtheria and croup, the proportions being 8.4 and 10.4 for the county, against 4.7 and 8.7, respectively, for the entire State.

The other six counties south of Tehachapi likewise have a high proportion for tuberculosis of the lungs, 188.7 against 134.0, as well as for diseases of the nervous system other than meningitis, 100.6 against 81.0. As for the coast counties of Northern and Central California, so for the counties of Southern California, the high proportion for nervous diseases is explained by the inclusion of deaths at State hospitals. The very high proportions of all deaths caused by tuberculosis both in Los Angeles and the other counties south of Tehachapi are accounted for by the great number of newcomers from Eastern states who succumb to the "great white plague" even after they reach the Land of Sunshine.

Tuberculosis.—Table 5 brings out sharply the contrasts between different parts of the State in the mortality from tuberculosis.

TABLE 5.—*Number and Per Cent of Total Deaths from Tuberculosis and All Other Causes, for Geographic Divisions: 1905-1906.*

Geographic Division.	Total Deaths: 1905-1906.	Tuberculosis.		All Other Causes.	
		Number.	Per Cent	Number.	Per Cent.
THE STATE	27,026	4,183	15.5	22,843	84.5
Northern California	3,093	365	11.8	2,728	88.2
Coast counties	1,457	191	13.1	1,266	86.9
Interior counties	1,636	174	10.6	1,462	89.4
Central California	16,720	2,251	13.5	14,469	86.5
San Francisco	7,010	939	13.4	6,071	86.6
Other bay counties	3,133	372	11.9	2,761	88.1
Coast counties	2,176	312	14.3	1,864	85.7
Interior counties	4,401	628	14.3	3,773	85.7
Southern California	7,213	1,567	21.7	5,646	78.3
Los Angeles	4,638	1,031	22.2	3,607	77.8
Other counties	2,575	536	20.8	2,039	79.2
Northern and Central California	19,813	2,616	13.2	17,197	86.8
Coast counties	13,776	1,814	13.2	11,962	86.8
Interior counties	6,037	802	13.3	5,235	86.7
Metropolitan area	10,143	1,311	12.9	8,832	87.1
Rural counties	9,670	1,305	13.5	8,365	86.5

It appears from this table that the 4,183 deaths from tuberculosis in California are 15.5 per cent, or over one seventh, of the total 27,026, reported in 1905-1906. The per cent of total deaths caused by tuberculosis is no less than 22.2 for Los Angeles and 20.8 for the other six counties south of Tehachapi. The per cent is below the State average, 15.5, for every geographic division north of Tehachapi. It is as low as 11.9 for the bay counties other than San Francisco, and only 10.6 for the interior counties of Northern California.

However, it must be remembered that deaths of newly arrived consumptives are much more numerous in Southern California than in the rest of the State. This appears clearly from Table 6, showing the length of residence in California of those who died of tuberculosis in 1905-1906.

TABLE 6.—Deaths from Tuberculosis classified by Length of Residence in California, with Per Cent Distribution, for Geographic Divisions: 1905-1906.

Geographic Division.	Total.	Length of Residence.				
		Under 1 Year.	1 to 9 Years.	10 Years and Over.	Life.	Unknown.
NUMBERS.						
THE STATE.....	4,183	557	831	1,188	1,187	420
Northern California.....	365	15	40	123	136	51
Coast counties.....	191	6	20	62	72	31
Interior counties.....	174	9	20	61	64	20
Central California.....	2,251	106	315	759	830	241
San Francisco.....	939	31	108	336	342	122
Other bay counties.....	372	15	53	135	142	27
Coast counties.....	312	22	51	73	150	16
Interior counties.....	628	38	103	215	196	76
Southern California.....	1,567	436	476	306	221	128
Los Angeles.....	1,031	278	342	195	125	91
Other counties.....	536	158	134	111	96	37
Northern and Central Cali- fornia.....	2,616	121	355	882	966	292
Coast counties.....	1,814	74	232	606	706	196
Interior counties.....	802	47	123	276	260	96
Metropolitan area.....	1,311	46	161	471	484	149
Rural counties.....	1,305	75	194	411	482	143
PER CENTS.						
THE STATE.....	100.0	13.3	19.9	28.4	28.4	10.0
Northern California.....	100.0	4.1	10.9	33.7	37.3	14.0
Coast counties.....	100.0	3.1	10.5	32.5	37.7	16.2
Interior counties.....	100.0	5.2	11.5	35.0	36.8	11.5
Central California.....	100.0	4.7	14.0	33.7	36.9	10.7
San Francisco.....	100.0	3.3	11.5	35.8	36.4	13.0
Other bay counties.....	100.0	4.0	14.2	36.3	38.2	7.3
Coast counties.....	100.0	7.1	16.3	23.4	48.1	5.1
Interior counties.....	100.0	6.1	16.4	34.2	31.2	12.1
Southern California.....	100.0	27.8	30.4	19.5	14.1	8.2
Los Angeles.....	100.0	27.0	33.2	18.9	12.1	8.8
Other counties.....	100.0	29.5	25.0	20.7	17.9	6.9
Northern and Central Cali- fornia.....	100.0	4.6	13.6	33.7	36.9	11.2
Coast counties.....	100.0	4.1	12.8	33.4	38.9	10.8
Interior counties.....	100.0	5.9	15.3	34.4	32.4	12.0
Metropolitan area.....	100.0	3.5	12.3	35.9	36.9	11.4
Rural counties.....	100.0	5.7	14.9	31.5	36.9	11.0

Table 6 shows that 27.8 per cent of those who died of tuberculosis in Southern California had lived in the State less than a year, the per cent being 27.0 for Los Angeles and even 29.5 for the other six counties. The corresponding figure for Northern and Central California together is only 4.6, and that for the entire State is 13.3 per cent.

In fact, many of the tuberculosis victims in Southern California had been in the State only a few months. This is shown clearly by the following tabular statement, giving the length of residence in months of those who died of tuberculosis in Los Angeles and the other counties of Southern California after having been in the State less than a year:

Geographic Division.	Total Under 1 Year.	Length of Residence.			
		Under 1 Month.	1 to 2 Months.	3 to 5 Months.	6 to 11 Months.
NUMBERS.					
<i>Southern California</i>	436	55	114	120	147
Los Angeles	278	36	66	82	94
Other counties	158	19	48	38	53
PER CENTS.					
<i>Southern California</i>	27.8	3.5	7.3	7.6	9.4
Los Angeles	27.0	3.5	6.4	8.0	9.1
Other counties	29.5	3.5	9.0	7.1	9.9

It appears from the preceding tabular statement that of all who died of tuberculosis in Southern California 3.5 per cent had been in the State less than a month, altogether 10.8 per cent less than three months, and altogether 18.4 per cent less than six months. In Los Angeles 17.9 per cent, and in the other counties 19.6 per cent, of the total victims of tuberculosis had lived in California less than half a year.

Referring again to Table 6, one finds that while in Southern California altogether 58.2 per cent of all tuberculosis victims had lived in the State less than 10 years, in Northern and Central California together only 18.2 per cent had lived here this length of time, the per cent for the whole State being 33.2.

Native Californians form a considerable proportion of all who succumb to tuberculosis in Northern and Central California. Thus, the per cent of native Californians among all who died of tuberculosis is 37.3 for Northern California, and 36.9 for Central California, as compared with 28.4 for the entire State, and only 14.1 for Southern California.

Similarly, deaths of old-time residents from tuberculosis are relatively more numerous north than south of Tehachapi. The per cent of tuberculosis victims who had lived here at least ten years is 33.7 for both Northern and Central California, against 19.5 for Southern California and an average of 28.4 for the whole State.

Sex.—The proportion of the sexes among decedents is given in the following table for the several geographic divisions:

TABLE 7.—Deaths classified by Sex, with Per Cent Distribution, for Geographic Divisions: 1905-1906.

Geographic Division.	Total.	Male.	Female.	Per Cent.	
				Male.	Female.
THE STATE	27,026	16,681	10,345	61.7	38.3
Northern California	3,093	2,059	1,034	66.6	33.4
Coast counties	1,457	942	515	64.7	35.3
Interior counties	1,636	1,117	519	68.3	31.7
Central California	16,720	10,308	6,412	61.7	38.3
San Francisco	7,010	4,364	2,646	62.3	37.7
Other bay counties	3,133	1,803	1,330	57.5	42.5
Coast counties	2,176	1,302	874	59.8	40.2
Interior counties	4,401	2,839	1,562	64.5	35.5
Southern California	7,213	4,314	2,899	59.8	40.2
Los Angeles	4,638	2,725	1,913	58.8	41.2
Other counties	2,575	1,589	986	61.7	38.3
Northern and Central California	19,813	12,367	7,446	62.4	37.6
Coast counties	13,776	8,411	5,365	61.1	38.9
Interior counties	6,037	3,956	2,081	65.5	34.5
Metropolitan area	10,143	6,167	3,976	60.8	39.2
Rural counties	9,670	6,200	3,470	64.1	35.9

Table 7 shows that of the 27,026 persons who died in California in 1905-1906, 16,681, or 61.7 per cent, were male, and 10,345, or 38.3 per cent, were female. The per cent male is highest for the interior and coast counties of Northern California, 68.3 and 64.7 respectively, followed by the interior counties of Central California, 64.5, and by San Francisco, 62.3. The per cent male is below the State average, 61.7, for the remaining geographic divisions, and is lowest of all, 58.8, for Los Angeles.

Race.—The race distribution of decedents appears in Table 8, below:

TABLE 8.—Deaths classified by Race, with Per Cent Distribution, for Geographic Divisions: 1905-1906.

Geographic Division.	Total.	White.	Negro.	Indian.	Chinese.	Japanese.
NUMBERS.						
THE STATE	27,026	25,463	400	113	731	319
Northern California	3,093	2,908	29	56	82	18
Coast counties	1,457	1,386	5	32	22	12
Interior counties	1,636	1,522	24	24	60	6
Central California	16,720	15,666	190	35	576	253
San Francisco	7,010	6,588	51	3	296	72
Other bay counties	3,133	3,001	60	6	43	23
Coast counties	2,176	2,079	14	6	41	36
Interior counties	4,401	3,998	65	20	196	122
Southern California	7,213	6,889	181	22	73	48
Los Angeles	4,638	4,405	149	---	49	35
Other counties	2,575	2,484	32	22	24	13
Northern and Central California	19,813	18,574	219	91	658	271
Coast counties	13,776	13,054	130	47	402	143
Interior counties	6,037	5,520	89	44	256	128
Metropolitan area	10,143	9,589	111	9	339	95
Rural counties	9,670	8,985	108	82	319	176

TABLE 8.—Deaths classified by Race, with Per Cent Distribution, for Geographic Divisions: 1905-1906—Continued.

Geographic Division.	Total.	White.	Negro.	Indian.	Chinese.	Japanese.
PER CENTS.						
THE STATE	100.0	94.2	1.5	0.4	2.7	1.2
<i>Northern California</i>	100.0	94.0	0.9	1.8	2.7	0.6
Coast counties.....	100.0	95.1	0.4	2.2	1.5	0.8
Interior counties.....	100.0	93.0	1.5	1.5	3.7	0.3
<i>Central California</i>	100.0	93.7	1.1	0.2	3.5	1.5
San Francisco.....	100.0	94.0	0.7	0.1	4.2	1.0
Other bay counties.....	100.0	95.8	1.9	0.2	1.4	0.7
Coast counties.....	100.0	95.5	0.6	0.3	1.9	1.7
Interior counties.....	100.0	90.9	1.5	0.4	4.4	2.8
<i>Southern California</i>	100.0	95.5	2.5	0.3	1.0	0.7
Los Angeles.....	100.0	95.0	3.2	---	1.1	0.7
Other counties.....	100.0	96.5	1.2	0.9	0.9	0.5
<i>Northern and Central California</i>	100.0	93.8	1.1	0.4	3.2	1.4
Coast counties.....	100.0	94.8	1.0	0.3	2.9	1.0
Interior counties.....	100.0	91.5	1.5	0.7	4.2	2.1
Metropolitan area.....	100.0	94.5	1.1	0.1	3.4	0.9
Rural counties.....	100.0	92.9	1.1	0.9	3.3	1.8

The table shows that of the 27,026 decedents, 25,463, or 94.2 per cent, were white; 731, or 2.7 per cent, were Chinese; 400, or 1.5 per cent, were negro; 319, or 1.2 per cent, were Japanese; and 113, or 0.4 per cent, were Indian.

The per cent white is highest, 96.5, for the six counties of Southern California other than Los Angeles, and next, 95.8, for the bay counties other than San Francisco. It is lowest, only 90.9, for the interior counties of Central California.

The per cent Chinese is highest, 4.4, for the interior counties of Central California; next, 4.2, for San Francisco; and next, 3.7, for the interior counties of Northern California. The per cent is below the State average, 2.7, for the remaining geographic divisions, and is especially low, 1.1 and 0.9 respectively, for Los Angeles and the other counties south of Tehachapi.

The per cent Japanese is highest, 2.8, for the interior counties of Central California, and is below the State average, 1.2, for every other minor geographic division.

The per cent negro is highest, 3.2, for Los Angeles, and is equal to the State average, 1.5, only for the interior counties of Northern and Central California besides.

The per cent Indian is highest, 2.2 and 1.5 respectively, for the coast and interior counties of Northern California, but is inconsiderable for both Central and Southern California.

Nativity.—Table 9 gives the nativity of the white decedents classified as born in California, born in other states, foreign born, or nativity unknown. The 1,122 of unknown nativity include 328 victims of the earthquake and fire in San Francisco and vicinity in April, 1906.

TABLE 9.—*White Decedents classified by Nativity, with Per Cent Distribution, for Geographic Divisions: 1905-1906.*

Geographic Division.	Total White Decedents.	Born in California.	Born in Other States.	For'gn Born.	Nativity Unknown.	Per Cent.			
						Born in California.	Born in Other States.	For'gn Born.	Nativity Unknown.
THE STATE -----	25,463	7,193	8,993	8,155	1,122	28.3	35.3	32.0	4.4
Northern California ----	2,908	769	1,108	863	168	26.4	38.1	29.7	5.8
Coast counties -----	1,386	353	514	453	66	25.5	38.1	32.7	4.7
Interior counties ----	1,522	416	594	410	102	27.3	39.0	27.0	6.7
Central California ----	15,666	4,949	4,284	5,704	729	31.6	27.3	36.4	4.7
San Francisco -----	6,588	2,110	1,287	2,745	446	32.0	19.5	41.7	6.8
Other bay counties ----	3,001	955	882	1,089	75	31.8	29.4	36.3	2.5
Coast counties -----	2,079	649	682	694	54	31.2	32.8	33.4	2.6
Interior counties ----	3,998	1,235	1,433	1,176	154	30.9	35.8	29.4	3.9
Southern California ----	6,889	1,475	3,601	1,588	225	21.4	52.3	23.0	3.3
Los Angeles -----	4,405	882	2,343	1,028	152	20.0	53.2	23.3	3.5
Other counties -----	2,484	593	1,258	560	73	23.9	50.7	22.5	2.9
Northern and Central California -----	18,574	5,718	5,392	6,567	897	30.8	29.0	35.4	4.8
Coast counties -----	13,054	4,067	3,365	4,981	641	31.1	25.8	38.2	4.9
Interior counties ----	5,520	1,651	2,027	1,586	256	29.9	36.7	28.7	4.7
Metropolitan area ----	9,589	3,065	2,169	3,834	521	32.0	22.6	40.0	5.4
Rural counties -----	8,985	2,653	3,223	2,733	376	29.5	35.9	30.4	4.2

It appears from Table 9 that of the 25,463 white decedents 8,993, or 35.3 per cent, were born elsewhere in the United States than California; 8,155, or 32.0 per cent, were foreign born; 7,193, or 28.3 per cent, were natives of the Golden State; and 1,122, or 4.4 per cent, were of unknown nativity.

The per cent of native Californians among the white decedents is highest, 32.0, for San Francisco, and next, 31.8, for the other bay counties. The per cent is also above the State average, 28.3, for the coast and interior counties of Central California, being 31.2 for the former and 30.9 for the latter. The per cent California born is somewhat below the State average for both the coast and interior counties of Northern California, and is very low indeed for Southern California. In Los Angeles one fifth, 20.0 per cent, of the white decedents were natives of California.

The per cent of white decedents born in other states is highest, 53.2, for Los Angeles, and next, 50.7, for the other counties south of Tehachapi. The per cent is also above the State average, 35.3, for both the coast and interior counties of Northern California, as well as for the interior counties of Central California. In San Francisco less than one fifth, 19.5 per cent, of the white decedents were natives of other states than California.

The per cent foreign-born among white decedents is highest, 41.7, for San Francisco, and next, 36.3, for the other bay counties. The percent is also above the State average, 32.0, for the coast counties of both Northern and Central California. The per cent foreign-born is lowest in Southern California, being only 23.3 for Los Angeles, and 22.5 for the other six counties.

Age.—Table 10 gives the classification of decedents by selected age periods representing, in a rough way, early infancy, childhood, youth, productive ages, and old age.

TABLE 10.—Deaths classified by Age Periods, with Per Cent Distribution, for Geographic Divisions: 1905-1906.

Geographic Division.	Totals.	Under 1 Year.	1 to 4 Years.	5 to 14 Years.	15 to 64 Years.	65 Yrs. and Over.	Age Un- known.
NUMBERS.							
THE STATE	27,026	2,953	1,212	891	14,213	7,324	433
<i>Northern California</i>	3,093	233	112	119	1,458	1,124	47
Coast counties	1,457	101	49	55	698	524	30
Interior counties	1,636	132	63	64	760	600	17
<i>Central California</i>	16,720	1,938	757	501	8,689	4,474	361
San Francisco	7,010	886	323	172	3,782	1,566	281
Other bay counties	3,133	403	155	107	1,484	972	12
Coast counties	2,176	195	81	71	1,097	692	40
Interior counties	4,401	454	198	151	2,326	1,244	28
<i>Southern California</i>	7,213	782	343	271	4,066	1,726	25
Los Angeles	4,638	511	204	180	2,678	1,049	16
Other counties	2,575	271	139	91	1,388	677	9
<i>Northern and Central California</i> ..	19,813	2,171	869	620	10,147	5,598	408
Coast counties	13,776	1,585	608	405	7,061	3,754	363
Interior counties	6,037	586	261	215	3,086	1,844	45
Metropolitan area	10,143	1,289	478	279	5,266	2,538	293
Rural counties	9,670	882	391	341	4,881	3,060	115
PER CENTS.							
THE STATE	100.0	10.9	4.5	3.3	52.6	27.1	1.6
<i>Northern California</i>	100.0	7.5	3.6	3.9	47.1	36.4	1.5
Coast counties	100.0	6.9	3.4	3.8	47.9	36.0	2.0
Interior counties	100.0	8.1	3.8	3.9	46.5	36.7	1.0
<i>Central California</i>	100.0	11.6	4.5	3.0	52.0	26.7	2.2
San Francisco	100.0	12.6	4.6	2.5	54.0	22.3	4.0
Other bay counties	100.0	12.9	4.9	3.4	47.4	31.0	0.4
Coast counties	100.0	9.0	3.7	3.3	50.4	31.8	1.8
Interior counties	100.0	10.3	4.5	3.4	52.9	28.3	0.6
<i>Southern California</i>	100.0	10.8	4.8	3.8	56.4	23.9	0.3
Los Angeles	100.0	11.0	4.4	3.9	57.7	22.6	0.4
Other counties	100.0	10.5	5.4	3.5	53.9	26.3	0.4
<i>Northern and Central California</i> ..	100.0	11.0	4.4	3.1	51.2	28.2	2.1
Coast counties	100.0	11.5	4.4	2.9	51.3	27.3	2.6
Interior counties	100.0	9.7	4.3	3.6	51.1	30.6	0.7
Metropolitan area	100.0	12.7	4.7	2.8	51.9	25.0	2.9
Rural counties	100.0	9.1	4.0	3.5	50.5	31.7	1.2

The table shows that of the 27,026 deaths in California in 1905-1906, 14,213, or 52.6 per cent, occurred at the "productive age" from 15 to 64 years; 7,324, or 27.1 per cent, at the period of old age, 65 years and over; 2,953, or 10.9 per cent, in early infancy or the first year of life; 1,212, or 4.5 per cent, in childhood, 1 to 4 years; 891, or 3.3 per cent, in youth, 5 to 14 years; and 433, or 1.6 per cent, at unknown ages.

The per cent of total deaths occurring in early infancy or the first

year of life is highest, 12.9, for the bay counties other than San Francisco; next, 12.6, for the metropolis itself; and next, 11.0 for Los Angeles. The per cent of all deaths at under 1 year of age is below the State average, 10.9, for the remaining geographic divisions, and is lowest of all, only 6.9, for the coast counties of Northern California.

The per cent of deaths in childhood, 1 to 4 years, is highest, 5.4, for the six counties of Southern California other than Los Angeles, and is also above the State average, 4.5, for San Francisco and the other bay counties. The per cent is lowest, 3.4, for the coast counties of Northern California.

The per cent of deaths in youth, 5 to 14 years, is highest, 3.9, for Los Angeles, and is about the same also, 3.8 and 3.9 respectively, for the coast and interior counties of Northern California. The per cent of deaths occurring at from 5 to 14 years of age is above or equal to the State average, 3.3, for every minor geographic division except only San Francisco, where the per cent is 2.5.

The per cent of deaths occurring at from 15 to 64 years, sometimes called the "productive ages," is highest, 57.7, for Los Angeles; next, 54.0 for San Francisco; and next, 53.9 for the six counties of Southern California other than Los Angeles. The per cent is above the State average, 52.6, only for the interior counties of Central California besides. The per cent of deaths at the productive ages is lowest in Northern California, being 47.9 for the coast counties and only 46.3 for the interior counties.

The per cent of deaths occurring at the period of old age, 65 years and over, is highest in Northern California, being 36.7 for the interior counties and 36.0 for the coast counties. The per cent is much above the State average, 27.1, for the coast counties of Central California as well as for the bay counties other than San Francisco, and is also slightly above the State average for the interior counties of Central California besides. The per cent of deaths occurring at 65 years and over is lowest of all, 22.3, for San Francisco, though it is almost as low, 22.6, for Los Angeles.

86	Syphilis	77	52	25	61	4	1	8	3	44	8	7	2	41	8	1	28	4
37	Gonorrhea of the adult	4	2	2	4	2				1	2	1		1				
38	Gonorrheal infections of children	54	49	5	53					2							28	
39	Cancer of stomach	560	352	208	547	7		1		24	217	25		6		1	311	25
40	Cancer of stomach and liver	103	49	54	102	1		4	2	36	217	288		1		1	246	41
41	Cancer of intestines and peritoneum	236			236	6	1			10	37	52	3			1	62	
42	Cancer of genital organs	110			110			1	1	34	106	86	1				197	39
43	Cancer of breast									10	53	45	2				81	29
44	Cancer of skin	60	45	15	59			1		1	36	22					92	38
45	Cancer of other or unspecified organs	305	196	109	290	3		7	5	27	143	119	1		5	4	188	107
46	Cancer (non-cancers)	13	5	8	13					1	7						7	5
47	Tumor (non-cancers)	90	45	45	87	2		1		30	29	25	3		4	22	49	13
48	Acute articular rheumatism	103	50	53	99			3	1	7	54	36	2			3	54	46
49	Chronic rheumatism and gout		1															
50	Scurvy	199	105	94	194	4		1		24	102	66	2		1	11	119	69
51	Diabetes	16	4	12	16					1	10	5			1	13	2	2
52	Exophthalmic goiter	8	6	2	9					2	3	3				7	1	
53	Addison's disease	29	20	9	27	1			1	8	10	9			1	1	23	3
54	Leukemia	63	24	39	63					16	30	14	3		1	1	41	16
55	Anemia, chlorosis	233	199	34	232		1			41	70	84	37		1	1	203	27
56	Alcoholism									1	1	3					8	2
57	Lead poisoning																	
58	Other professional intoxications																	
59	Other chronic poisonings	71	62	9	42	1		27	1	17	14	5	6		1		62	8
60	Other general diseases	4	3	1													2	
II. DISEASES OF THE NERVOUS SYSTEM																		
61	Encephalitis	2,638	1,588	1,050	2,545	34	2	35	22	612	1,016	865	52	223	150	102	1,082	1,065
62	Meningitis	15	10	5	15					6	5	3	1	4	2		5	3
63	Locomotor ataxia	448	257	191	423	3		7	15	305	75	40	7	130	112	65	121	18
64	Other diseases of spinal cord	69	47	12	58					1	7	36	31		1	1	41	17
65	Apoplexy	1,071	646	423	1,039	11	1	18	2	60	490	464	25	5	2	7	423	630
66	Softening of brain	83	61	32	90	2		1		7	29	53	1				36	57
67	Paralysis	286	154	132	279	3		4		21	138	114	6	1	1	1	75	205
68	General paralysis of insane	112	92	20	108	4				59	34	2				1	79	32
69	Other forms of mental disease	123	75	48	117	4		2		17	54	23	4			93	27	
70	a (pt). Other diseases of brain	73	37	36	66	4		2	1	18	21	42	4		4	2	45	21
71	Epilepsy	92	56	36	92					34	39	18	1		2	1	7	70
72	Convulsions (nonpuerperal)	8	6	2	8											2		
73	Convulsions of children	96	49	47	93	1			2	87	5	1				6		
74	Tetanus	37	27	10	37					22	10	5				13	15	2
75	Chorea	5	1	4	5					3	2					3		
76	b (pt). Other diseases of nervous system	36	13	23	35			1		7	17	11				28	7	
77	Diseases of the eye and its annexa	1		1	1					1						1		
78	Diseases of the ear	5	2	3		1				1	2	1			2	2	1	
III. DISEASES OF THE CIRCULATORY SYSTEM																		
79	Pericarditis	3,413	2,129	1,294	3,263	47	7	78	18	293	1,426	1,446	98	16	8	65	1,645	1,668
80	Endocarditis	32	20	12	29			3		6	6	15	2			3	22	33
81	Heart disease	2,766	1,727	1,039	2,635	40	5	70	16	271	1,127	1,200	84	9	5	44	1,339	1,361
82	Angina pectoris	101	62	39	99	1				7	60	29	3			50	51	8
83	Diseases of arteries	81	174	85	253	3		3		6	121	125	1			82	177	
84	Embolism and thrombosis	78	46	32	77					9	41	24	3			2	48	26

TABLE 11. — Deaths from each Specified Disease and Class of Diseases, classified by Sex, Race, Nativity, and Age Periods, for California: 1905-1906. — *Cont'd.*

No.	Cause of Death.	Total Deaths	Male	Fe- male	White	Ne- gro	In- dian	Chi- nese	Jap- anese	WHITE.				Un- der 1 Year	1 to 4 Years	5 to 14 Years	15 to 64 Years	65 Years and Over	Age Un- known
										Born in Cal- ifornia	Born in other States	For- eign born	Na- tivity known						
III. DISEASES OF CIR. SYSTEM—Continued.																			
83	Diseases of veins	9	5	4	8			1			7	1					5	4	
84	Diseases of lymphatics	4	3	1	3					1	1	1				1	3		
*85	Hemorrhages (except of lungs)	38	29	9	37		1			13	13	8	3	5			23	9	1
86	Other diseases of circulatory system.																		
IV. DISEASES OF THE RESPIRATORY SYSTEM.																			
*87	Diseases of nasal fossæ	2,920	1,791	1,129	2,781	41	8	74	16	854	865	985	77	401	210	80	1,234	985	10
{ (a) Laryngitis		1	1		1												1	3	
{ (b) Other diseases of larynx		18	10	8	18					12	3			2	6	4	1	2	1
Diseases of the thyroid body		3	3	2	4			1		3					1				
89	Acute bronchitis	161	91	70	155	2	1	2	1	90	26	38	1	63	23	5	23	45	
90	Chronic bronchitis	248	138	110	243	2		3		24	94	123	2	116	3	2	66	175	1
91	Broncho-pneumonia	427	218	209	406	8		9	4	188	100	111	7	191	62	11	93	144	8
92	Pneumonia	1,725	1,109	617	1,633	27	6	50	10	471	324	586	52	191	103	48	885	488	16
93	Pleurisy	59	46	13	56			2	1	6	21	27	2	2	1	2	39	59	1
*95	Congestion of lungs	120	71	49	118		1	1		39	36	40	3	21	5	5	29	59	6
96	Gangrene of lungs	14	9	5	14					3	5	5	1	1	2		8	6	
97	Asthma	62	36	26	60	1		1		4	26	27	3				29	30	2
98	Emphysema	9	6	3	9							4					6	2	
{ (a) Hemorrhage of lungs		43	34	9	39			3		7	15	12	5	1		1	33	9	
{ (b) Other diseases of respiratory system		24	19	5	22			2		6	6	9	1	1		2	14	7	
V. DISEASES OF THE DIGESTIVE SYSTEM.																			
100	Diseases of mouth	2,405	1,354	1,051	2,303	29	8	39	26	1,103	609	555	36	686	207	95	973	436	8
{ (a) Tonsillitis		7	4	3	7					6	1			6			1		
{ (b) Diseases of pharynx		26	13	13	25			1		12	10	3		2	6	9	6	3	
Diseases of esophagus		8	4	4	8					5				3	1		3	1	
102	Ulcer of stomach	3	1	2	3					1		1		1			2		
103	{ * (a) Gastritis	53	28	25	52	1		1		7	28	17		8	3	40	45	13	
	{ (b) Other diseases of stomach	133	73	60	128	3		2		25	48	53	2	20	6	3	18	19	
104	Dentition	66	45	21	63	3				29	24	10		8	2				
*1007	Diarrhea	10	7	3	10					10	24	3	3	1	584	116			
105	Diarrhea and enteritis (under 2 years)	700	373	327	681	4	3	2	10	653	24								
106	Diarrhea and enteritis (2 years and over)	278	147	131	269	2	1	6		79	104	79	7			48	103	105	4
107	Intestinal parasites																		
{ (a) Hernia		66	36	30	61	2		3		12	19	29	1	7		1	31	27	
{ (b) Obstruction of intestines		152	77	75	147	2		1		60	43	41	3	32	17	7	58	36	2
109	Other diseases of intestines	37	19	18	36	1				9	20	6	1	2	2	1	25	7	
110	Acute yellow atrophy of liver	4	3	1	4					2		2		2					
111	Hydatid tumors of liver	2	2	0						2		2							
112	Cirrhosis of liver	321	230	91	299		2	14	4	37	84	162	16			1	251	69	

113	Biliary calculi	37	17	20	3	1	2	2	3	18	55	12	1	3	2	21	16
114	Other diseases of liver	135	79	56	127	2	1	2	3	1	3	54	3	2	88	42	
115	Diseases of spleen	4	4	3	3	3	1	4	1	51	64	28	3	8	4	11	14
116	Peritonitis (nonpuerperal)	154	68	86	146	3	1	4	5	82	60	46	1	2	38	150	8
118	Appendicitis	198	120	78	189	3	2	2	2	4	4	8	1	1	1	8	8
117	Other diseases of digestive system	9	4	5	7	7	2	2	2	2	2	2	2	2	2	2	2
VI. DISEASES OF GENITO-URINARY SYSTEM																	
119	Acute nephritis	1,740	1,040	700	1,652	34	3	43	8	221	749	645	37	20	8	26	949
120	Bright's disease	56	33	23	54	1	1	1	1	22	19	13	7	10	5	6	28
121	Other diseases of kidneys	1,351	831	520	1,282	24	1	39	6	152	576	523	31	8	3	20	749
122	Calculi of urinary tract	48	35	13	47	1	1	1	1	4	24	16	3	2	22	23	1
123	Diseases of bladder	8	5	3	8	3	2	2	2	1	3	56	42	1	3	5	8
124	Diseases of urethra, urinary abscess, etc.	107	92	15	102	1	2	2	2	3	56	42	1	3	5	8	1
125	Diseases of prostate	44	44	43	43	1	1	1	1	23	19	1	1	1	1	8	35
126	Nonvenereal diseases of (male) genital organs	6	6	6	6	3	1	1	1	3	2	2	1	1	1	6	1
127	Metritis	3	3	3	3	3	3	3	3	10	8	9	3	3	3	22	3
128	Uterine hemorrhage (nonpuerperal)	25	25	20	5	5	5	5	5	10	8	9	3	3	3	22	3
129	Uterine tumor (noncancerous)	31	31	30	1	1	1	1	1	6	6	4	1	1	1	14	8
130	Other diseases of uterus	17	17	16	1	1	1	1	1	14	12	11	1	1	1	40	1
131	Ovarian tumors	41	41	38	1	1	1	1	1	14	12	11	1	1	1	40	1
132	(a) Diseases of tubes	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
133	(b) Other diseases of female genital organs	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Nonpuerperal diseases of the breast (cancer excepted)																	
VII. CHILD BIRTH																	
134	Accidents of pregnancy	262	262	246	2	2	3	3	8	94	81	71	1	1	1	261	1
135	Puerperal hemorrhage	90	90	85	1	1	1	1	4	38	30	17	1	1	1	90	1
136	Other accidents of labor	13	13	13	1	1	2	2	5	5	3	5	1	1	1	16	1
137	Puerperal septicemia	17	17	14	1	1	1	1	4	23	23	21	1	1	1	73	1
138	Puerperal convulsions	73	73	67	1	1	1	1	1	23	23	21	1	1	1	73	1
139	Puerperal phlegmasia alba dolens	33	33	31	1	1	1	1	1	14	13	4	1	1	1	33	1
140	Other puerperal accidents	36	36	36	1	1	1	1	1	10	11	15	1	1	1	36	1
141	Puerperal diseases of the breast	36	36	36	1	1	1	1	1	10	11	15	1	1	1	36	1
VIII. DISEASES OF THE SKIN																	
142	Gangrene	97	58	39	93	2	2	1	1	15	40	34	4	4	1	3	59
143	Carbuncle	54	30	24	53	1	1	1	1	4	25	21	3	2	2	7	45
144	Abscess	4	2	2	4	1	1	1	1	1	2	1	1	1	1	2	1
145	Other diseases of the skin	27	18	9	25	1	1	1	1	7	8	9	1	1	1	3	14
IX. DISEASES OF THE LOCOMOTOR SYSTEM																	
146	Diseases of bones	35	23	12	32	1	1	3	3	11	10	11	1	8	4	3	17
147	Diseases of joints	30	18	12	27	1	1	3	3	11	8	8	1	8	4	3	12
148	Amputation	4	4	4	4	1	1	1	1	1	1	3	1	1	1	4	1
149	Other diseases of organs of locomotion	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
X. MALFORMATIONS																	
150	(a) Hydrocephalus	181	110	71	175	2	2	2	2	172	2	1	1	164	12	3	2
	(b) Congenital malformation of heart, cyanosis	25	16	9	25	1	1	1	1	25	1	1	1	15	6	3	1
	(c) Other congenital malformations	126	79	47	121	2	2	2	2	119	2	1	1	121	4	4	1
		30	15	15	29	1	1	1	1	28	1	1	1	28	2	2	1

* Indefinite and unsatisfactory title. † Order of titles changed.

TABLE 11.—Deaths from each Specified Disease and Class of Diseases, classified by Sex, Race, Nativity, and Age Periods, for California: 1905-1906.—Cont'd.

No.	Cause of Death.	Total Deaths	Male	Fe- male	White	Ne- gro	In- dian	Chi- nese	Jap- anese	WHITE.				Un- der 1 Year	1 to 4 Years	5 to 14 Years	15 to 64 Years	65 Years and Over
										Born in Cal- ifornia	Born in other States	For- eign born	Na- tivity Un- known					
XI. EARLY INFANCY																		
151	{(a) Premature birth.....	851	492	359	813	14	2	13	9	813				851				
	{*(b) Congenital debility.....	455	260	195	438	6	1	4	6	438				455				
	{Other diseases of early infancy.....	345	198	147	327	7	1	9	1	327				345				
	{Lack of care.....	33	22	11	32					1	16			33				
152		18	12	6	16	1			1				18					
153																		
XII. OLD AGE																		
*154	Old age.....	687	396	291	666	7	3	11		4	321	330	11			23	662	2
		687	396	291	666	7	3	11		4	321	330	11			23	662	2
XIII. VIOLENCE																		
155	Suicide by poison.....	3,138	2,552	586	2,939	32	20	85	62	678	804	849	608	119	103	124	2,106	339
156	Suicide by asphyxia.....	147	107	40	142	1		3	1	26	36	47	33			2	126	17
157	Suicide by hanging or strangulation.....	48	42	6	48					13	16	12	7			1	44	2
158	Suicide by drowning.....	53	44	9	38	1		11	3	3	9	19	7				46	6
159	Suicide by firearms.....	15	13	2	14					4	2	7	1				12	3
160	Suicide by cutting instruments.....	157	146	11	148	2			7	25	52	49	22				143	12
161	Suicide by jumping from high places.....	33	30	3	31			1	1	4	8	15	4				27	6
162	Suicide by crushing.....	3	3	2	1	3				1			3				3	
163	Other suicides.....	4	3	1	4			1	1	4			3				4	
164	Fractures.....	14	10	4	12			1	1	4			5				12	2
165	Dislocations.....	145	108	37	138	2		1	4	22	56	53	7		2	3	86	53
166	Burns and scalds.....	2	2	63	185	8	2	6	1	57	82	41	5		7	34	15	2
*167	Burning by corrosive substances.....	202	139	1	3					1			2				130	16
168	Heat and sunstroke.....	3	3	2	11	40				14	5	18	3				20	12
169	Cold and freezing.....	44	33	11	15	1	1	4			4	3	5		1		32	6
170	Lightning.....	33	33		33					10	15	3	5		2		7	1
171	Drowning.....	216	196	21	203	1	3	2	7	63	50	52	38		6	12	23	9
172	Starvation, privation, etc.....	5	5	5	4			1	1				1		1		3	8
173	Inhalation of poisonous gases.....	88	68	20	81	1		2	4	17	21	33	10		2	1	74	11
174	Other accidental poisonings.....	97	51	46	93	1	1	1	1	33	37	20	3		6	19	8	7
175	{(a) Accidental gunshot wounds.....	94	86	8	88	2	2	1	1	30	33	19	6		3	8	82	4
	{(b) Injuries by machinery.....	22	22		21					7	10	4			1	1	19	1
	{(c) Injuries in mines and quarries.....	49	49		48					8	10	22	8				47	1
*166	{(d) Railroad accidents and injuries.....	321	300	21	304	2	1	5	9	45	109	89	61		5	12	271	30
	{(e) Injuries by horses and vehicles.....	79	15	89	31		2	2	2	28	27	27	7		3	14	61	16
	{(f) Other accidental traumatism.....	816	285	31	307		1	4	4	60	102	118	27		4	10	223	57
	{(g) Suffocation.....	21	13	8	19	1			1	14	3	2			12	1	2	5
	{(h) Injuries at birth.....	53	39	14	51	1	1	10		51			15		53		109	5
176	{(i) Homicide.....	119	98	21	93	7	1	4	4	20	25	85	6				11	2
	{(j) Other external violence.....	14	14		11	1	1	31		114	83	146	328			16	292	314
	{(k) Earthquake and fire.....	709	518	191	671				7					19		12		56

XIV. ILL-DEFINED DISEASES		495	343	152	429	12	3	37	9	156	125	108	40	116	24	6	194	144	11
*177	"Dropsy"	18	12	6	17	1	1	1	1	1	9	7	2	2	1	7	7	11	11
*178	Sudden death	14	8	6	14	1	1	1	1	1	6	5	3	3	1	4	4	10	10
	(a) Heart failure	62	47	15	59	1	1	3	3	8	81	22	3	1	1	80	80	30	30
	(b) Inanition (over 3 months)†	18	22	30	50	1	1	1	1	87	7	6	1	38	6	2	2	6	6
	(c) Debility (over 3 months)†	62	11	7	16	1	1	1	1	11	1	8	1	11	2	2	2	2	1
*179	(d) Marasmus (over 3 months)†	2	29	33	57	2	1	1	1	51	4	2	1	49	8	1	3	2	2
	(e) Fever	25	1	1	1	1	1	1	1	7	8	7	2	2	1	13	7	7	2
	(f) Other ill-defined diseases	242	13	12	24	7	7	34	3	45	59	55	82	15	7	5	131	76	8
	(g) Unknown		200	42	191	1	1	7	1	1	1	1	1	1	1	1	1	1	1

* Indefinite and unsatisfactory title.

† Deaths reported from this cause, under 3 months of age, are compiled under "Congenital debility" 151 (b).

STATE HYGIENIC LABORATORY.

REPORT OF THE STATE HYGIENIC LABORATORY.

July 1, 1905, to July 1, 1906.

By ARCHIBALD R. WARD, DIRECTOR.

Assistant Professor of Bacteriology, University of California.

The work of the laboratory, as defined in the legislative Act by which it was established, embraces bacteriological and chemical examinations of a kind to be designated by the State Board of Health. The limited funds available for the support of the laboratory have restricted its activity to only a few of the lines legitimately within its field and for which there is pressing demand. Under instructions from Dr. N. K. Foster, Secretary of the State Board of Health, both routine and research work has been carried on as herein reported.

The dominant idea in equipping and organizing the work of the State Hygienic Laboratory has been to extend to the health officers and physicians in smaller cities and country districts certain laboratory facilities available in the larger cities. To this end, mailing cases, with directions for use, have been prepared and distributed about the State, upon request. Twenty-one towns are supplied with these mailing cases. For the convenience of all concerned, it has been found desirable to deposit the cases in drugstores, where they may be obtained for use by the physician when needed. By this means it is possible for a limited number of outfits to be available for emergency use by the maximum number of physicians. The arrangement is especially desirable for the diphtheria mailing cases, as their contents deteriorate and need to be renewed from time to time.

The distribution of outfits has not been limited to drugstores, nor to health officers, but in numerous instances the cases have been sent directly to such physicians as constantly use them.

The mailing cases are constructed in accordance with regulations of the Postoffice Department governing the transmission of pathological material through the mails. The data cards accompanying the mailing cases for pathological material, etc., from the various diseases, contain on one side blanks for facts to be supplied by the physician, and on the other, blanks for the laboratory record of the material. These cards are uniformly three by five inches, and the blanks for each kind of determination are printed on paper of a distinctive color, as are the circulars of directions, etc.

DIPHTHERIA.

In the control of diphtheria epidemics a laboratory renders valuable assistance. A laboratory report on cultures from the throat is of use in each of the following particulars: (a) early diagnosis of diphtheria, (b) detection of mild cases, (c) differentiating between diphtheria and

tonsillitis, (d) confirmation of positive clinical diagnosis, (e) for determining duration of quarantine after recovery.

The outfit contains a sterile swab, which is to be brought in contact with the suspected throat and afterwards rubbed over the surface of a tube of blood serum. After twelve hours' incubation a microscopic examination is made of the growth. Considerable emphasis is laid upon the necessity for prompt reports on these cultures inoculated at the bedside by the physician. A positive report enables him to apply the antitoxin treatment without the undesirable delay which would be necessitated if he waited for the full development of symptoms upon which to base a clinical diagnosis.

The diphtheria outfits of the laboratory may be sent as first-class mail, when stamped with the necessary postage, eight cents. Care is taken to insure prompt delivery of these cases from the Berkeley post-office. A messenger from the laboratory each evening collects those that have arrived too late for the afternoon delivery, so that they are not delayed over night in the postoffice.

The diphtheria work was undertaken with some idea that the delay during transportation would render the service unsatisfactory to physicians in quarters of the State far distant from Berkeley. Experience has shown the contrary. Diphtheria reports have been of use in an epidemic in Ontario, which town is over five hundred miles distant from Berkeley by rail.

During the year 330 diphtheria culture outfits have been sent in. Sacramento furnished 126, Berkeley 75, Ontario (and Cucamonga) 50, and the rest scattering. The data furnished by the physicians showed that of the 330, 120 were for diagnosis, 115 for release from quarantine, and 95 for confirmation of clinical diagnosis of diphtheria.

Several physicians, who had sent in numerous cultures, were asked for information as to just what use was made of the reports. The replies emphasize the diversity of ways in which laboratory reports are of use:

"In reply to your favor of July 8, I will say that the greatest benefit derived from the examinations for diphtheria bacilli was in convincing certain physicians and school officials of the true nature of the epidemic, and thus making possible the establishment of quarantine and closing of schools. Had examinations been made in the first cases much trouble and expense would have been saved. Probably the next in value is the determination of the length of quarantine; one of my cases having bacilli for at least forty-five days. At this distance the benefits for early diagnosis are not so great as in nearer points, but the detection of mild cases of diphtheria and the positive proof that severe cases of pharyngitis and tonsillitis are not diphtheria, are invaluable. In fact, the laboratory is a boon to the country practitioner who has no time for such work, and to the people of limited means who have no money to pay for private laboratory work."

"In reply to your letter of the 6th instant, I would say that we have found the use of your laboratory valuable chiefly in differentiating diphtheria from tonsillitis. In the epidemic which we had last year in and about Cucamonga the majority of the cases presented the clinical characteristics of tonsillitis, and it was only by your laboratory work that we were able to diagnose and control the disease. In this epidemic none of the cases were fatal, but a few developed serious after effects. From time to time, however, we have had fatal cases of diphtheria in our community, and it is my belief that they have developed from these cases which pass clinically as tonsillitis, but which now, by using your laboratory for the bacteriological examination, we are able to properly class as diphtheria and by the continued and more extended use of the same many lives will undoubtedly be saved."

"Answering yours of the 6th instant in regard to value of work of the State Hygienic Laboratory, would say:

"1. Greatest value of examinations in my practice (made by you) has been to give the voice of authority to diagnoses, insuring more thorough cooperation on the part of

responsible persons. This would come under your heading (d), confirmation of positive clinical diagnosis.

"2. Work has not happened to prove of value to me in early diagnosis of diphtheria, as I have used diphtheria antitoxin in every case where I made a clinical diagnosis, without waiting for bacteriological diagnosis.

"This is in large part due to conditions arising out of our extremely poor mail facilities. Same is true of (b), detection of mild cases. In one case where there was an element of doubt as between scarlet fever and diphtheria, bacteriological examination decided, although the clinical diagnosis in that case was scarlet fever.

"In its saving to municipalities, in insuring more thorough quarantine regulations and thereby cutting down net losses, not only municipal, but also individual, the wisdom of the establishment of this laboratory has, in my judgment, been completely vindicated.

"An experience in a diphtheria epidemic in Golien, Mich., in 1897-9, covering upward of 87 cases, where we were deplorably handicapped by lack of just such facilities, enables me to appreciate the work of the laboratory as I might possibly not otherwise."

"I can not too highly commend the excellent work that the Hygienic Laboratory is doing—and for my part, it has rendered inestimable service to myself during the recent diphtheria epidemic that has visited this town. Unfortunately, during the early weeks of the disease we were unaware that such help existed, and it was only when the trouble reached such a climax that we were forced to seek aid from Dr. Foster that he told us of the laboratory, and from then on our labors were lightened and the mischief began to disappear. Before we knew of the laboratory the deaths from the disease by percentage were great, and since we began using your institute we have had no deaths from diphtheria at all. We were able to make an early diagnosis and institute appropriate measures; moreover, we were able to keep under supervision suspicious cases until we heard from you, and thus limit the spread of the disease. Personally, I have used your laboratory on every case of mine and it has been a great relief to me in many ways, and I can never thank you and your assistants sufficiently for the great aid you have been to me, and I am confident that, were your institute better known, it would be the means of saving the lives of many little ones."

[All diphtheria blanks are blue.]

DIRECTIONS FOR COLLECTING SPECIMENS FOR EXAMINATION FOR DIPHTHERIA BACILLI.

STATE HYGIENIC LABORATORY—UNIVERSITY OF CALIFORNIA, BERKELEY.

Directions for Taking Specimen.

Place patient in good light, and if a child, hold properly.

Depress the tongue so as to get a clear view of throat.

With swab rub the suspicious portions firmly, twisting it around while in contact with patch.

Remove swab from throat without touching other parts of mouth if possible. Without laying down the swab perform the succeeding manipulations.

Warm the mouth of the tube of culture medium to melt paraffin, which facilitates the removal of the cotton stopper.

Remove cotton stopper from culture tube and hold between fingers, gently rubbing the swab over the culture medium without injuring its surface.

Replace cotton in culture tube and replace swab in the other tube and plug with cotton stopper.

Place in case and send immediately to laboratory. In order to prevent breakage, wrap the two tubes carefully in the manner in which they were received.

An antiseptic used immediately prior to taking the specimen will interfere with the subsequent development of the culture.

Old dried culture medium is undesirable and may retard the growth of the organisms.

RECORD CARDS FOR EXAMINATIONS FOR DIPHTHERIA BACILLI.

STATE HYGIENIC LABORATORY—UNIVERSITY OF CALIFORNIA, BERKELEY.

Please fill out this blank in full and return to laboratory with culture.

Patient's name	Address
Physician's name	Address
Health Officer's name	Address
Has case been reported on before?	When?
Patient's age	Sex
Date of earliest symptoms	This is the 1st, 2d, 3d culture.
How contracted	Date of taking culture
Has antitoxin been used?	Is membrane present?
Has antiseptic been used within two hours in mouth or throat?	When?
Clinical diagnosis	Amount

Report by { telephone
telegraph (collect)
mail

DIPHTHERIA.

Examination No.
 Date received Hour
 Placed in incubator Examined
 Result:
 Type of bacillus on swab
 Type of bacillus in culture
 Associated bacilli
 Remarks
 Reported by { telephone } By Date
 { telegraph }
 { mail }

REPORT BLANK FOR EXAMINATIONS FOR DIPHTHERIA BACILLI.

STATE HYGIENIC LABORATORY—UNIVERSITY OF CALIFORNIA.

BERKELEY,, 190...

Dr.
 DEAR SIR: In the examination of the culture from the case
 of taken
 diphtheria bacilli were found.
, Director.

Circumstances Influencing Interpretation of Results Obtained.

No diphtheria bacilli may be found in culture for a variety of reasons, as (a) use of antiseptic wash or spray in throat before taking specimen; (b) failure to apply swab thoroughly to affected region of throat; (c) failure to smear infected portion of swab over blood serum; (d) or actual absence from throat. If old dried culture tubes are used, no development or scanty growth may occur. In case of positive findings it is desirable that another test be made after the complete disappearance of membrane, before case is released from quarantine.

TYPHOID FEVER.

The Widal test is made upon blood collected dry, upon an aluminum sheet, after the method described by Dr. F. F. Wesbrook, director of the laboratory of the Minnesota State Board of Health. Thirty-two Widal tests have been made.

[All typhoid fever blanks are white.]

DIRECTIONS FOR COLLECTING SPECIMENS FOR WIDAL TEST, AND RECORD CARDS FOR THE SAME.

STATE HYGIENIC LABORATORY—UNIVERSITY OF CALIFORNIA, BERKELEY.

Outfit for Collecting Specimen of Blood for Serum Diagnosis of Typhoid Fever.

Remember that a reaction does not often occur before the end of the first week of the disease. To insure a satisfactory test, observe carefully the following directions:

Securing Sample: Wash lobe of ear or finger tip thoroughly with boiled water. Pierce skin with clean needle, and with enclosed wire loop transfer four or five droplets of blood to different spots on edge of enclosed sheet of foil. ALLOW BLOOD TO AIR DRY AT ROOM TEMPERATURE (never heat it), then fold over foil to protect blood clot.

Sending Sample: Enclose folded aluminum sheet and wire loop in this envelope, together with data blank (properly filled out), and mail to laboratory.

Telegraphic reports will be sent when requested, charges collect.

STATE HYGIENIC LABORATORY—UNIVERSITY OF CALIFORNIA, BERKELEY.

Please fill out blank in full and send to laboratory with dried blood.

Patient's name Address
 Physician's name Address
 Health Officer's name Address
 Has this case been reported before? When?
 Patient's age Sex This is the 1st, 2d, 3d specimen.
 How long since disease commenced? Date of taking specimen
 Supposed source of infection
 Has patient been away during month previous to illness?
 When, if ever before, has patient had typhoid fever?
 Clinical diagnosis

Report by { telephone }
 { telegraph (collect) }
 { mail }

TYPHOID FEVER.

Examination No.		
Date received	Hour	
Age of culture	Strain	
Dilution	Agglutination	Time
Remarks		
Reported by { telephone { telegraph { mail	By	Date

REPORT BLANKS FOR EXAMINATIONS FOR TYPHOID FEVER.

STATE HYGIENIC LABORATORY—UNIVERSITY OF CALIFORNIA.

Dr. BERKELEY,, 190...

DEAR SIR: The specimen of blood of
 taken diluted
 the reaction characteristic of typhoid fever.

Director.

Circumstances Influencing Interpretation of Results Obtained.

The reaction characteristic of typhoid fever is not likely to occur earlier than the fifth day of the disease.

The reacting substance persists in the blood for a considerable time after recovery. One must therefore be sure that a previous attack has not happened within two years.

"A negative result obtained with the serum of a case of suspected typhoid affords a presumptive evidence against the diagnosis of typhoid fever, but this is only probability, especially if the examination has been made in the first few days of the disease. The examination should then be repeated within the next few days. The presumption that a case in which a negative result has been obtained is not typhoid, becomes stronger as the stage of the disease becomes more advanced." (Widal.)

In doubtful cases we will examine later samples of blood at intervals of about two days, until diagnosis is settled.

Please let us know if the course of the case shows anything different from what our findings would lead you to expect.

TUBERCULOSIS.

Fifty-four examinations of sputum for tubercle bacilli have been made.

{All tuberculosis blanks are yellow.}

DIRECTIONS FOR COLLECTING SPUTUM.

STATE HYGIENIC LABORATORY—UNIVERSITY OF CALIFORNIA, BERKELEY.

Directions for Collecting and Sending Sputum.

The expectoration discharged in the morning is preferred.

Have the patient wash out the mouth and throat with pure water early in the morning and then cough up the sputum from the lower air passages.

Care should be taken that the contents of the stomach, articles of food, etc., are not discharged during the act of expectoration and collected instead of the ordinary sputum. Purulent, cheesy, and muco-purulent sputum most frequently contain the bacilli; pure mucus, blood, or saliva do not, as a rule, contain the bacilli.

If the expectoration is scanty, the entire amount discharged in twenty-four hours should be collected.

The sputum should not be kept, but forwarded in as fresh a condition as possible.

RECORD CARDS FOR EXAMINATIONS FOR TUBERCLE BACILLI.

STATE HYGIENIC LABORATORY—UNIVERSITY OF CALIFORNIA, BERKELEY.

Please fill out this blank in full and send to laboratory with sputum.

Patient's name	Address
Physician's name	Address
Health Officer's name	Address
This is the 1st, 2d, 3d specimen discharged during	Date
Patient's age	Sex
Occupation	
Are there other cases in the same household?	If so, how many?
Clinical diagnosis	
Report by { telephone { telegraph (collect) { mail	

TUBERCULOSIS.

Examination No.
 Date received Hour.....
 Result:
 Number of tubercle bacilli
 Associated bacilli
 Other contents of sputum.....
 Remarks
 Reported by { telephone } By Date.....
 { telegraph }
 { mail }

REPORT BLANKS FOR EXAMINATIONS FOR TUBERCLE BACILLI.

STATE HYGIENIC LABORATORY—UNIVERSITY OF CALIFORNIA.

BERKELEY,, 190..

Dr.

DEAR SIR: In the examination of the specimen of sputum
 from taken.....
 tubercle bacilli were found.

..... Director.

Circumstances Influencing Interpretation of Results Obtained.

If the result of the examination is negative, it is not to be assumed that the case is not one of pulmonary tuberculosis, for frequently, in this disease, tubercle bacilli are at times absent from the sputum and the disease can only be probably excluded if repeated examination of the sputum fails to show the presence of bacilli. If the first examination in a case is negative, other specimens should be sent for examination.

The demonstration of the presence of tubercle bacilli in the sputum proves conclusively the existence of tuberculosis, but the absence of tubercle bacilli, or the failure to find them microscopically, does not exclude the existence of the disease.

BUBONIC PLAGUE.

One culture from a suspected case of bubonic plague was submitted by a municipal laboratory, in order that another independent conclusion might be reached. A detailed study of the culture, and of the lesions produced by it in guinea pigs, led to its recognition as *B. pestis*.

WATER SUPPLIES.

Sixty-seven samples of water have been examined with reference to sewage pollution. The impression exists in many quarters that a bacteriological examination of the water supply during a typhoid epidemic will determine exactly whether or not the water is the source of infection. Much more conclusive evidence could be obtained by a careful study of a history of the cases with particular reference to the source of their drinking water, previous to attack. To insure the most satisfactory results, it is desirable that the judgment of the character of a water supply be drawn from facts derived by (a) sanitary survey of the source, (b) bacteriological examinations of samples preferably collected by an expert, (c) chemical analysis. In reporting on many samples of water it has been necessary to rely upon persons submitting the sample, for information about the sanitary condition of the source. For the chemical work, Prof. George E. Colby, of the College of Agriculture, has generously contributed his services.

To put this branch of the laboratory in a thoroughly satisfactory condition will require a large amount of bacteriological work to deter-

mine the kinds and numbers of bacteria present in the various sources of water supply at different seasons.

The demand for the study of water supplies and the importance of the subject warrants the addition of two experts to the staff of the laboratory to handle the water work.

[Water blanks are pink and red.]

DIRECTIONS FOR COLLECTING SAMPLES OF WATER.

STATE HYGIENIC LABORATORY—UNIVERSITY OF CALIFORNIA, BERKELEY.

Directions for Collecting Samples of Water.

The outfit for obtaining water samples consists of two parts. The gallon bottle is for the sample for chemical analysis. The small bottle, for the sample for bacteriological examination, has been sterilized before being sent from the laboratory and must not be opened until ready to collect. The two bottles must be filled at the same time and at the same place.

Sample for Bacteriological Examination.

When you are ready to take the sample, not before, take the small bottle from the can. Under no circumstances touch the stem of the stopper, nor allow the inside of the neck of the bottle to touch anything. Do not lay the stopper down, but hold it in the fingers by the head until sample is taken.

From a Stream, Pond, or Reservoir: Loosen, without removing, the stopper. Hold the bottle in one hand and the stopper in the other. Lower bottle about a foot below the surface, avoiding any scum or sediment. Then remove the stopper quickly to a distance of one foot. Turn the mouth of the bottle away from the hands and move it forward while it is filling. If there is a current, turn the mouth of the bottle against it. The bottle must be filled only to the base of the neck, leaving an air space. Replace the stopper and immediately fasten it in securely with the foil.

From a Tap: Allow the water to flow 10 minutes before filling the bottle. Do not rinse out the bottle.

From a Pump: Pump should be in continuous operation for at least 10 minutes, preferably half an hour, before sample is taken.

Place the small bottle in the smaller can and press the lid down. Then pack it in broken ice and excelsior in the larger can.

Sample for Chemical Examination.

Before collecting a sample, the bottle and stopper must be thoroughly rinsed twice with the water to be examined, and neither the inside of the neck of the bottle nor the stem of the stopper must be touched by the hand or wiped with a cloth during or after these operations.

After rinsing, fill the bottle to a point about 2 inches below the bottom of the stopper. Secure the stopper in the bottle by means of a clean cloth, or a clean heavy paper, double if necessary and tie about the neck of the bottle.

From a Tap, Spigot, or Hydrant: Allow the water to run for fully 10 minutes before collecting, then rinse and fill the bottle as directed above.

From a River, Pond, Reservoir, or Basin: Rinse the bottle as directed. Lower it, with the stopper in place, into the water to a depth of 12 inches below the surface, remove the stopper, allow the bottle to fill completely and replace the stopper before bringing to the surface to avoid collecting any scum. When brought to the surface, pour out a small quantity so that the sample shall fill the bottle to a point 2 inches below the bottom of the stopper. If the water is shallow, collect the running water in a clean vessel and pour into bottle. Precautions must always be taken not to stir up any sediment.

Shipping.

Fill out fully the card, in the envelope attached to the lid, according to the direction printed thereon, and then replace in same envelope. Place both bottles in their proper compartments in the shipping case, lock the box with the enclosed padlock and ship, by express, prepaid, to the State Hygienic Laboratory, University of California, Berkeley, Cal., as soon after collection as possible. Samples should not be sent so as to be en route over Sunday.

RECORD CARDS FOR WATER EXAMINATION.

To be filled out by person collecting sample.

Time of collection: Year?.....Month?.....Day?.....Hour?.....Min.?.....a.m. or p.m.?

(Give exact description of source, whether from tap, stream, reservoir, or pond, and if there are any unusual conditions these should be noted under the head of "Remarks.")

Sample from

Remarks

Collected by

STATE HYGIENIC LABORATORY—UNIVERSITY OF CALIFORNIA, BERKELEY.

Chemical Examination of Water.

(Parts per million.)

Serial No.	Received.			Temp.	Odor.	Appearance.		Residue on Evaporation.			
	Year, Day, Month.	Hour.	A. M. or P. M.			Turbidity.	Color.	Total Solids.	Suspended Matter.	Dissolved Mineral Matter.	Loss on Ignition.
Nitrogen as											
Free Ammonia.	Organic Nitrogen.	Albuminoid Ammonia.	Nitrites.	Nitrates.	Oxygen Dissolved.	Chlorine.	Iron.	Acidity.	Alkalinity.	Incrustants.	Total Hardness.
											Free Carbonic Acid.

STATE HYGIENIC LABORATORY—UNIVERSITY OF CALIFORNIA, BERKELEY.

Bacteriological Examination of Water.

Examination No. Age of sample. Date

Agar plates: Inoculated with Incubated for ... hrs. at Average

Gelatin plates: Inoculated with Incubated for ... hrs. at Average

Colonies per c.c.

Glucose bouillon: Incubated at for

Amount Used.	100 c.c.	10 cc.	1 c.c.	0.1 c.c.	0.01 c.c.
Gas					
H CO ₂					

Remarks

Presumptive tests for *B. coli*:

Character of Colony on Litmus Lactose Agar.	Ordinary Agar.	Gelatin.	Fermentation Tube.				Indol	Milk coagulation.	Reduction of Nitrates.
			Turbidity.	% Gas.		H CO ₂			
				24 hrs.	48 hrs.				

Reported by { telephone }
 { telegraph } by Date

MISCELLANEOUS PATHOLOGICAL WORK.

Ninety-six determinations of various kinds have been made. These comprise examinations of material from cases of anthrax, glanders, gonorrhea, and examinations of blood, milk, and urine. The urine and blood work was done for the physicians in charge of the hospital for San Francisco refugees, established on the University campus.

[Miscellaneous blanks are salmon.]

RECORD CARDS FOR MISCELLANEOUS EXAMINATIONS.

STATE HYGIENIC LABORATORY—UNIVERSITY OF CALIFORNIA, BERKELEY.

Miscellaneous Examinations.

Material.....	Animal.....
Received from.....	Address.....
Description of material.....	
Clinical diagnosis.....	
Cultures.....	
Examination No.....	
Injected into.....	
Result.....	
Microscopical examination—	
Direct.....	Embedded in.....
Hardened in.....	Stained.....
Sectioned.....	
Result.....	
Chemical examination.....	
Reported by { telephone } { telegraph } { mail }	By..... Date.....

ASSISTANCE TO THE SAN FRANCISCO HEALTH COMMISSION.

Owing to the crippled condition of the bacteriological laboratory of the San Francisco Health Commission, a considerable amount of culture media has been supplied to them. At the request of Dr. D. F. Ragan, the Health Officer of San Francisco, an examination was made of some bottled "soft drinks" made in Oakland, and sold in large quantity in San Francisco shortly after the fire. A quotation from the report made to Dr. Ragan is herewith presented: "The important fact revealed by the bacteriological examination of these beverages is that the water of which they were made was not boiled. The last three, judged as drinking water, from a bacteriological standpoint, would be reported 'probably unsafe.'"

MUNICIPAL MILK SUPPLY.

During the summer of 1905, Dr. George F. Reinhardt, Health Officer of Berkeley, enforced the dairy ordinance requiring that cows supplying the town be tested with tuberculin. The opposition of the dairymen resulted in the disclosure of legal flaws in the ordinance, which prevented the completion of the work. The writer supervised the testing of the cows and herewith presents some extracts from a report on the work, made to the town health officer:

STATISTICAL SUMMARY.

<i>All Dairies—</i>	
Number of cows tested.....	383
Number of cows approved.....	319
Number of cows condemned.....	64
Retest, not included in other figures.....	4
Per cent condemned.....	16.7
<i>Large Dairies—</i>	
Number of cows in dairy over five.....	329
Number of cows approved.....	267
Number of cows condemned.....	62
Per cent condemned.....	18.8
<i>Small Dairies—</i>	
Number of cows in dairies of five and less.....	54
Number of cows approved.....	52
Number of cows condemned.....	2
Percent condemned.....	3.6

Of the sixty-four animals condemned, I regarded nine as showing physical signs of tuberculosis and would have condemned them without the additional evidence furnished by their reacting to the test. The others would not have been recognized as tubercular unless the test had been used. It does not follow that a cow reacting to the tuberculin test, but not showing physical signs of tuberculosis, is not a source of danger to public health and to other animals. On the contrary, it is a well-recognized fact that cows may frequently appear in the best of condition and yet be extensively affected with tuberculosis. Dairymen keep weeding out those cases which are visibly diseased, in their judgment, but the practice does not materially improve conditions with respect to the existence of tuberculosis in the herds. Any inspection for tuberculosis, other than by the use of the tuberculin test, will fail to accomplish the desired purpose.

The fact that 18.8 per cent of all cows tested in large dairies about Berkeley were tubercular, and that of the cows isolated from others of their kind only 3.6 per cent reacted, illustrate well the contagious nature of tuberculosis.

The experience of others, and my own in similar work elsewhere, leads me to conclude that the above figures regarding the percentage of tuberculosis in large dairies do not give an exaggerated idea of the conditions existing in other large dairies. Once it has been my disagreeable duty to condemn thirty-five per cent of a herd of one hundred and twenty cows. In such large dairies where the tuberculin test has not been used to improve conditions, the percentage of tuberculosis will be found much higher than the general average found so far in Berkeley dairies.

CHEMICAL WORK.

No chemical work such as herein reported would have been possible but for the generous assistance of chemists of the Agricultural Department of the University. Professor Colby's assistance has been mentioned in connection with the discussion of water examination.

The examination of food products with reference to their nutritive value and with reference to the presence of preservatives, or adulterants, is a branch of public health laboratory work, the importance of which is obtaining wide recognition. To enable the laboratory to meet the demand for this class of work, Prof. M. E. Jaffa has kindly volunteered his services, and herewith submits a report on the chemical work done for the State Hygienic Laboratory:

It has been the ardent wish of the Food Laboratory of the University of California to have exercised in this State a modern Food Inspection law, similar to the Fertilizer Control law. Therefore, with a view of creating a greater demand for, and exciting public interest in, this line of work, the personnel of the Food Laboratory has done all that it could, with its limited facilities, to assist the State Hygienic Laboratory.

Chemical analyses have been made of foods and other materials received from different parts of the State. The nature of the examinations has been very varied, as will be seen by a review of the data here presented. A small portion of the work accomplished has appeared from time to time in the bulletins of the State Board of Health, but by far the major part has been of purely local interest, so has not been made public. Among the important analyses made at laboratory, the following may be cited:

Evaporated Creams.—In response to many inquiries concerning the nutritive value of so-called evaporated creams, a systematic investigation was undertaken of all samples of those foods to be found in the local market.

Analyses of so-called Evaporated Creams.

Lab No.	Brand.	Manufacturer.	Water.	Casein, etc.	Fat.	Lactose.	Mineral Matter.
512	Carnation brand sterilized cream	Pac. Coast Cond. Milk Co.	76.78	6.06	7.50	8.11	1.55
519	California Poppy brand evaporated cream	Cold Brook Creameries	78.90	6.23	5.90	7.80	1.17
520	Isleton evaporated cream	Western Creameries Co.	77.99	5.88	6.90	8.00	1.23
546	Lily cream	Pacific Creamery Co.	78.21	6.12	5.40	8.91	1.36
547	Jersey evaporated sterilized cream	Cond'sed Milk Co. of Cal.	80.22	5.55	4.80	8.18	1.25
548	Highland brand evaporated cream	Helvetia Milk Cond'g Co.	72.48	7.56	7.50	10.86	1.60
549	Yacht brand evaporated cream	Borden Cond. Milk Co.	75.28	7.15	8.10	7.84	1.63
586	Pet brand evaporated cream	Helvetia Milk Cond'g Co.	70.47	7.57	9.90	10.42	1.64
587	Red Ribbon evaporated cream	Elmira Cond. Milk Co.	78.81	5.87	5.70	8.33	1.29
588	Silver Cow evaporated cream	St. Charles Milk Cond. Co.	70.73	7.42	9.30	10.93	1.62
593	Alpine cream	Alpine Evap. Cream Co.	75.13	6.72	7.20	9.46	1.49
594	Pioneer brand evaporated cream	Borden Cond. Milk Co.	70.45	7.27	10.20	10.55	1.53

No determinations were made on the above samples for either adulterants or preservatives. The investigation was undertaken with a view of showing the necessity of a food inspection law which would enable consumers to buy food materials honestly labeled.

These tabulated results show that the "evaporated creams" do not approach in fat content that of an average cream, which should contain at least twenty per cent fat. The food value of these products is about double that of ordinary milk, and consequently they should be labeled "condensed milk."

On the Occurrence of Hydrocyanic Acid in Johnson-Grass.—Word was received at the University of California that cattle were dying at Los Banos. Owing to the nature of the symptoms it was decided to make a chemical analysis of Johnson-grass (*Sorghum halepense*), which appeared to be the cause of the deaths. The result of the chemical analyses showed conclusively that the grass contained hydrocyanic acid in appreciable quantities. A request was then made to the owner of the cattle for another specimen of the Johnson-grass, and also of one of a rank-growing grass at the same stage of growth as the Johnson-grass, but which did not kill the cattle. Upon receipt of the specimens at the laboratory, chemical examinations were made, with the result that hydrocyanic acid was found in the fresh Johnson-grass to the extent of five-hundredths of one per cent; and to be entirely absent from the other specimen—barnyard-grass (*Panicum crus-galli*). This is the first time in California (to our knowledge) that hydrocyanic acid has been found in Johnson-grass. In Bulletin No. 77, issued in January, 1903, by the Agricultural Experiment Station of the University of Nebraska, are given the results of a similar investigation made there with reference to common sorghum and kaffir corn, both of which are relatives of the Johnson-grass. The following paragraph, referring to antidotes, is taken from the bulletin in question:

"Prussic acid has a tendency to unite with certain carbohydrates, forming additional products. These compounds are much less poisonous than the free acid. Both glucose and milk sugar unite with prussic acid to some extent even in dilute solutions. Aside from this action these carbohydrates retard the action of enzyme in liberating prussic acid. These facts suggest that, in case the animal is not in such a condition as to render medical treatment out of the question, the following may be effective: A strong solution of glucose, which nearly every farmer has on hand in the form of 'corn syrup,' or molasses, may be administered. Large quantities of milk have in a number of instances been administered, apparently with good effect. In all cases the animal should have as much fresh air as possible."

Lye-peeled Peaches.—Much discussion has arisen concerning the safety of the process of treating peaches with lye so as to admit of rapid and economical peeling of the fruit to be canned. The fruit is immersed in hot lye for a very short period and is then washed several times with cold water, thus removing the alkali. In order to test the alkalinity of the juice of canned peaches put up by the lye process, and compare it with that of the fruit as usually canned, two analyses were made—one of lye-processed peaches and the other of a can of hand-peeled fruit. The result of the analyses showed that neither can showed alkaline juice. The acidity of can No. 38 was 0.32 per cent calculated in terms of sulphuric acid, while that of can No. 4 was 0.39 per cent. These figures are only very slightly below, if at all below, the acidity of a ripe peach. We have data for the acidity of some ripe peaches which show 0.5 per cent, which is very little higher than that shown in No. 4. There is nothing harmful in any way in these peaches.

Chemical Investigation for Board of Health of Santa Clara County.—These analyses were made in accordance with requests of Dr. Simpson to the State Hygienic Laboratory, and included a considerable number of samples of canned fruit and vegetables. It

is a source of satisfaction to know that none of the samples tested were found to contain any preservative, or subject deleterious to health.

Work Done for Board of Health, Point Richmond, Cal.—During the last three months this laboratory has examined twenty-five samples of milk for Dr. Barney, Health Officer, Point Richmond, with reference to the chemical composition and adulterants. Two of the samples submitted showed the presence of formalin in appreciable quantities. The use of this antiseptic, however, has been discontinued, through the energetic efforts of Dr. Barney.

Milks.—A large number of analyses of samples of milk and cream have been made in response to inquiries sent in from Alameda and other parts of the State. In every case preservatives have been tested for in addition to the usual analysis made for the purpose of ascertaining the quality of the milk.

Examination of Miscellaneous Samples of Foods and Food Products, Preservatives, etc.—These have included the analyses of specimens of grape juice (1), raspberry wafers (2), flours (6), butters (3), condensed milks (5), creams (10), hay (2), formalin (5).

Toxicological Work.—In addition to the work done on foods and food products, no inconsiderable time was spent on examinations of materials for the occurrence of poisons. Prominent among such was the testing of organs from animals suspected of having died of poisoning. In response to the request of the Napa State Hospital, examinations were made of contents of stomachs of some cows which had died under suspicious circumstances. Tests were made for common poison in the contents of the stomach and also of some of the organs, as the liver, etc. Negative results were obtained in every case. The contents of stomachs showed high alkalinity which suggested poison by lye; a further examination showed the presence of an excess of potash. This fact, in connection with the symptoms, conclusively showed that the animals had died of lye poisoning.

M. E. JAFFA.

INVESTIGATIONS OF THE SAN FRANCISCO MILK SUPPLY.

On October 3, 1905, the Board of Supervisors of the City and County of San Francisco passed the following resolutions, afterwards approved by the Mayor:

Resolved, That Professor A. R. Ward, Director of the State Hygienic Laboratory, at the University of California, and Professor M. E. Jaffa, also of the University of California, be and they are hereby requested to inspect the dairies and investigate the milk industry of the city;

Further resolved, That the sum of \$925 be and it is hereby set aside out of the fund for urgent necessities to cover the expense of bacteriological examinations of milk.

Later, to provide for a continuance of the work, a similar resolution was passed, as follows:

Resolved, That the sum of seven hundred dollars (\$700) be and is hereby set aside out of the appropriation for urgent necessities to complete the investigation of the dairies and milk supply of this city under the direction of the State Hygienic Laboratory of the University of California.

A staff of assistants to carry on the necessary field and laboratory work was organized with all possible expedition. Work was carried on for about three months, during which time it was possible to make a thorough survey of the condition of the San Francisco milk supply. Besides the inspections of dairies and cows, a large amount of microscopical work was done in the examination of milk for leucocytes.

Herewith are presented copies of the two reports made to the San Francisco officers regarding the character of the milk supply. A paper on "The Numerical Determination of Leucocytes in Milk," based on data obtained in the San Francisco milk investigations, forms a part of the present report.

DR. A. A. D'ANCONA, *San Francisco, California.*

DEAR DOCTOR: We herewith present a preliminary report of the special investigation of the San Francisco milk supply conducted by us during the past four weeks.

In view of the public alarm over the use of chemical preservatives in milk we have endeavored to examine for such substances as many samples as possible. These represent the product as it reaches the city, and as it is sold to the consumer from wagons, bakeries, and groceries.

Five hundred and forty-nine (549) samples of milk and cream have been analyzed for boracic acid compounds, formaldehyd, carbonates, and coloring matter. Boracic acid was found in five (5) samples—four cream, three of which were labeled "Borated Cream," and in one sample of milk. (See Appendix A.) None of the other substances mentioned above were found in any case. Tests were made for fluorids in all samples not soured within twenty-four hours after arrival at the laboratory, but the result was negative in every case.

In four hundred and forty-six (446) samples, representing the milk as it reaches the consumer, the specific gravity was determined and quantitative determinations were made for fat and ash. In thirty-eight (38) samples the fat was below the three per cent (3%). Details concerning these appear in Appendix B. In sixty-seven (67) samples the fat per cent ranged from 3 to 3.3 per cent, inclusive. (See Appendix C.) A map showing areas covered by city collector is appended.

Of the total number mentioned, one hundred and three (103) analyses were made of samples representing the milk as it reaches the city via train, boats, and wagon. In each case quantitative determinations were made for all of the milk constituents, in addition to the tests for preservatives above noted. These samples represent practically all of the large producers supplying the city. Of these, only three (3) showed a fat content under 3.4 per cent and none under 3 per cent. (See Appendix C.) No preservatives were found in any samples.

It should be stated that the casein and ash percentages were lower in many cases than the average generally accepted. This does not mean that the milk in question had been sophisticated, for the fat and sugar contents were normal, but merely indicates a condition not usually supposed to exist. Consequently a duplication of samples is desirable in these cases.

The exceptionally good showing of the samples examined for preservatives can hardly be taken as indicating the condition of the milk at other seasons of the year. The recent great popular protest, the hue and cry of the press, and the activity of the City Board of Health, have doubtless been the means of checking the use of preservatives in the milk. It should be noted that the present season furnishes the most favorable conditions for the keeping of milk without the use of chemical preservatives.

The number of leucocytes in milk, and the significance thereof, is receiving the serious attention of progressive health departments at present. Methods for the determination of leucocytes are being gradually perfected, and the number of leucocytes to be regarded as abnormal is still a subject of investigation.

We have made two hundred and twenty-seven (227) microscopic examinations for leucocytes, and find that in but one case have they exceeded the tentative standards set by health departments of Philadelphia and Boston. We believe, however, that before drawing conclusions it would be highly desirable that these laboratory investigations should be accompanied by a careful examination of the udders of the cows; but the opportunity to do this has been limited.

An important phase of an investigation of the kind in which we are engaged is the sanitary inspection of all dairies supplying milk to the city, and of milk depots in the city. Our inspectors are provided with printed blanks, in which are enumerated, in condensed form, the points covered by the San Francisco dairy ordinances. They are also provided with a score card adopted by the State Dairy Bureau. By the intelligent use of these blanks it is possible to collect accurate data regarding the sanitary condition of the dairies and the condition of the udders of the cows as regards disease. Specimens of the blanks mentioned are submitted in Appendix D. About twenty-five (25) dairies outside of the city have been inspected, the score averaging seventy-seven (77) out of a possible one hundred (100) points. About twenty-five (25) milk depots have been inspected.

Statistical Summary.

Total number of samples examined chemically.....	549
Samples subjected to complete chemical analysis.....	103
Samples from vendors, examined for specific gravity, fat, ash, and preservatives.....	446
Samples from vendors, illegally containing boracic acid compounds ..	2
Samples from vendors (cream), labeled "Borated".....	3
Samples from vendors containing other preservatives or coloring matter.....	none
Samples from vendors containing less than 3% fat.....	38
Samples from vendors containing between 3% and 3.3% fat, inclusive..	64
Samples representing milk as it arrives in the city.....	103
Of these, containing less than 3% fat.....	none
Of these, containing less than 3.4% fat.....	4
Of these, containing preservatives or coloring matter.....	none
Total number of examinations for leucocytes.....	227
By the Doane-Buckley method.....	126
By the Philadelphia Bureau of Health method.....	101
Total number of numerical determinations of bacteria.....	35
Number of samples exceeding 500,000 per c.c.....	1
Number of samples below 500,000 per c.c.....	34
County dairies inspected.....	25
City milk depots inspected.....	25

Plans for Completion of Investigation.—About seventy-five dairies in the country have not yet been inspected and about the same number of milk depots in the city should be visited. This is obviously important in connection with an undertaking of this kind, and especially so as we are devoting attention to the condition of the cows' udders. This latter phase referred to is essential in throwing light upon the significance of leucocytes in milk. As yet, comparatively few numerical determinations have been made of the bacteria in milk.

The study of the subject of pathogenic bacteria in milk would be incomplete without examinations for tubercle bacilli. This requires that the samples be centrifuged and that guinea pigs be inoculated with the sediment thus obtained.

Many of the samples have shown a low casein and ash content, far below the accepted normal, while other constituents remained normal. In view of this, it seems highly desirable that further quantitative determinations be made on samples from dairies that have previously shown this abnormality. This point is of importance in connection with the careful modification of milk for infant feeding.

In conclusion we will say, in our opinion, the progress of the work, as outlined by the resolutions of your Board, is approximately half completed.

Respectfully submitted.

(Signed) M. E. JAFFA.

A. R. WARD.

APPENDIX A.

Samples found Adulterated with Boracic Acid Compounds and not so marked.

Lab. No.		Taken at	Nature of Sample.	Date.	Boracic Acid per cent.
180	L. Hauser.....	2216 Fillmore Street ..	Unbranded bo- rated cream.....	Nov. 20	-----
528	H. Mesenburg	370 Hayes Street	Unbranded bo- rated milk	Dec. 8	-----

APPENDIX B.

Summary of Determinations of Fat Ranging Below Three Per Cent.

Lab. No.		Taken at	Date.	Fat, per cent.
11	Prost's Bakery.....	226 Third Street	1905 Nov. 14	2.3

(In the original report this consisted of a record of thirty-eight samples, arranged like the above, but here omitted.)

APPENDIX C.

Summary of Determinations of Fat Ranging from 3.0 to 3.3 Per Cent inclusive.

Lab. No.		Taken at	Class of Business.	Date.	Fat, per cent.
3	J. E. Wagner	347 Fourth Street		1905 Nov. 14	3.2

(In the original report this consisted of a record of sixty-five samples, arranged like the above, but here omitted.)

APPENDIX D.

(Blanks used in dairy inspections.)

Blank for report on Inspection of Dairies with respect to the San Francisco Dairy Ordinances.

Owner.....	Location.....	A. M.....	P. M.....
No. cows.....	No. dirty.....	%; No. diseased.....	%
Diseases.....			
Stable floor wood, cement, leaky, gutter, drain.....			
Stable walls whitewashed. Lighting sufficient. Bucket rest.....			
Privy or manure inside. Beds. Feed. Troughs clean.....			
Manure accumulates outside. Cows access to. Cows' drinking water.....			
No. milkers.....	Clean.....	Wash.....	Healthy.....
Fore milk.....			
Milk room isolated. Floor tight, washed daily, cement, wood, drain.....			
Walls tight, screened. Wooden vats, painted, clean.....			
Milk cooled by..... to..... ° F. Leaks. Strainer.....			
Utensils, rust, cracks, clean. Pegs. Stored well.....			
Washing compound, soap. Renew. Rinsed in flowing water.....			
Scalded in closed vats..... Steam.....			
Wooden vats metal lined..... Water polluted or pure.....			

State Dairy Bureau Score Card.

Owner	Address		
	Perfect.	Rating.	
Healthy appearance of cows	5	Pig and calf quarters	1
Cleanliness of cows	10	Stale milk and refuse	2
Water, source and purity	7	Utensils, construction of	2
Cow yard—room, condition, etc.	10	Cleaning and sterilizing	5
Stable, ventilators, floor, etc.	10	Separator clean	2
Manure, disposal of	5	Churn clean	1
No decayed food in mangers	5	Attendant's clothing	2
Cobwebs	3	Attendant's hands	2
Stable, whitewashed	5	Udders cleaned	1
Dairy room, clean	5	Milk at once removed to dairy	3
Dairy room, distance of drainage	2	Fore milk	1
Dairy room floor	3	Aërated and cooled, 68° F.	2
Cleaning facilities	2	Sediment in milk	2
		Butter, packing and weight	2
Total			100

FEBRUARY 1, 1906.

To the Committee on Hospital and Health of the Honorable Board of Supervisors of the City and County of San Francisco.

GENTLEMEN: As a portion of our report of work to date, we submit a copy of the preliminary report of December 11, 1905, to Dr. A. A. D'Ancona, chairman of the committee at that time.

The greater portion of the work done since December 11 concerns the sanitary condition of the dairies in and about San Francisco.

The inspections have included practically all of the dairies shipping milk to the city on the California Northwestern and North Shore Railroads and those within the City and County of San Francisco. Eighty-six (86) dairies have been inspected with reference to the details of building construction, health of cows, and manner of milk handling mentioned in the dairy ordinances of the City and County of San Francisco.

Attention should be called to the fact that only those dairies situated within the city and county can be forced to comply with certain features of the city dairy ordinances. Nevertheless, we have reported all on the basis of their having complied with or violated the ordinances in question.

In the following list we present an analytical summary of the results of the inspections. There is given the percentage of compliance with and of violation of the various features of the ordinance:

Number of dairies inspected	86
Number of cows inspected	9,199
Dairies in which were found cows with inflamed udders	31%
Dairies in which other diseases were observed	24%
Dairies entirely healthy in appearance	43%
Dairies showing dirty cows	35%

Stable.

Stable floor cement	2%
Stable floor wood	95%
Stable floor cement and wood	2%
Stable floor leaky	30%
Gutter present	87%
Drain present	28%
Walls whitewashed	89%
Lighting sufficient	67%
Bucket rest three feet from floor, present	66%
Privy inside stable	3%
Manure accumulates inside stable	11%
Manure allowed to remain in heaps outside for over seven (7) days	72%
Cows have access to above	51%
Sleeping quarters under cow stable roof	21%
Feed apparently wholesome	98%
Feeding troughs clean	97%
Cows' drinking water apparently wholesome	96%

<i>Milkers.</i>		
Number		355
Clean in appearance	Compliance,	96%
Wash hands before milking	Compliance,	65%
Apparently healthy		100%

<i>Milk Room.</i>		
Isolated from stable	Compliance,	86%
Floor tight	Compliance,	93%
Washed daily	Compliance,	95%
Drain present	Compliance,	64%
Floor constructed of cement		55%
Floor constructed of wood		36%
Floor constructed of cement and wood		5%
Floor constructed of neither		2%
Side walls tight	Compliance,	90%
Windows screened	Compliance,	54%
Vats painted	Compliance,	23%
Vats clean	Compliance,	50%
Milk cooled by aëerator		89%
Milk cooled by standing tanks in water		2%
Milk cooled naturally		6%
Milk not reported		1%
Leaks present in milk cooler	Violation,	30%

<i>Utensils.</i>		
Strainers used		100%
Rust present in utensils	Violation,	23%
Cracks present in utensils	Violation,	9%
Clean utensils	Compliance,	97%
Utensils hung on pegs	Violation,	15%
Utensils stored in suitable place after washing	Compliance,	95%
Soap or washing compound used	Compliance,	100%
Utensils scalded	Compliance,	100%
Wooden vats, metal lined	Compliance,	15%
Water used for washing, apparently pure source		91%

Thirty-three (33) of the more important city milk depots have been inspected, and the results appear as follows:

Analytical Summary of Results of Inspection of City Milk Depots.

Milk room isolated	72%
Floor tight	Compliance, 97%
Floor washed daily	Compliance, 90%
Floor cement	51%
Floor wood	30%
Floor cement and wood	18%
Walls tight	Compliance, 90%
Windows screened	Compliance, 97%
Vats wood	69%
Vats painted	Compliance, 54%
Vats clean	Compliance, 72%
Milk cooled by shipper only	45%
Milk cooled at city depot with ice	27%
Milk cooled at city depot with aëerator	6%
Milk cooled at city depot by standing tanks in water	3%
Milk cooled at city depot naturally	3%
Milk cooled unreported	15%
Leaky aërotors	Violation, 30%
Strainers used	75%
Utensils rusty	Violation, 21%
Utensils containing cracks	Violation, 21%
Utensils hung on pegs	Violation, 6%
Utensils stored in suitable places after washing	Compliance, 94%
Washing compound or soap used	Compliance, 100%
Utensils scalded	Compliance, 100%
Wooden vats, metal lined	Compliance, 51%

The rating of the dairies by the use of the score card of the State Dairy Bureau makes it possible to present in small compass a statement of the relative condition of the dairies. The score card assigns a definite score for perfection in each of the important points in the construction of buildings and management of the dairy. The inspector, during his work, assigns to each feature on the card a number indicating in his judgment of the nearness to which each feature approaches perfection. With this system the perfect dairy would score 100 points. Table III gives a statement of the relative condition of the eighty-two dairies, based on the score. (This table in the original report contained a list of names of owners, location and score, arranged in order of excellence. To economize space, the list is omitted here.)

To give a better idea of the average conditions found, we may arrange the dairies in groups scoring within 10 per cent of one another, as follows:

<i>Sanitary Rating.</i>	<i>Perfection, 100%.</i>	
Dairies scoring from 90 to 100%-----	12	
Dairies scoring from 80 to 90%-----	28	
Dairies scoring from 70 to 80%-----	37	
Dairies scoring from 60 to 70%-----	13	
Dairies scoring from 50 to 60%-----	none	
Dairies scoring from 40 to 50%-----	2	
		82 dairies

A glance at the tabulations of the results of inspection, and analytical summaries of the same, will show that the majority of the dairies were in a fair condition on the dates when inspected.

Certain facts brought out indicate the beneficial effects of the inspection by the Board of Health. The exceptions, however, indicate the necessity for a most rigid system of continuous inspection.

The difficulties in the way of securing a uniformly good municipal milk supply are many. The dairy business is one in which competition is most keen. The requirements of the production of sanitary milk are costly. The general public does not appreciate the cost of good milk and objects to paying what it is worth. Consequently close inspection is required to counteract the evil effects of competition in lowering the quality of the milk supply. Milk occupies a unique place among foods as a carrier of disease, and this fact should justify extensive expenditures for the proper supervision of the conditions under which it is produced.

We have paid particular attention to the number of leucocytes in milk and to the significance of their presence. During the progress of the work numerical determinations of the leucocytes have been made with the milk of each dairy inspected. In many cases two different methods of counting have been used and their accuracy compared. The work has resulted in the accumulation of a vast amount of data, but the time required to arrange the facts in an orderly condition prohibits our undertaking the task at present.

It has been assumed by some workers that the milk of the healthy cow contains few leucocytes and that a large number of leucocytes in milk indicates that milk from an inflamed udder is mixed in the milk. We have found milk of healthy cows to contain high numbers of leucocytes and consequently have been unable to set a standard for the determination of udder disease by counting of leucocytes.

No sanitary inspection of a public milk supply is complete and wholly satisfactory without the application of the tuberculin test to the cattle for the purpose of determining those affected with tuberculosis. The disease can be recognized in but few instances unless the tuberculin test is used. It is a matter of regret, therefore, that we can not present data relating to the extent of this disease among the cattle. The task of collecting such information is so enormous that it could not be included within the scope of this investigation. The tabulations contain reference to the disease, but it should be remembered that such observations are incomplete, and unsupported by the tuberculin test.

The extent of tuberculosis among dairy cattle is a matter of great sanitary importance, for there is very good reason to believe that the disease is transmitted from cattle to man through milk.

Enough is known of the prevalence of tuberculosis among dairy cattle in the San Francisco Bay region to warrant the statement that the disease constitutes the greatest obstacle in the production of sanitary milk for San Francisco.

We mentioned, in the first report, the desirability of collecting information on the matter of the spread of tuberculosis through milk, by inoculating guinea pigs. The progress of the work is delayed on account of difficulty in obtaining guinea pigs, but in a later report we shall present data on the subject.

One hundred and thirty-six (136) samples of milk and cream have been chemically examined since the date of our last report. One hundred and ten (110) of the samples of milk taken at dairies were subjected to complete chemical analysis; that is, the specific gravity, water, fat, casein, and mineral matter were determined in each of the cases. Nineteen (19) samples of cream, also taken at dairies, were tested for the fat content. Six (6) dairy samples of milk tested below 3.2 per cent of fat. The range of fat in the remaining one hundred and four (104) samples was as follows:

Between 3.2% and 3.8% fat.-----	16 samples
Between 3.8% and 4.0% fat.-----	19 samples
4% and above-----	69 samples

The casein and ash percentages were normal in nearly all of the dairy samples examined.

In the near future we hope to present comprehensive tabulations of the results of the microscopic examinations and of the results of the studies of the composition of milk.

Respectfully submitted.

(Signed) M. E. JAFFA.
A. E. WARD.

DISINFECTION WITH FORMALDEHYD.

Miss Margaret Henderson, assistant in the State Hygienic Laboratory, in addition to routine work, has carried out a series of experiments with formaldehyd disinfection. The details of the work are embodied in a paper by her, forming a part of the present report.

This work will be continued with some brands of solidified formaldehyd on the market in California.

FORMALDEHYD DISINFECTION.

By MARGARET HENDERSON, B.S.,

Assistant in the State Hygienic Laboratory.

These experiments with formaldehyd as a disinfecting agent were undertaken with the purpose of determining a safe routine method of disinfection that repeated experiment should prove efficient under the conditions that prevail in California, and that could be confidently recommended to health officers throughout the State.

The method simplest, easiest, and best adapted to conditions seemed to be that recommended by the State Board of Health of Maine, described by Evans and Russell.¹ The formaldehyd is liberated by the heat resulting from the chemical action between potassium permanganate and formalin, and no apparatus is required but a large vessel in which to mix the reagents. The simplicity of the method, the inexpensive apparatus, and the absence of danger from fire, make it an almost ideal method; and the only thing that remained was to prove that it was efficient under the conditions in California.

The experiments were conducted first in a room prepared for the purpose in the laboratory. The house was of the lightest possible construction, shingled outside, and finished inside with rough and loosely fitting boards, and so, to make it approach the tightness found in an ordinary dwelling house, the walls and ceilings were covered with paraffin roofing paper. Paper was pasted over the cracks around the three windows and one of the doors, and the second door was packed with felt strips. Nevertheless, there was some leakage, and a strong smell of formaldehyd was always perceptible in the other rooms of the house.

These tests under laboratory conditions were followed by tests in a room of an ordinary dwelling house, to make sure that the results were not merely laboratory results.

The test objects were prepared after a method suggested by M. J. Rosenau² in his paper on formalin disinfection of baggage without apparatus. Squares of filter paper, an eighth of an inch in width, were put into a sterile Petri dish, four in each dish, and sterilized. Each paper was then wet with a drop of a forty-eight-hour bouillon culture of the organism and allowed to dry. These Petri dishes were carried to the disinfecting room, and when everything was in readiness the tops were lifted off and set at one side of the dish. At the end of the exposure the tops were replaced and the dishes were carried back to the laboratory and the bits of paper dropped each into a tube of broth. The broth was incubated for forty-eight hours or more. At the end of that

¹ Evans and Russell. Formaldehyd disinfection. Thirteenth Annual Report State Board of Health of Maine.

² Rosenau, M. J. Formalin disinfection of baggage without apparatus. Bull. No. 2, Hyg. Lab. U. S. Public Health and Marine-Hospital Service, Washington, D. C.

time the tubes that did not show growth were reinoculated with the same organism and again incubated for forty-eight hours, to prove that the lack of growth was the result of the disinfection and not a fault of the medium or of the organism. Those tubes that showed growth were examined to make sure that the growth was not contamination, but really the organism that was inoculated into them on the paper. Controls were always arranged for each organism. A set of papers in Petri dishes, four to each organism, was inoculated at the same time as those to be disinfected, and allowed to stand on a bench in the well-lighted laboratory during all the time that the exposure was going on. After all the other papers had been put into bouillon these control papers were planted, and the after treatment of all the tubes was the same. In this way the chance that drying, or sunlight, or poor bouillon had led to the death of the organisms was ruled out.

The process was always started, the room was closed and allowed to remain closed for three hours and then opened and aired. When it was desired to make exposures for less than that time, the Petri dishes were put into a shallow drawer, either end of which would make a tight joint with the wall, and which could be opened either into the disinfecting room or into the room next to it. Petri dishes could be put into this drawer in the room next to the disinfecting room and then the drawer could be slid into the disinfecting room, and its end would completely close the hole in the wall. At the end of the desired time the drawer could be pulled out again and its other end would close the hole, and the Petri dishes could be removed, the whole process leading to very little loss of gas.

The Maine State Board of Health (Bulletin No. 75) recommends the use of a quart of formalin and thirteen ounces of potassium permanganate to a thousand cubic feet, with an exposure of three hours. The first series of experiments was done with this amount of formalin and with times varying from one hour to three hours. The organisms used were *Bact. anthracis*, *B. subtilis*, *M. pyogenes aureus*, *B. typhosus*, *B. prodigiosus*, and *Ps. pyocyanea*. Table 1 shows the results of this test.

TABLE 1.—One quart of formalin and 13 ounces of potassium permanganate per 1,000 cubic feet in laboratory room. Space, 348 cubic feet. Surface exposure.

Culture.	Time.	Test.		Control.		Reinoculation.	
		Gro'th	No Gro'th	Gro'th	No Gro'th	Gro'th	No Gro'th
<i>Bact. anthracis</i>	1 hour	0	4	4	0	3	1
<i>B. subtilis</i>	1 hour	0	4	4	0	3	1
<i>M. pyogenes aureus</i>	1 hour	0	4	4	0	4	0
<i>Ps. pyocyanea</i>	1 hour	1	3	4	0	3	0
<i>B. typhosus</i>	1 hour	0	4	4	0	4	0
<i>Bact. anthracis</i>	1½ hours	0	4	4	0	4	0
<i>B. subtilis</i>	1½ hours	0	4	4	0	3	0
<i>M. pyogenes aureus</i>	1½ hours	0	4	4	0	4	0
<i>Ps. pyocyanea</i>	1½ hours	0	4	4	0	4	0
<i>B. typhosus</i>	1½ hours	0	4	4	0	4	0
<i>Bact. anthracis</i>	2 hours	0	3	4	0	0	3
<i>B. subtilis</i>	2 hours	0	4	4	0	3	1
<i>M. pyogenes aureus</i>	2 hours	0	4	4	0	4	0
<i>Ps. pyocyanea</i>	2 hours	0	4	4	0	3	0
<i>B. typhosus</i>	2 hours	0	4	4	0	4	0

TABLE 1.—One quart of formalin and 13 ounces of potassium permanganate per 1,000 cubic feet in laboratory room. Space, 348 cubic feet. Surface exposure.—Continued.

Culture.	Time.	Test.		Control.		Reinocu- lation.	
		Gro'th	No Gro'th	Gro'th	No Gro'th	Gro'th	No Gro'th
Bact. anthracis	2½ hours	0	4	4	0	3	1
B. subtilis	2½ hours	0	4	4	0	4	0
M. pyogenes aureus	2½ hours	0	4	4	0	3	1
Ps. pyocyanea	2½ hours	0	3	4	0	3	0
B. typhosus	2½ hours	0	4	4	0	4	0
Bact. anthracis	3 hours	0	4	4	0	4	0
B. subtilis	3 hours	0	4	4	0	4	0
M. pyogenes aureus	3 hours	0	4	4	0	4	0
Ps. pyocyanea	3 hours	0	3	4	0	4	0
B. typhosus	3 hours	0	3	4	0	3	0

Ninety-five of the ninety-six cultures exposed were sterilized; nineteen in one hour, and twenty in one and one half hours; but not all of these tubes showed growth after reinoculation. This was probably due to the fact that the papers on which the cultures were exposed were very large, one inch by one fourth of an inch, and consequently such a large amount of formaldehyd was introduced into the bouillon that it ceased to be a good culture medium. In subsequent experiments the size of the paper was reduced to one eighth of an inch, and the reinoculations always showed growth thereafter.

The formalin used in this experiment was some that had been in the laboratory for months and showed a strength of 33.7 per cent of formaldehyd by the method recommended and described by Rosenau.³

The second test was made in the same room, with the same amount of chemicals and for three hours, and was an exact repetition of the first, except that the papers used were smaller. Its results are shown in Table 2. Of one hundred and forty-three cultures exposed, none showed growth after three hours.

TABLE 2.—One quart of formalin and 13 ounces of potassium permanganate per 1,000 cubic feet in laboratory room. Space, 348 cubic feet. Surface exposure.

Culture.	Time.	Test.		Control.		Reinocu- lation.	
		Gro'th	No Gro'th	Gro'th	No Gro'th	Gro'th	No Gro'th
Bact. anthracis	1 hour	0	4	4	0	3	0
B. subtilis	1 hour	0	4	4	0	4	0
Bact. diphtheriæ	1 hour	0	4	2	2	4	0
M. pyogenes aureus	1 hour	0	4	4	0	3	1
Ps. pyocyanea	1 hour	0	4	4	0	4	0
B. typhosus	1 hour	0	3	4	0	3	0
Bact. anthracis	1½ hours	0	4	4	0	4	0
B. subtilis	1½ hours	0	4	4	0	4	0
Bact. diphtheriæ	1½ hours	0	4	2	2	4	0
M. pyogenes aureus	1½ hours	0	4	4	0	4	0
Ps. pyocyanea	1½ hours	0	4	4	0	4	0
B. typhosus	1½ hours	0	4	4	0	4	0

³ Rosenau, M. J., *loc. cit.*

TABLE 2.—One quart of formalin and 13 ounces of potassium permanganate per 1,000 cubic feet in laboratory room. Space, 348 cubic feet. Surface exposure.—Continued.

Culture.	Time.	Test.		Control.		Reinoculation.	
		Gro'th	No Gro'th	Gro'th	No Gro'th	Gro'th	No Gro'th
Bact. anthracis.....	2 hours	0	4	4	0	4	0
B. subtilis.....	2 hours	0	4	4	0	4	0
Bact. diphtheriæ.....	2 hours	0	4	2	2	4	0
M. pyogenes aureus.....	2 hours	0	4	4	0	3	0
Ps. pyocyanea.....	2 hours	0	4	4	0	4	0
B. typhosus.....	2 hours	0	4	4	0	4	0
Bact. anthracis.....	2½ hours	0	4	4	0	4	0
B. subtilis.....	2½ hours	0	4	4	0	3	0
Bact. diphtheriæ.....	2½ hours	0	4	2	2	4	0
M. pyogenes aureus.....	2½ hours	0	4	4	0	3	1
Ps. pyocyanea.....	2½ hours	0	4	4	0	4	0
B. typhosus.....	2½ hours	0	4	4	0	4	0
Bact. anthracis.....	3 hours	0	8	4	0	8	0
B. subtilis.....	3 hours	0	8	4	0	8	0
Bact. diphtheriæ.....	3 hours	0	8	2	2	7	0
M. pyogenes aureus.....	3 hours	0	8	4	0	5	1
Ps. pyocyanea.....	3 hours	0	8	4	0	8	0
B. typhosus.....	3 hours	0	8	4	0	8	0

The third test was made under the same conditions to try the penetrating power of the formaldehyd gas. Cultures were exposed as before on paper in Petri dishes, but the Petri dishes were put between the folds of a sterilized woolen blanket and a sterilized sheet, and on the floor under a piece of carpet and into a closed drawer. The results of this test are shown in Table 3.

TABLE 3.—One quart of formalin and 13 ounces of potassium permanganate per 1,000 cubic feet in laboratory room. Space, 348 cubic feet. Time, 3 hours.

Culture.	Test.		Control.		Exposed under
	Gro'th	No Gro'th	Gro'th	No Gro'th	
Bact. anthracis.....	0	4	3	1	1 layer of blanket.
B. subtilis.....	0	4	4	0	
Bact. diphtheriæ.....	0	4	4	0	
M. pyogenes aureus.....	0	4	4	0	
Ps. pyocyanea.....	0	4	4	0	
B. typhosus.....	0	4	4	0	
Bact. anthracis.....	0	4	3	1	2 layers of blanket.
B. subtilis.....	4	0	4	0	
Bact. diphtheriæ.....	0	4	4	0	
M. pyogenes aureus.....	3	1	4	0	
Ps. pyocyanea.....	0	4	4	0	
B. typhosus.....	0	4	4	0	
Bact. anthracis.....	4	0	3	1	3 layers of blanket.
B. subtilis.....	3	0	4	0	
Bact. diphtheriæ.....	0	4	4	0	
M. pyogenes aureus.....	2	2	4	0	
Ps. pyocyanea.....	4	0	4	0	
B. typhosus.....	0	4	4	0	

TABLE 3.—One quart of formalin and 13 ounces of potassium permanganate per 1,000 cubic feet in laboratory room. Space, 348 cubic feet. Time, 3 hours.—Continued.

Culture.	Test.		Control.		Exposed under
	Gro'th	No Gro'th	Gro'th	No Gro'th	
Bact. anthracis	4	0	3	1	4 layers of blanket.
B. subtilis	4	0	4	0	
Bact. diphtheriæ	0	4	4	0	
M. pyogenes aureus	2	1	4	0	
Ps. pyocyanea	4	0	4	0	
B. typhosus	2	2	4	0	
Bact. anthracis	4	0	3	1	6 layers of blanket.
B. subtilis	4	0	4	0	
Bact. diphtheriæ	4	0	4	0	
M. pyogenes aureus	3	0	4	0	
Ps. pyocyanea	4	0	4	0	
B. typhosus	3	1	4	0	
Bact. anthracis	4	0	4	0	8 layers of blanket.
B. subtilis	4	0	4	0	
Bact. diphtheriæ	3	0	4	0	
M. pyogenes aureus	3	0	4	0	
Ps. pyocyanea	4	0	4	0	
B. typhosus	3	0	4	0	
Bact. anthracis	4	0	3	1	10 layers of blanket.
B. subtilis	4	0	4	0	
Bact. diphtheriæ	4	0	4	0	
M. pyogenes aureus	4	0	4	0	
Ps. pyocyanea	4	0	4	0	
B. typhosus	4	0	4	0	
Bact. anthracis	0	4	3	1	1 layer of sheet.
B. subtilis	0	4	4	0	
Bact. diphtheriæ	0	4	4	0	
M. pyogenes aureus	0	4	4	0	
Ps. pyocyanea	0	4	3	1	
B. typhosus	0	4	4	0	
Bact. anthracis	0	4	3	1	2 layers of sheet.
B. subtilis	0	4	4	0	
Bact. diphtheriæ	0	4	4	0	
M. pyogenes aureus	0	4	4	0	
Ps. pyocyanea	0	4	3	1	
B. typhosus	0	4	4	0	
Bact. anthracis	4	0	3	1	3 layers of sheet.
B. subtilis	0	4	4	0	
Bact. diphtheriæ	0	4	4	0	
M. pyogenes aureus	0	4	4	0	
Ps. pyocyanea	0	4	3	1	
B. typhosus	0	4	4	0	
Bact. anthracis	0	4	3	1	4 layers of sheet.
B. subtilis	2	2	4	0	
Bact. diphtheriæ	0	4	4	0	
M. pyogenes aureus	0	3	4	0	
Ps. pyocyanea	1	7	3	1	
B. typhosus	0	4	4	0	
Bact. anthracis	4	0	3	1	6 layers of sheet.
B. subtilis	4	0	4	0	
M. pyogenes aureus	0	4	4	0	
Ps. pyocyanea	1	3	3	1	
Bact. diphtheriæ	0	4	4	0	
B. typhosus	0	4	4	0	

TABLE 3.—One quart of formalin and 13 ounces of potassium permanganate per 1,000 cubic feet in laboratory room. Space, 348 cubic feet. Time, 8 hours.—Continued.

Culture.	Test.		Control.		Exposed Under.
	Gro'th	No Gro'th	Gro'th	No Gro'th	
Bact. anthracis.....	0	4	4	0	8 layers of sheet.
B. subtilis.....	4	0	4	0	
Bact. diphtheriæ.....	0	4	4	0	
M. pyogenes aureus.....	1	3	4	0	
Ps. pyocyanea.....	3	1	3	1	
B. typhosus.....	0	4	4	0	10 layers of sheet.
Bact. anthracis.....	4	0	3	1	
B. subtilis.....	4	0	4	0	
Bact. diphtheriæ.....	0	3	4	0	
M. pyogenes aureus.....	4	0	4	0	
Ps. pyocyanea.....	1	3	3	1	1 layer of carpet.
B. typhosus.....	0	4	4	0	
Bact. anthracis.....	3	0	3	1	
B. subtilis.....	4	0	4	0	
Bact. diphtheriæ.....	2	2	4	0	
M. pyogenes aureus.....	0	4	4	0	In a closed drawer.
B. typhosus.....	0	4*	4	0	
Ps. pyocyanea.....	0	4	4	0	
Bact. anthracis.....	0	3	4	0	
B. subtilis.....	0	4	4	0	
Bact. diphtheriæ.....	0	4	4	0	
B. typhosus.....	0	4	4	0	
M. pyogenes aureus.....	0	4	4	0	
Ps. pyocyanea.....	0	4	4	0	

*1 contaminated.

All of the cultures (24) were killed through one layer of blanket, all but the spore bearers and *M. pyogenes aureus* through two layers, but only such easily killed ones as *Bact. diphtheriæ* and *B. typhosus* through three layers, and there was no disinfecting action at all through more than four layers. Through the sheet, penetration was somewhat better. Sterilization was complete through two layers, and only the spore bearers survived when protected by four layers of sheeting. Under one layer of carpet the spore bearers were not harmed at all, and two out of the sixteen cultures of non-spore bearers survived. The inside of the closed drawer was disinfected, even though it was a dead space, and there was no artificial means of moving the air about.

Rosenau,⁴ in his bulletin, calls attention to the fact that the formalin may inhibit the growth of organisms without actually killing them. He made it a practice to neutralize the formaldehyd with ammonia before planting the papers in bouillon. To make sure that no such error was creeping into the results of these tests, thirty-nine cultures were exposed freely to the action of the formaldehyd for three hours. At the end of that time twenty-two of these papers were exposed for a few seconds to the action of ammonia gas and then all of them were planted in bouillon and incubated. There was no growth in any of the thirty-nine tubes.

⁴ Rosenau, M. J., *loc. cit.*

TABLE 4.—One quart of formalin and 13 ounces of potassium permanganate per 1,000 cubic feet in laboratory room. Space, 348 cubic feet. Formalin neutralized by ammonia. Time, 3 hours.

Culture.	Exposed to Ammonia.		Not Exposed to Ammonia.		Control.	
	Gro'th	No Gro'th	Gro'th	No Gro'th	Gro'th	No Gro'th
Bact. anthracis	0	4	0	3	3	1
B. subtilis	0	4	0	3	4	0
Bact. diphtheriæ.....	0	4	0	2	4	0
M. pyogenes aureus.....	0	2	0	3	4	0
Ps. pyocyanea.....	0	4	0	4	4	0
B. typhosus.....	0	4	0	2	4	0

Next it was decided to see whether this method of disinfecting would be equally effectual in an ordinary dwelling house. The room used was a living room containing all of its furniture. It had two doors and three windows, on two sides of the room. These windows were of the loose-fitting French kind so common in California houses, and the only attempt that was made to make the room less leaky was to stuff towels into the cracks through which came a very perceptible draft, and into the crack under the outer door. Cultures were exposed in various parts of the room, and at various distances from the floor, in order to make sure that the gas penetrated to every corner of the room. One set of Petri dishes was placed on a ledge of the very leaky window, one was put under the carpet on the floor, one under two and one under four layers of heavy woolen blanket, and one under a loose pile of magazines and papers. The results of this test are shown in Table 5.

TABLE 5.—One quart of formalin and 13 ounces of potassium permanganate per 1,000 cubic feet in room of dwelling house. Space, 1,686 cubic feet. Time, 3 hours.

Culture.	Test.		Control.		Reinoculation.		Conditions of Exposure.
	Gro'th	No Gro'th	Gro'th	No Gro'th	Gro'th	No Gro'th	
B. typhosus	0	3	3	1	4	0	On a table in the middle of room.
Bact. anthracis	0	3	4	0	3	0	
M. pyogenes aureus	0	4	4	0	4	0	
B. subtilis	0	4	4	0	4	0	
Mixed throat culture.....	0	4	4	0	4	0	
Ps. pyocyanea.....	0	3	4	0	3	0	On the floor in a corner between two windows.
B. subtilis	0	3	4	0	4	0	
Bact. anthracis	0	4	4	0	4	0	
Mixed throat culture.....	0	4	4	0	4	0	
M. pyogenes aureus	0	4	4	0	4	0	
Ps. pyocyanea.....	0	4	4	0	4	0	On bookshelves in corner between two windows.
B. typhosus	0	4	3	1	4	0	
Bact. anthracis	0	4	4	0	4	0	
B. subtilis	0	3	4	0	3	0	
Mixed throat culture.....	0	4	4	0	4	0	
M. pyogenes aureus	0	4	4	0	4	0	On a ledge above the window.
Ps. pyocyanea.....	0	4	4	0	4	0	
B. typhosus	0	4	3	1	4	0	
Bact. anthracis	0	4	4	0	4	0	
B. subtilis	0	4	4	0	4	0	
Mixed throat culture.....	0	4	4	0	4	0	
M. pyogenes aureus	0	4	4	0	4	0	
B. typhosus	0	4	3	1	4	0	

TABLE 5.—One quart of formalin and 13 ounces of potassium permanganate per 1,000 cubic feet in room of dwelling house. Space, 1,686 cubic feet. Time, 3 hours.—Continued.

Culture.	Test.		Control.		Reinoculation.		Conditions of Exposure.
	Gro'th	No Gro'th	Gro'th	No Gro'th	Gro'th	No Gro'th	
Bact. anthracis	1	0	4	0	--	--	On sill of a leaky window.
B. subtilis	0	4	4	0	4	0	
Mixed throat culture	0	4	4	0	--	--	
M. pyogenes aureus	0	4	4	0	4	0	
Ps. pyocyanea	0	7	4	0	7	0	
B. typhosus	0	5	3	1	5	0	On bookshelves about four feet from floor.
Bact. anthracis	0	4	4	0	4	0	
B. subtilis	0	4	4	0	4	0	
Mixed throat culture	0	4	4	0	--	--	
Ps. pyocyanea	0	4	4	0	4	0	
B. typhosus	0	7	3	1	7	0	Under 1 layer of a felt table cover that had holes in it.
Bact. anthracis	0	4	4	0	4	0	
B. subtilis	0	4	4	0	4	0	
Mixed throat culture	0	4	4	0	--	--	
M. pyogenes aureus	0	4	4	0	4	0	
Ps. pyocyanea	0	4	4	0	3	1	Under 2 layers of a heavy wool blanket.
B. typhosus	0	5	3	1	5	0	
Bact. anthracis	0	4	4	0	4	0	
B. subtilis	0	3	4	0	3	0	
Mixed throat culture	1	3	4	0	--	--	
M. pyogenes aureus	1	3	4	0	3	0	Under 4 layers of a heavy wool blanket.
Ps. pyocyanea	0	4	4	0	4	0	
B. typhosus	0	4	3	1	4	0	
Bact. anthracis	4	0	4	0	--	--	
B. subtilis	4	0	4	0	2	0	
Mixed throat culture	1	3	4	0	--	--	Under 1 layer of carpet on the floor.
M. pyogenes aureus	1	3	4	0	2	0	
Ps. pyocyanea	4	0	4	0	--	--	
B. typhosus	0	3	3	1	--	--	
Bact. anthracis	4	0	4	0	--	--	
B. subtilis	4	0	3	0	--	--	Under a loose pile of papers and magazines on the floor.
Mixed throat culture	2	2	4	0	--	--	
M. pyogenes aureus	0	3	4	0	3	0	
Ps. pyocyanea	3	1	4	0	1	0	
B. typhosus	0	4	3	1	4	0	
Bact. anthracis	3	0	4	0	--	--	
B. subtilis	0	2	4	0	2	0	
Mixed throat culture	0	4	4	0	--	--	
M. pyogenes aureus	0	4	4	0	3	0	
Ps. pyocyanea	2	2	4	0	2	0	
B. typhosus	1	3	3	0	2	0	

Of one hundred and fifty-nine cultures exposed to the gas with nothing over them, one hundred and fifty-eight were killed. The one that grew was an anthrax culture exposed on the ledge of the leaky window. Disinfection was incomplete under the carpet and in the pile of papers; and the formaldehyd did not penetrate the folds of blanket any better than in the preceding experiment. Evidently in practical disinfection it would be necessary to take up the carpet, and to spread out all bedding and clothes. At the end of the three hours the room was allowed to air, but it was found, even on the next day, impossible to occupy it with any comfort. At the end of that time flat dishes of ammonia were

set around in it, and in an hour or so the smell of formaldehyd had practically disappeared.

The results of the disinfection with this amount of formalin had been so uniformly satisfactory that it was decided to see whether it could not be cut down without impairing the efficiency of the process. It was decided to try the effect of one pint of formalin and six and one-half ounces of potassium permanganate to a thousand cubic feet of space. Two tests with this amount were made in the laboratory room (Tables 6 and 7), and one in the room of a house. This was a room of ordinarily tight finish, with two doors and two windows. As in the other room, no attempt was made to seal up cracks, nor to make it air tight in any way, except that the keyhole was plugged. The smell of formaldehyd was very strong in all the other rooms on the same floor. The results of using this reduced amount of formalin are shown in Tables 6, 7, and 8.

TABLE 6.—One pint of formalin and 6½ ounces of potassium permanganate per 1,000 cubic feet in laboratory room. Space, 348 cubic feet.

Culture.	Time.	Test.		Reinoculation.		Conditions of Exposure.
		Gro'th	No Gro'th	Gro'th	No Gro'th	
Bact. anthracis	1 hour	0	4	3	0	On surface.
B. subtilis	1 hour	0	4	4	0	
M. pyogenes aureus	1 hour	0	4	4	0	
Ps. pyocyanea	1 hour	1	3	3	0	
B. typhosus	1 hour	0	4	4	0	
B. prodigiosus	1 hour	0	2	2	0	
Bact. anthracis	1½ hours	0	4	4	0	On surface.
B. subtilis	1½ hours	0	4	4	0	
M. pyogenes aureus	1½ hours	0	4	4	0	
Ps. pyocyanea	1½ hours	0	3	3	0	
B. typhosus	1½ hours	0	3	3	0	
B. prodigiosus	1½ hours	0	4	4	0	
Bact. anthracis	2 hours	0	4	4	0	On surface.
B. subtilis	2 hours	0	4	4	0	
M. pyogenes aureus	2 hours	0	4	4	0	
Ps. pyocyanea	2 hours	1	3	3	0	
B. typhosus	2 hours	0	4	4	0	
B. prodigiosus	2 hours	0	3	3	0	
Bact. anthracis	2½ hours	0	4	4	0	On surface.
B. subtilis	2½ hours	0	4	4	0	
M. pyogenes aureus	2½ hours	0	3	3	0	
Ps. pyocyanea	2½ hours	0	4	4	0	
B. typhosus	2½ hours	0	4	4	0	
B. prodigiosus	2½ hours	0	4	4	0	
Bact. anthracis	3 hours	0	4	4	0	On surface.
B. subtilis	3 hours	0	4	4	0	
M. pyogenes aureus	3 hours	0	4	4	0	
Ps. pyocyanea	3 hours	0	4	4	0	
B. prodigiosus	3 hours	0	4	3	0	
B. typhosus	3 hours	0	3	3	0	
Bact. anthracis	3 hours	0	4	3	0	Under 1 layer of sheet.
B. subtilis	3 hours	1	3	4	0	
M. pyogenes aureus	3 hours	0	3	4	0	
Ps. pyocyanea	3 hours	1	3	2	0	
B. typhosus	3 hours	0	4	4	0	
B. prodigiosus	3 hours	0	4	4	0	

TABLE 6.—One pint of formalin and 6½ ounces of potassium permanganate per 1,000 cubic feet in laboratory room. Space, 548 cubic feet.—Continued.

Culture.	Time.	Test.		Reinoculation.		Conditions of Exposure.
		Gro'th	No Gro'th	Gro'th	No Gro'th	
Bact. anthracis	3 hours	0	4	2	0	Under 2 layers of sheet.
B. subtilis	3 hours	0	4	4	0	
M. pyogenes aureus	3 hours	0	4	4	0	
Ps. pyocyanea	3 hours	0	4	4	0	
B. typhosus	3 hours	0	4	4	0	
B. prodigiosus	3 hours	0	4	4	0	Under 3 layers of sheet.
Bact. anthracis	3 hours	0	3	3	0	
B. subtilis	3 hours	0	4	3	0	
M. pyogenes aureus	3 hours	0	4	3	0	
Ps. pyocyanea	3 hours	0	4	4	0	
B. typhosus	3 hours	0	4	3	0	Under 4 layers of sheet.
B. prodigiosus	3 hours	0	3	3	0	
Bact. anthracis	3 hours	0	4	4	0	
B. subtilis	3 hours	1	3	3	0	
M. pyogenes aureus	3 hours	0	4	4	0	
Ps. pyocyanea	3 hours	0	4	4	0	Under 2 layers of blanket.
B. typhosus	3 hours	0	4	3	0	
B. prodigiosus	3 hours	0	4	4	0	
Bact. anthracis	3 hours	0	4	3	0	
B. typhosus	3 hours	0	4	4	0	
M. pyogenes aureus	3 hours	0	4	4	0	
Ps. pyocyanea	3 hours	1	3	3	0	
B. prodigiosus	3 hours	0	4	4	0	

TABLE 7.—One pint of formalin and 6½ ounces of potassium permanganate per 1,000 cubic feet in laboratory room. Temperature, 22° C. Weather windy.

Culture.	Time.	Test.		Control.		Reinoculation.		Conditions of Exposure.
		Gro'th	No Gro'th	Gro'th	No Gro'th	Gro'th	No Gro'th	
Bact. anthracis	1 hour	0	3	3	0	--	--	On surface.
B. subtilis	1 hour	0	4	4	0	4	0	
M. pyogenes aureus	1 hour	0	4	4	0	4	0	
Ps. pyocyanea	1 hour	0	4	4	0	--	--	
B. typhosus	1 hour	0	4	4	0	--	--	
B. prodigiosus	1 hour	0	4	4	0	4	0	On surface.
Bact. anthracis	1½ hours	0	4	3	0	4	0	
B. subtilis	1½ hours	0	4	4	0	4	0	
M. pyogenes aureus	1½ hours	0	4	4	0	4	0	
Ps. pyocyanea	1½ hours	0	4	4	0	4	0	
B. typhosus	1½ hours	0	3	4	0	3	0	On surface.
B. prodigiosus	1½ hours	0	4	4	0	4	0	
Bact. anthracis	2 hours	0	4	3	0	3	0	
B. subtilis	2 hours	0	4	4	0	4	0	
M. pyogenes aureus	2 hours	0	4	4	0	--	--	
Ps. pyocyanea	2 hours	0	4	4	0	4	0	On surface.
B. typhosus	2 hours	0	4	4	0	4	0	
B. prodigiosus	2 hours	0	4	4	0	--	--	

TABLE 7.—One pint of formalin and 6½ ounces of potassium permanganate per 1,000 cubic feet in laboratory room. Temperature, 22° C. Weather windy.—Continued.

Culture.	Time.	Test.		Control.		Reinoculation.		Conditions of Exposure.
		Gro'th	No Gro'th	Gro'th	No Gro'th	Gro'th	No Gro'th	
Bact. anthracis	2½ hours	0	4	4	0	--	--	On surface.
B. subtilis	2½ hours	0	4	4	0	3	0	
M. pyogenes aureus	2½ hours	0	4	4	0	--	--	
Ps. pyocyanea	2½ hours	0	3	3	0	3	0	
B. typhosus	2½ hours	0	4	4	0	--	--	
B. prodigiosus	2½ hours	0	4	4	0	3	0	
Bact. anthracis	3 hours	0	4	4	0	3	0	On surface.
B. subtilis	3 hours	0	4	4	0	4	0	
M. pyogenes aureus	3 hours	0	4	4	0	--	--	
Ps. pyocyanea	3 hours	0	4	4	0	--	--	
B. typhosus	3 hours	0	4	4	0	4	0	
B. prodigiosus	3 hours	0	4	4	0	4	0	
Bact. anthracis	3 hours	0	4	3	0	4	0	Under 1 layer of blanket.
M. pyogenes aureus	3 hours	0	4	4	0	2	2	
B. typhosus	3 hours	0	4	4	0	4	0	
B. prodigiosus	3 hours	0	4	4	0	4	0	
Bact. anthracis	3 hours	1	3	3	0	3	0	Under 2 layers of blanket.
M. pyogenes aureus	3 hours	0	4	4	0	1	2	
Ps. pyocyanea	3 hours	1	3	4	0	2	0	
B. typhosus	3 hours	0	4	4	0	4	0	
B. prodigiosus	3 hours	0	4	4	0	4	0	
Bact. anthracis	3 hours	4	0	4	0	--	--	Under 3 layers of blanket.
B. subtilis	3 hours	3	1	4	0	--	--	
M. pyogenes aureus	3 hours	0	2	4	0	--	--	
Ps. pyocyanea	3 hours	4	0	4	0	--	--	
B. typhosus	3 hours	0	4	4	0	--	--	
B. prodigiosus	3 hours	0	4	4	0	--	--	
Bact. anthracis	3 hours	3	0	4	0	--	--	Under 4 layers of blanket.
Ps. pyocyanea	3 hours	4	0	4	0	--	--	
Bact. anthracis	3 hours	0	8	3	0	--	--	Under 1 layer of sheet.
M. pyogenes aureus	3 hours	0	4	4	0	--	--	
Ps. pyocyanea	3 hours	0	4	4	0	4	0	
B. typhosus	3 hours	0	6	4	0	--	--	
B. prodigiosus	3 hours	0	4	4	0	--	--	
Bact. anthracis	3 hours	0	4	3	0	--	--	Under 2 layers of sheet.
M. pyogenes aureus	3 hours	0	4	4	0	--	--	
Ps. pyocyanea	3 hours	0	4	4	0	--	--	
B. typhosus	3 hours	0	4	4	0	--	--	
B. prodigiosus	3 hours	0	4	4	0	--	--	
Bact. anthracis	3 hours	0	3	3	0	--	--	Under 3 layers of sheet.
M. pyogenes aureus	3 hours	0	4	4	0	--	--	
Ps. pyocyanea	3 hours	0	4	4	0	3	0	
B. typhosus	3 hours	0	4	4	0	--	--	
B. prodigiosus	3 hours	0	4	4	0	--	--	
Bact. anthracis	3 hours	0	4	4	0	--	--	Under 4 layers of sheet.
Ps. pyocyanea	3 hours	0	4	4	0	--	--	
M. pyogenes aureus	3 hours	0	4	4	0	--	--	
B. typhosus	3 hours	0	4	4	0	4	0	
B. prodigiosus	3 hours	0	4	4	0	4	0	

TABLE 8.—One pint of formalin and 6½ ounces of potassium permanganate per 1,000 cubic feet in dwelling house. Space, 979 cubic feet. Time, 3 hours. Temperature, 20° C.

Culture.	Test.		Control.		Conditions of Exposure.
	Gro'th	No Gro'th	Gro'th	No Gro'th	
Bact. anthracis	0	4	3	0	Beside a window on level of window sill.
B. subtilis	0	4	4	0	
M. pyogenes aureus	0	4	4	0	
Ps. pyocyanea	0	4	4	0	
B. typhosus	0	4	4	0	
B. prodigiosus	0	4	4	0	In a partially open drawer.
Bact. anthracis	0	4	4	0	
B. subtilis	0	8	4	0	
M. pyogenes aureus	0	3	4	0	
Ps. pyocyanea	0	4	4	0	
B. typhosus	0	4	4	0	On the floor in a corner.
B. prodigiosus	0	4	4	0	
Bact. anthracis	0	3	3	0	
B. subtilis	0	4	4	0	On a table.
M. pyogenes aureus	0	4	4	0	
Ps. pyocyanea	0	4	4	0	
B. typhosus	0	4	4	0	
B. prodigiosus	0	4	4	0	
Bact. anthracis	0	4	3	0	On a bed, under one layer of blanket.
B. subtilis	3	1	4	0	
M. pyogenes aureus	0	4	4	0	
Ps. pyocyanea	0	4	4	0	
B. typhosus	0	4	4	0	
B. prodigiosus	0	4	4	0	On a bed, under two layers of blanket.
Bact. anthracis	0	4	4	0	
B. subtilis	0	4	4	0	
M. pyogenes aureus	1	3	4	0	
B. typhosus	1	3	4	0	
B. prodigiosus	0	4	4	0	Under a blank't thrown over the back of a chiffonier.
Bact. anthracis	0	4	4	0	
B. subtilis	0	4	4	0	
M. pyogenes aureus	0	4	4	0	
Ps. pyocyanea	0	4	4	0	
B. typhosus	0	4	4	0	On floor, under one layer of blanket.
B. prodigiosus	0	4	4	0	
B. subtilis	1	3	4	0	
Bact. anthracis	0	4	3	0	
M. pyogenes aureus	0	4	4	0	
Ps. pyocyanea	0	4	4	0	
B. typhosus	0	4	4	0	
B. prodigiosus	0	4	4	0	
B. subtilis	1	3	4	0	

* Contamination.

For free exposures, sterilization was complete for three hundred and seventeen out of three hundred and nineteen cultures. The two that grew were two cultures of *Ps. pyocyanea* exposed, one for one hour and one for two hours. Sterilization was complete through four layers of sheet, except for one case out of a total of forty-three cultures exposed.

Of thirty-seven cultures exposed under one layer of blankets, thirty-four were killed, the other three being cultures of *Bact. anthracis*. Under two layers of blanket fifty-five cultures were exposed, and five grew afterwards.

As a result of this set of experiments, it would seem that one pint of formalin and six and one half ounces of potassium permanganate per one thousand cubic feet of space is certainly a safe receipt for disinfection under the conditions which are to be met with here. How much of a margin of safety this allows has not been determined by this limited series of experiments, except that one hour's exposure seems to have given as complete disinfection as three hours. In all cases it is necessary to spread out, or hang up, blankets and clothing and to take up the carpets.

These experiments were carried on in Berkeley, in the summer time, from June to September, when the weather is cool and very damp. There is some doubt whether the same tests repeated in the hot, dry interior of the State would result in the same way, so a further course of experiments has been planned to settle this point, and to determine the best amount of formalin for a dry climate.

We have also planned to do some work to determine the efficiency of disinfection with the various forms of solidified formaldehyd, so commonly sold by druggists for that purpose.

THE NUMERICAL DETERMINATION OF LEUCOCYTES IN MILK.

By

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Mammitis in the cow, commonly called garget, is a matter of importance in its relation to the purity and wholesomeness of market milk. The rôle of streptococci as the cause of mammitis in the cow, and the probable relation of this affection to digestive disorders in infants, are both of vital interest in this connection.

Mammitis frequently appears without specific symptoms. Sometimes white caseous masses are noticed in otherwise normal milk, and often the milker first becomes aware of the existence of udder inflammation by noticing the masses of casein lodged on the milk-strainer. Pus is always present in the milk of cows so affected, but it is not always present in sufficient amount to attract attention. The insidious onset of mammitis renders it exceedingly difficult for even the most conscientious milk-dealer to exclude infected milk from the product sold by him. Slight catarrhal conditions of the udder mucosa may readily pass unnoticed.

The prevalence of mammitis among cows, and the difficulty of avoiding the marketing of milk infected with streptococci, have led to the development of microscopic tests of milk for the detection of mammitis.

Stokes¹ devised a microscopic examination of milk for pus cells and streptococci as a means of detecting the presence of mammitis among cows supplying the milk. Centrifugal sediment from 10 cubic centimeters of milk was strained and examined with a one-twelfth inch oil immersion lens. He regarded the presence in milk of an individual cow, of five cells per field of the oil immersion lens, as justification for excluding the animal from the herd.

Bergey² modified Stokes's method and made extensive examinations of the milk of individual cows. Parallel bacteriological examinations for both species and numbers supplemented his examinations for cells. He observes:

Cells can be demonstrated in the milk of practically all cows, and hence the number of these cells present in milk becomes a matter of importance. It is believed that the occurrence of ten cells per field of the one-twelfth immersion lens indicates the presence of pus in milk, especially if the cells occur in masses. The presence of pus in milk denotes an inflammatory reaction within the udder, from the fact that the pus is always associated with pyogenic organisms.

Streptococci were found in nearly all the samples of milk derived from cows which showed the presence of pus. These bacteria are usually the cause of catarrhal mammitis.

¹ Stokes. The microscopic examination of milk. Annual Report of the Health Department of the City of Baltimore, 1897, p. 105.

² Bergey. The source and nature of bacteria in milk. Bulletin No. 125, Department of Agriculture, Commonwealth of Pennsylvania.

Streptococci and pus cells were also encountered in samples of milk derived from cows in which no inflammation of the udder could be discovered. This occurrence is probably due to the fact that the disease was not very active, or that it had persisted for a considerable time and become chronic.

Stewart³, of the Philadelphia Bureau of Health, further modified the method so that it was practicable to use it for the examination of large numbers of samples of mixed herd milk. Stewart describes the apparatus and method as follows:

This apparatus consists of a circular pan about 12 inches in diameter, and $\frac{3}{4}$ inch deep, containing twenty small glass tubes. The tubes contain 1 c.c. of milk and are filled by means of a small bulb similar to that ordinarily used on medicine droppers. The end of the tube is closed by a small rubber stopper, and the tubes are held in the pan by spring clamps. This pan is fitted upon the ordinary Boekel water centrifuge and covered with a lid which is held down by a thumbscrew. The pan covered in this way furnishes a surface of very slight resistance to the atmosphere during its revolution, somewhat on the principle of a child's top.

By the old method the arms of the centrifuge containing the milk encountered so much resistance in their revolution that the speed with 15 pounds water pressure was not more than 1,200 revolutions per minute, while the speed obtained with the new apparatus is from 2,500 to 3,000 revolutions per minute with 15 pounds pressure. This rapid speed causes sedimentation to occur in less than five minutes. When this is completed the centrifuge pan can be lifted from the motor and the per cent of cream measured by a graduated scale marked upon the tube. The heavier matter, as the insoluble dirt, pus cells and bacteria, is thrown to the peripheral end of the tube, where it adheres to the rubber cork in the lumen of the tube. To examine this sediment, the cork is carefully removed and a spread made by rubbing the cork containing the sediment over an area of a square centimeter on a 3-inch by 6-inch glass slide. The proper area of the smear is obtained by placing underneath the slide a scale of circles having an area of a square centimeter. After the smears are dried in air without fixation of heat, the preparation is stained with the Jenner blood stain for two minutes, keeping the stain in constant motion. The excess of stain is washed off in water, and the preparation is dried in air. By this blood-staining method the pus and blood cells are stained perfectly and the ordinary microorganisms take the blue stain well.

The stained specimens are examined with a one-twelfth Leitz objective and a No. 3 eye-piece. The character of the bacteria is noted, and the average number of pus cells per field is counted. This average number is multiplied by 4,400, since there are about 4,400 fields to a square centimeter, as estimated by the stage micrometer. This result is approximately the number of pus cells per cubic centimeter of milk.

When a sample of milk showed over 100,000 cells per cubic centimeter, or showed "*streptococci* and the ordinary pus-producing organisms," an examination of the herd was ordered. The writer quoted figures showing that inspections of condemned herds by veterinarians confirmed the conclusions from laboratory work.

Doane⁴ felt the need for a more accurate quantitative method for determining leucocytes, and, with Dr. Buckley, devised the Doane-Buckley method. The process is described by Doane as follows:

With this method 10 cubic centimeters of milk are centrifuged for four minutes in graduated sedimentation tubes, at an approximate speed of 2,000 revolutions per minute. The cream is lifted out with a cotton swab, care being taken to get as much of the fat out as possible. It is then centrifuged for one minute more and the cream again removed with a cotton swab. Any fat remaining in the milk interferes seriously with the counting, as, if there are more than a few globules, they form a layer at the top of the liquid in the counting chamber, and as the leucocytes settle to the bottom of the chamber, it is difficult to see through the fat. It is only with cows giving milk difficult of separation where this trouble is experienced, and with such animals considerable care is necessary in removing all of the cream gathered at the top of the sedimentation tube. The method of removing the fat with cotton is the best one that has occurred to us, and it is the only part of the process that does not operate with entire satisfaction in every instance.

Following the removal of the cream, after the second centrifuging, the bottom of the tube will contain a portion of sediment which is easily seen. This sediment may, in

³ Stewart. Methods employed in the examination of milk by city health authorities. *American Medicine*, Vol. IX, No. 12, p. 486.

⁴ Doane. Leucocytes in milk, and their significance. *Bulletin No. 102*, Maryland Agricultural Experiment Station.

extreme cases of cows suffering with garget, amount to as much as one cubic centimeter. Ordinarily, it will be considerably less than one-half cubic centimeter. The amount varies considerably with the number of leucocytes, but not absolutely. The milk above this sediment is removed with a small siphon, which can be easily arranged with bent glass rods drawn to a fine point and supplied with a small rubber and a pinch cock. In using the siphon it is better to keep the point near the surface of the milk in the tube in order not to agitate the precipitated leucocytes and draw a number of them off with the milk. The milk in the tube may be siphoned within an eighth of an inch of the sediment in the tube. This will usually be below the $\frac{1}{2}$ c.c. mark. Two drops of a saturated alcoholic solution of methylene blue are then added, thoroughly mixed with the sediment by shaking, and then set in boiling water for two or three minutes to assist the leucocytes in taking up the color. The contents of the tube can be boiled by holding it directly in the flame, but it has no advantage over the use of the water bath, and it is very likely to break the glass. After heating, some water is added to the tube to render the color less dense. Ordinarily filling the tube to the 1 c.c. mark will be sufficient, and this quantity gives an easy factor for calculating the final results.

In putting this liquid, containing the leucocytes, into the blood counter, considerable care is necessary, owing to the tendency of the leucocytes to sink to the bottom. At this place a capillary tube was used, and the cover glass was held in one hand ready to cover the chamber as soon as the drop was transferred to the counter. After placing the glass cover over the chamber, about a minute is required to allow the leucocytes to settle to the bottom of the chamber. There are very few foreign bodies that are likely to be mistaken for leucocytes in counting. Ordinarily, the polynuclear leucocytes predominate and the stained nuclei, with the unstained surrounding cell, show up very distinctly. A few small leucocytes with large nuclei may be found, and these may be confounded with yeast cells until the worker becomes familiar with the distinction.

As regards counting, we have taken a standard with a cubic centimeter as a basis quantity of milk, though we are of course aware that the corpuscles in the blood are enumerated with a cubic millimeter basis. We adopted the centimeter largely for two reasons. In counting bacteria in the milk the cubic centimeter is always the basis employed. Simply because the leucocytes were derived from the blood seemed to be no reason why the same basis for counting should be employed as was used with the blood, while to the ordinary bacteriological worker, to whom this work will fall, if ever adopted to any extent, the cubic centimeter standard would be a little more easily comprehended, because more frequently used. The blood-counter holds one-tenth cubic millimeter, and one ten-thousandth cubic centimeter. If 10 cubic centimeters of milk are used, and 1 cubic centimeter of fluid is in the tube after siphoning, and the coloring matter and the water used to dilute have been added, then the resulting number of leucocytes in the counter multiplied by 1,000 will be the total number of leucocytes per cubic centimeter in the milk. If a total of 75 leucocytes was counted in the chamber, there would be 75,000 leucocytes per cubic centimeter in the milk.

In the actual counting under the microscope a square millimeter of the counting chamber will be found to be ruled off into 400 smaller equal squares. This facilitates an accurate and rapid count. Where the number of leucocytes is not great, the entire field can be counted in a short time. Where there is a great number of leucocytes a few squares or sets of squares in different parts of the ruled surface will give approximately the number.

There are occasionally a few variations desirable from these rules, but it may be well to state that the details have been pretty carefully and thoroughly worked over and compared, and it is seldom that short cuts can be made if correct results are desired. The time and speed of centrifuging are placed as low as possible for accurate work. Where there is one half centimeter or more of sediment, it is necessary to use more of the methylene blue for staining, and as there will be too great a number of leucocytes to make a satisfactory count in the counting chamber, it is better to add water until there are 2 cubic centimeters, or sometimes even more, in the sedimentation tube.

This method of counting, while long in explaining, is in reality comparatively short and simple in application. Moreover, it is based on accurate measurements in every detail, and the results are correspondingly reliable.

This method gives much higher results than that used by Stokes and by Bergey. The cows of the Maryland Agricultural Experiment Station averaged 113,760 leucocytes per cubic centimeter, while those of "one of the best and most carefully kept herds in the United States" averaged 241,578 per cubic centimeter. Doane was unable to determine any difference between those leucocytes and pus cells. He would regard the presence of 500,000 leucocytes per cubic centimeter as suspicious, and 1,000,000 per cubic centimeter as indicating inflammation of the udder. He writes:

In truth, counting leucocytes with the blood-counter, or in any way putting dependence on the number of leucocytes, is very unsatisfactory. The presence of fibrin, as

shown by clumps of leucocytes in the blood-counter, or, as demonstrated by stained threads, combined with an abnormal number of leucocytes, is the only satisfactory proof that inflammation exists in the udder.

Slack⁵ modified the Stewart method by using tubes of a larger bore, containing 2 cubic centimeters, and smeared the sediment over 4 square centimeters. He condemns when over fifty cells are seen to the field of a one-twelfth oil immersion objective. He condemns for streptococci, when streptococci, diplococci, or cocci are observed microscopically, if the observation is confirmed by the presence of streptococci in cultures from the same sample.

Savage⁶ devised a method similar to that of Doane and Buckley, which, like theirs, shows large numbers of leucocytes in the milk of normal cows. Savage can not distinguish between a leucocyte and a pus cell, nor does he set a standard to designate an abnormal number of pus cells.

The Stewart method was very slightly modified in the laboratory of the San Francisco Health Commission. The disk covered with tubes was fitted to a Bausch & Lomb centrifuge and a speed of 3,000 revolutions a minute was used. Milk of the various dealers was reported upon with respect to its content of streptococci, staphylococci, and pus.

It will be noted that there is a wide discrepancy between the different methods as regards the number of cells that should be regarded as indicating contamination by pus. Stewart condemns for 100,000 per cubic centimeter. Doane found the individual cows of a whole herd averaging twice this number and with hesitancy designated 500,000 leucocytes per cubic centimeter as suspicious. Doane used his method in judging the milk of individual cows, while the Stewart method was used to determine the quality of the mixed milk of whole herds. To detect the contamination introduced into the mixed milk of a herd by a few cows indicates a highly delicate test.

The variations between these methods and the prominence given the Stewart method in municipal laboratory work led us to conduct tests for the comparison of the two and for the comparison of duplicate determinations by each.

In our work with the Stewart method we used the apparatus devised by Stewart and made by Boekel of Philadelphia, fitted to our electric centrifuge capable of revolving 3,000 times a minute. For the numerical determinations by the use of the microscope, the relation borne by the area of one field to a square centimeter was determined by means of a stage micrometer. The precautions concerning the search of the whole area of the smear, as suggested by Stewart, were carried out. The Doane-Buckley method was carried out in strict accordance with the description quoted above.

The first numerical determinations of leucocytes were made by the Stewart method, on samples of market milk. By this method the total number of leucocytes in ten fields taken at random is observed. The average number per field is multiplied by a factor representing the relation of the area of the microscopic field to one square centimeter, the area of the smear. With our work this factor was 2173, 2332, or 2632,

⁵ Slack. Methods of bacteriological examination of milk. The Journal of Infectious Diseases, Supplement No. 2, February, 1906, p. 214.

⁶ Savage. Streptococci and leucocytes in milk. Jour. Hyg. (Cambridge), (1906), No. 2, p. 123. Abs. in Experiment Station Record, Vol. XVII, No. 10, p. 1007.

depending upon the microscope used. Table 1 contains the figures showing the total of ten fields and the numerical determination obtained by multiplying the *average* number of leucocytes per field by the factor.

TABLE 1.—*A Series of Numerical Determinations of Leucocytes by the Stewart Method.*

Leucocytes in 10 Fields.	Leucocytes per c.c.	Leucocytes in 10 Fields.	Leucocytes per c.c.	Leucocytes in 10 Fields.	Leucocytes per c.c.
8	1,865	300	69,960	33	7,695
5	1,316	105	27,636	9	2,098
18	3,911	79	17,166	7	1,521
10	2,173	1	233	6	1,303
13	2,824	32	7,462	48	10,430
1	217	0	0,000	13	3,031
3	651	7	1,521	1	233
3	789	0	0,000	43	9,343
3	651	13	2,824	18	3,911
0	0,000	5	1,166	0	0,000
15	3,948	0	0,000	12	2,607
0	0,000	1	233	2	434
129	33,952	8	2,105	6	1,303
50	13,160	181	*47,639	14	3,264
9	1,555	19	4,128	3	651
11	2,895	32	6,953	19	4,430
2	526	4	869	0	0,000
14	3,042	4	1,052	7	1,632
11	2,390	3	789	3	652
17	4,474	0	000	6	1,303
26	5,649	0	000	43	10,027
64	3,907	1	233	11	2,565

The sixty-six determinations averaged 5,459 leucocytes per cubic centimeter. In nine cases no cells could be recognized, and the highest number found in 1 c.c. was 69,960. The cells occasionally were not uniformly distributed, and it was difficult to count them accurately when they occurred crowded closely together. In only one case were large numbers of leucocytes and streptococci found associated, and this is designated by a star. In about half of the examinations other organisms such as micrococci and short rods were found.

Other determinations were made with market milk, to compare the results by the Stewart and Doane-Buckley methods, and are recorded in Table 2. The numerical result by the Doane-Buckley method is obtained by counting the number of leucocytes in one ten-thousandth cubic centimeter (.0001 c.c.) of sediment from 10 cubic centimeters of the sample. The number counted is multiplied by 1,000 to give the number of leucocytes per cubic centimeter of the milk. The figures for the Stewart method have the same significance as in Table 1.

TABLE 2.—*Numerical Determinations of Leucocytes in the Same Samples, by the Stewart and Doane-Buckley Methods.*

Number.	STEWART.		DOANE-BUCKLEY.	Number.	STEWART.		DOANE-BUCKLEY.
	Leuco- cytes in 10 Fields.	Leuco- cytes per c.c.	Leucocytes per c.c.		Leuco- cytes in 10 Fields.	Leuco- cytes per c.c.	Leucocytes per c.c.
67.....	29	6,301	78,000	225.....	13	2,824	31,000
71.....	32	6,953	26,000	226.....	9	1,955	32,000
72.....	44	9,561	20,000	227.....	11	2,390	14,000
73.....	21	4,563	24,000	228.....	12	2,607	46,000
74.....	27	5,867	18,000	230.....	5	1,086	33,000
75.....	57	12,386	48,000	231.....	14	3,042	29,000
77.....	3	789	37,000	232.....	10	2,632	88,000
78.....	26	6,843	33,000	233.....	12	2,607	74,000
95.....	34	8,949	40,000	234.....	17	3,474	55,000
97.....	11	2,895	22,000	235.....	12	2,607	30,000
99.....	36	7,822	38,000	236.....	13	2,824	83,000
182.....	11	2,390	33,000	238.....	21	5,527	55,000
183.....	7	1,521	77,000	240.....	14	3,042	101,000
184.....	14	3,042	58,000	241.....	27	5,867	61,000
185.....	4	869	29,000	242.....	126	33,163	33,000
186.....	31	6,736	55,000	243.....	11	2,395	182,000
187.....	34	7,388	41,000	244.....	5	1,086	49,000
188.....	6	1,303	28,000	245.....	6	1,579	52,000
190.....	7	1,521	31,000	246.....	1	2,173	95,000
191.....	1	217	62,000	247.....	3	789	13,000
192.....	28	6,084	42,000	248.....	37	8,040	108,000
193.....	10	2,173	41,000	249.....	12	4,563	147,000
194.....	8	1,738	48,000	250.....	4	869	56,000
195.....	21	4,563	50,000	251.....	9	1,955	10,000
196.....	15	2,359	49,000	252.....	12	2,607	37,000
197.....	5	1,086	67,000	253.....	4	869	37,000
198.....	11	2,309	97,000	254.....	71	16,559	411,000
203.....	14	3,042	17,000	255.....	4	869	9,000
221.....	3	651	44,000	256.....	46	9,980	539,000
222.....	2	434	23,000				
224.....	9	1,955	38,000	Totals.....		254,290	3,824,000

The figures for the sixty determinations show that the results by the Doane-Buckley method average over fifteen times as large as those by the Stewart method. There is no constant ratio between the results by the two methods.

Another series of determinations was made with the view of comparing duplicate determinations by the Stewart method with one another, and of further comparing the results by this method with those of the Doane-Buckley method. The samples were taken directly from the teats of individual cows in a dairy, where extraordinary attention was paid to the health of the cows. The cows were all free from udder disease, except two cases of slight skin infection, which produced no perceptible effect in the leucocyte count. The numerical results may or may not represent the leucocyte count of the milk of the various cows, for the samples did not represent the whole of the mass of milk yielded by the cows. The series of determinations appearing in Table 3 then are of chief importance for comparing the three determinations from each sample. The fifth column in the table shows the percentage relation of the lower count by the Stewart method to the higher.

TABLE 3.—*Numerical Determinations of Leucocytes in the Same Samples by the Stewart Method and by the Doane-Buckley Method.*

STEWART.					DOANE-BUCKLEY.
First Count.		Second Count.		Per Cent Relation of Lower to Higher.	Leucocytes per c.c.
Leucocytes in 10 Fields.	Leucocytes per c.c.	Leucocytes in 10 Fields.	Leucocytes per c.c.		
34	7,388	8	1,738	23.5	34,000
0	0,000	0	0,000	-----	8,000
10	2,173	11	2,390	90.9	56,000
0	0,000	4	869	-----	46,000
3	651	9	1,955	33.3	28,000
0	000	0	0,000	-----	19,000
1	217	8	1,738	12.5	19,000
148	32,160	119	25,858	80.4	68,000
1	217	1	217	100.00	14,000
0	000	1	217	-----	4,000
2	434	4	869	50.0	99,000
4	869	1	217	25.0	90,000
6	1,303	11	2,390	54.5	37,000
89	23,424	6	1,303	5.5	336,000
18	3,911	27	5,867	66.6	194,000
0	0,000	0	0,000	-----	30,000
4	869	0	0,000	-----	151,000
0	000	0	0,000	-----	354,000
5	1,086	1	217	20.0	122,000
2	424	1	217	50.0	406,000
6	1,303	9	1,955	66.6	148,000
5	1,086	8	1,738	62.5	85,000
8	1,738	1	217	12.5	16,000
136	31,715	51	11,893	37.5	101,000
8	1,738	34	7,388	23.5	34,000
23	6,053	29	7,632	79.3	165,000
25	6,580	26	6,843	96.1	187,000
0	0,000	95	25,004	-----	5,000
6	1,579	30	7,896	19.8	379,000
0	0,000	1	217	-----	3,000
7	1,635	6	1,401	85.6	191,000
2	526	29	7,632	6.8	37,000
204	53,692	23	6,053	11.2	451,000
18	4,737	13	3,421	72.2	360,000
26	6,843	90	23,688	28.8	92,000
00	0,000	0	0,000	-----	58,000
48	12,633	24	6,316	50.0	155,000
23	6,053	32	8,422	71.8	92,000
22	5,790	51	13,423	43.1	237,000
Totals,	218,817	-----	187,201	-----	4,911,000
Averages,	5,610	-----	4,800	-----	125,820

The average number of leucocytes by the Stewart method in the first series is 5,610, in the second 4,800, and in the Doane-Buckley method 125,820. The averages of the Stewart counts do not show an especially convincing agreement, the second average being 85 per cent of the size of the first. Agreement is very much closer in the case of the averages of the two series than in the individual counts of pairs. In one case the count is the same in each series. Other cases vary from this high percentage of agreement to the pair that is farthest apart, 23,424 leucocytes per cubic centimeter for the first and 1,303 for the second count, the second showing but 5 per cent as many leucocytes in a cubic centimeter as the first. Except for one single instance throughout the table, the Doane-Buckley counts are much greater than the Stewart counts. The average of the Stewart counts shows 4 per cent as many leucocytes

per cubic centimeter as the average of the Doane-Buckley counts. The Stewart count that comes nearest to the corresponding Doane-Buckley count shows 15.6 per cent as many. The one count that comes farthest from agreeing shows 0.08 of one per cent.

A series of twenty-two determinations were made in duplicate by the Doane-Buckley method. In the case of the first two samples, two counts were made from the sediment and the numerical results of these are recorded as 1st and 2d drop, in Table 4. The closeness with which the two parallel determinations agree is shown in a column in which are figures showing the percentage relation of the lower to the higher determination.

TABLE 4.—*Numerical Determinations of Leucocytes in the Same Samples of Milk, in Duplicate, by the Doane-Buckley Method.*

Sample.	1 Leucocytes per c.c.	2 Leucocytes per c.c.	Per Cent Relation of Lower to Higher.
1	48,000 (1st drop) 29,000 (2d drop)	35,000 (1st drop) 29,000 (2d drop)	83.1
2	39,000 (1st drop) 42,000 (2d drop)	40,000 (1st drop) 44,000 (2d drop)	96.4
3	149,000	92,000	61.7
4	51,000	37,000	72.5
5	127,000	99,000	77.9
6	39,000	34,000	87.1
7	121,000	79,000	65.2
8	379,000	335,000	88.3
9	3,000	7,000	42.8
10	84,000	83,000	98.8
11	45,000	61,000	73.7
12	147,000	59,000	40.1
13	71,000	97,000	73.2
14	99,000	79,000	79.8
15	71,000	47,000	66.2
16	310,000	352,000	88.0
17	13,000	16,000	81.2
18	84,000	93,000	90.3
19	53,000	45,000	84.9
20	211,000	236,000	89.4
21	56,000	53,000	94.6
22	49,000	112,000	43.7
Totals	2,320,000	2,164,000	
Averages	96,666	90,166	93.2

The determinations from the 1st and 2d drops, in the first series, from sample 1 are discordant, but the other three duplicate drop counts are very close together. This line of work is treated more extensively in Table 5.

Thirteen determinations agreed within 25 per cent of the larger one, five within 35 per cent, and four more varied between 35 and 40 per cent.

Determinations 10 to 22 were made from the whole mess of milk of individual cows in the dairy of the University of California, and No. 8 was also made from the milk of an individual cow. The cows were all free from any apparent udder disease. This observation confirms that of Doane, who calls attention to the high leucocyte count of the milk of healthy cows.

A series of determinations was made with the Doane-Buckley method, on samples of the milk of individual healthy cows. In each deter-

mination two counts were made with different portions of the stained sediment. The results of these counts, together with figures indicating the percentage relation of the lower to higher, appear in Table 5.

TABLE 5.—*Numerical Determinations of Leucocytes by the Doane-Buckley Method, in which Two Counts were made from Each Centrifuge Tube.*

Number.	Leucocytes per c.c.		Per Cent Relation of Lower to Higher.	Number.	Leucocytes per c.c.		Per Cent Relation of Lower to Higher.
	First Count.	Second Count.			First Count.	Second Count.	
1	131,000	176,000	77.43	46	10,000	5,000	50.00
2	27,000	25,000	92.59	47	16,000	17,000	94.11
3	17,000	13,000	76.47	48	63,000	62,000	98.41
4	Clumped	Clumped	-----	49	106,000	112,000	89.35
5	18,000	17,000	94.45	50	17,000	10,000	58.82
6	14,000	12,000	85.71	51	61,000	55,000	90.17
7	30,000	38,000	78.95	52	22,000	18,000	81.82
8	68,000	81,000	83.85	53	131,000	127,000	96.95
9	16,000	14,000	87.50	54	77,000	89,000	86.51
10	60,000	32,000	53.33	55	12,000	17,000	70.59
11	18,000	13,000	72.22	56	124,000	114,000	91.93
12	9,000	11,000	81.82	57	7,000	9,000	77.78
13	29,000	34,000	85.3	58	8,000	7,000	87.5
14	63,000	85,000	74.12	59	28,000	25,000	89.29
15	69,000	68,000	68.55	60	24,000	29,000	82.76
16	29,000	28,000	96.56	61	36,000	43,000	83.72
17	28,000	17,000	60.71	62	58,000	53,000	91.38
18	34,000	20,000	58.83	63	104,000	107,000	97.19
19	21,000	15,000	71.43	64	44,000	37,000	84.09
20	14,000	14,000	100.00	65	17,000	15,000	88.24
21	33,000	43,000	76.75	66	13,000	15,000	86.66
22	58,000	50,000	86.21	67	8,000	7,000	87.5
23	18,000	25,000	72.00	68	17,000	14,000	82.35
24	35,000	33,000	94.29	69	30,000	32,000	93.74
25	19,000	20,000	95.00	70	80,000	87,000	91.96
26	73,000	75,000	97.34	71	21,000	21,000	100.00
27	107,000	99,000	92.52	72	375,000	369,000	98.38
28	120,000	102,000	85.00	73	52,000	64,000	81.25
29	62,000	60,000	96.78	74	4,000	6,000	66.66
30	59,000	31,000	52.54	75	24,000	28,000	85.71
31	19,000	22,000	86.36	76	31,000	24,000	77.41
32	23,000	23,000	100.00	77	35,000	41,000	85.37
33	71,000	72,000	98.61	78	28,000	21,000	75.00
34	10,000	8,000	80.00	79	87,000	84,000	97.71
35	54,000	53,000	98.15	80	49,000	29,000	59.19
36	8,000	10,000	80.00	81	49,000	33,000	67.35
37	28,000	19,000	67.86	82	39,000	42,000	92.86
38	24,000	20,000	83.33	83	40,000	44,000	90.91
39	12,000	15,000	80.00	84	99,000	86,000	86.86
40	18,000	27,000	66.00	85	3,000	2,000	66.66
41	23,000	29,000	79.31	86	7,000	6,000	85.71
42	35,000	28,000	80.00	87	19,000	13,000	68.42
43	226,000	210,000	92.92				
44	581,000	445,000	76.60	Totals	4,314,000	4,274,000	
45	17,000	21,000	80.96	Averages	49,586	49,126	

The average for the first count is 49,586, and for the second 49,126, which is an agreement within one per cent. The agreement between each pair of determinations is fair. Twenty-seven agree within 10 per cent, and there are no glaring inconsistencies.

A series of determinations was made from market milk to determine the numbers found by the Doane-Buckley method. These are set forth in Table 6.

TABLE 6.—*A Series of Numerical Determinations of Leucocytes by the Doane-Buckley Method.*

103,000	116,000	49,000	90,000	50,000	8,000	90,000
183,000	72,000	147,000	137,000	15,000	29,000	52,000
71,000	56,000	135,000	32,000	44,000	46,000	147,000
37,000	23,000	251,000	104,000	40,000	99,000	108,000
56,000	63,000	146,000	203,000	102,000	85,000	49,000
69,000	305,000	56,000	140,000	99,000	23,000	182,000
85,000	178,000	147,000	36,000	44,000	20,000	159,000
101,000	81,000	26,000	50,000	97,000	14,000	147,000
139,000	235,000	17,000	68,000	65,000	235,000	178,000
30,000	123,000	202,000	73,000	105,000	202,000	52,000
147,000	9,000	52,000	83,000	78,000	116,000	32,000
10,000	116,000	72,000	350,000	51,000	81,000	68,000
53,000	164,000	14,000	144,000	52,000	123,000	61,000
48,000	159,000	32,000	197,000	7,000	49,000	13,000
43,000	189,000	207,000	113,000	5,000	42,000	49,000
17,000	40,000	68,000	54,000	40,000	40,000	37,000
71,000	32,000					

The average number of leucocytes per cubic centimeter of the 114 determinations is 90,614. Seventy-three numerical results are below 100,000, thirty-two between 100,000 and 200,000, seven between 200,000 and 300,000, and two above 300,000.

It would not be justifiable to regard even the highest of these as evidence of disease among the cows, for they have been equaled by counts from undoubtedly healthy cows. Doane (*loc. cit.*) presents a series of 102 counts of milk of healthy cows that average 241,000 per cubic centimeter. In not one of the 114 samples was any clumping observed.

The collection of the samples of milk used for the determinations appearing in Table 5 occupied three afternoons. The milk of nine cows was sampled and counted twice on these days. Table 7 contains the results of these counts, in each of which two drops were counted in the blood-counter. In some cases the interval between counts is one day, in others two days.

TABLE 7.—*Numerical Determinations of Leucocytes in the Milk of Individual Cows on Different Days.*

First Day.		Second Day.	
First Count.	Second Count.	First Count.	Second Count.
131,000	176,000	581,000	445,000
21,000	21,000	28,000	25,000
35,000	28,000	27,000	25,000
16,000	14,000	28,000	19,000
9,000	11,000	61,000	55,000
30,000	38,000	58,000	53,000
18,000	13,000	22,000	18,000
18,000	25,000	7,000	9,000
14,000	12,000	62,000	60,000
Totals	295,000	Totals	874,000
Averages ...	32,777	Averages ...	97,111
	37,888		78,777

The few observations recorded in Table 7 do not indicate a constancy in the number of leucocytes present on different days. The average of the counts of the second day is two and a half times the average of the first day.

The study of the leucocyte counts of the milk of a few cows over a long period of time would be an interesting piece of work.

Table 8 shows counts, by the Doane Buckley method, of the leucocytes in samples of the mixed milk from dairies, and from individual cows in those dairies, which showed some diseased condition of the udder. These samples were collected in the course of the sanitary inspection of a number of dairies, and the inspectors made a very careful examination of each cow, felt her udder all over, and even went so far, in most cases, as to sit down on the stool and do a part of the milking. Where there was any udder trouble a sample was taken from the pail when the milking of the cow was finished. The inspectors experienced difficulty in distinguishing between true mammitis and post-parturition troubles, so it is impossible to tell from the table what was the exact trouble in each case.

The composite samples were taken from the strainer tank at the end of the milking. Into this tank the milk from the cows was poured as the buckets were filled, and from this tank milk was being drawn and cans were being filled while the milking was still going on. So while the tank never contained all the milk from all the cows in the dairy, still a sample taken from it was a fairly just sample of the mixed milk of the herd, certainly as just a sample as would be gotten by a random collection from a milk depot. The composite samples never represented the milk of more than twenty cows. Where the milk is marked "used" it means that the milk from this cow was put into the straining tank with all the rest, and is represented in the composite sample.

TABLE 8.—*Counts, by the Doane-Buckley Method, of the Leucocytes in Samples of Mixed Milk from Dairies, and from Individual Cows in those Dairies.*

DAIRY 1.

Composite.....	32,000.	
Cow 1	62,000.	One half of udder indurated. Used.
Cow 2	90,000.	One half of udder indurated. Used.
Cow 3	17,000.	One half of udder indurated. Used.
Cow 4	clumped.	One half of udder indurated. Used.

DAIRY 2.

Composite.....	82,000.	
Cow 1	454,000.*	Udder indurated. Used.
Cow 2	clumped.*	One quarter of udder indurated. Used.
Cow 3	97,000.	One half of udder indurated. Used.

DAIRY 3.

Composite.....	19,000.	
Cow 1	4,800,000.	Udder indurated. Used.
Cow 2	93,000.	One half of udder indurated. Used.
Cow 3	344,000.	One quarter of udder indurated. Used.
Cow 4	116,000.	One half of udder indurated. Used.
Cow 5	80,000.	Udder indurated. Calved 5 days ago. Used.
Cow 6	11,000.	Udder indurated. Calved 7 days ago. Used.

DAIRY 4.

Composite.....	48,000.	
Cow 1	317,000.	Abscess discharging from part of udder. Used.
Cow 2	921,000.	One half of udder indurated. Used.
Cow 3	76,000.	One half of udder indurated. Used.

DAIRY 5.

Composite 1.....	49,000.	
Composite 2.....	112,000.	
Cow 1	6,000.	One hard lump in udder. Used.

DAIRY 6.

Composite.....	22,000.	
Cow 1	9,000.	Fresh three days. Used.
Cow 2	120,000.	(?) Used.

* Badly clumped.

TABLE 8.—*Counts, by the Doane-Buckley Method, of the Leucocytes in Samples of Mixed Milk from Dairies, and from Individual Cows in those Dairies—Continued.*

DAIRY 7.			
Composite.....	12,000.		
Cow 1.....	1,520,000.	One quarter enlarged.	No abscess. Used.
Cow 2.....	38,000.	One quarter indurated.	Not used.
DAIRY 8.			
Composite.....	58,000.		
Cow 1.....	17,000.	One quarter indurated.	Used.
Cow 2.....	18,000.	One quarter indurated.	No abscess. Not used.
DAIRY 9.			
Composite.....	191,000.		
Cow 1.....	260,000.	Udder slightly indurated.	Used.
Cow 2.....	92,000.	One quarter slightly indurated.	Used.
Cow 3.....	58,000.	Skin infection.	Used.
Cow 4.....	37,000.	(?)	
Cow 5.....	451,000.	Bloody milk, but no lesion.	Not in composite.
DAIRY 10.			
Composite.....	92,000.		
Cow 1.....	237,000.	Abscess in one quarter.	Not used.
Cow 2.....	Innumerable.	Not used.	
Cow 3.....	Clumped.	Udder slightly indurated.	Not used.
Cow 4.....	150,000.	Udder slightly indurated.	Used.
DAIRY 11.			
Composite.....	65,000.	Does not contain milk of Cow 1.	
Cow 1.....	Innumerable.	(Clumped.) One quarter of udder swollen.	
DAIRY 12.			
Composite.....	104,000.	(?)	
Cow 1.....	53,000.	Sore red teat.	Used.
DAIRY 13.			
Cow 1.....	129,000.	Udder swollen.	Used.
Cow 2.....	7,000.	Udder swollen.	Used.
Cow 3.....	47,000.	Teat red.	Used.
Cow 4.....	17,000.	Fresh.	Not used.
DAIRY 14.			
Composite.....	7,000.	(?)	
Cow 1.....	146,000.	Emaciated.	Used.
Cow 2.....	173,000.	Emaciated.	Not used.
DAIRY 15.			
Composite.....	146,000.		
Cow 1.....	499,000.	Not used.	
DAIRY 16.			
Composite.....	63,000.		
Cow 1.....	73,000.	Swollen udder.	Used.
Cow 2.....	72,000.	Swollen udder.	Used.
Cow 3.....	40,000.	(?) Used.	
Cow 4.....	30,000.	(?) Used.	
Cow 5.....	50,000.	(?) Not used.	
DAIRY 17.			
Composite 1.....	95,000.		
Composite 2.....	34,000.		
Cow 1.....	3,000.	Udder abscess.	Used.
DAIRY 18.			
Composite 1.....	85,000.		
Composite 2.....	42,000.		
Cow 1.....	173,000.	Swollen teat.	Used.
DAIRY 19.			
Composite.....	16,000.	(?)	
Cow 1.....	281,000.	(?) Used.	
Cow 2.....	21,000.	(?) Used.	
DAIRY 20.			
Composite.....	23,000.	(?)	
Cow 1.....	296,000.	(?) Used.	

TABLE 8.—*Counts, by the Doane-Buckley Method, of the Leucocytes in Samples of Mixed Milk from Dairies, and from Individual Cows in those Dairies—Continued.*

DAIRY 21.

Composite	46,000.	
Cow 1	1,110,000.	One quarter indurated. Used.

DAIRY 22.

Composite 1	134,000.	(?)
Composite 2	163,000.	(?)
Composite 3	245,000.	(?)
Cow 1	61,000.	Emaciated. Used.
Cow 2	115,000.	Emaciated. Used.
Cow 3	Clumped.	Abscess in udder. Used.
Cow 4	9,000.	Emaciated. Used.

DAIRY 23.

Composite 1	75,000.	
Composite 2	80,000.	
Cow 1	10,000.	(?) Used.
Cow 2	361,000.	Udder indurated. Used.
Cow 3	125,000.	Udder indurated. Used.
Cow 4	226,000.	Fresh. Not used.
Cow 5	152,000.	(?)

DAIRY 24.

Composite 1	180,000.	
Composite 2	43,000.	
Composite 3	62,000.	
Composite 4	20,000.	
Composite 5	104,000.	(Clumped).
Cow 1	190,000.	Abscess in udder. Used.
Cow 2	10,000.	(?) Used.
Cow 3	154,000.	Emaciated. Used.
Cow 4	268,000.	Fresh. Used.

DAIRY 25.

Composite 1	50,000.	
Composite 2	55,000.	
Composite 3	43,000.	
Composite 4	17,000.	
Cow 1	52,000.	Udder indurated. Used.
Cow 2	325,000.	Udder indurated. Used.

DAIRY 26.

Composite 1	25,000.	
Composite 2	25,000.	
Composite 3	14,000.	
Cow 1	196,000.	Emaciated. Used.

DAIRY 27.

Composite	47,000.	
Cow 1	959,000.	Udder swollen. Used.
Cow 2	207,000.	(?) Used.
Cow 3	67,000.	(?) Used.

DAIRY 28.

Composite	79,000.	
Cow 1	241,000.	Udder indurated. Used.

DAIRY 29.

Composite	21,000.	
Cow 1	383,000.	Emaciated. Used.

DAIRY 30.

Composite 1	17,000.	
Composite 2	16,000.	
Cow 1	20,000.	Udder indurated; fresh. Not used.
Cow 2	93,000.	Emaciated. Used.
Cow 3	54,000.	Emaciated. Used.

DAIRY 31.

Cow 1	453,000.	Fresh. Used.
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DAIRY 32.

Cow 1	17,000.	Fresh.
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It is noticeable in the table that the milk from the diseased cows has no recognizable effect on the count of the mixed milk. Most of the composite counts would be regarded as entirely normal, and the highest one of all is that of Dairy 9, 191,000, which lies well within the probable safety limit suggested by Doane.

In Dairy 3, cow 1 has a count of 4,800,000, and yet the mixed milk count is only 19,000. In Dairy 8 the mixed milk count is larger than that of any of the recognized diseased cows in the herd. The originators of the Doane-Buckley method of estimating leucocytes in milk did not claim that the milk of diseased cows could be detected in herd milk by an increase in number of leucocytes alone, but suggested that it might be recognized by an increase in number of leucocytes, together with clumping of the leucocytes or fibrin. Only six of the samples from diseased cows showed any clumping, and only one of the composites, that one being that of Dairy 24, in which none of the milks from diseased cows showed any clumping. The counts of the individual cows, all diseased, vary from 3,000, for a cow reported as having an udder abscess, to 4,800,000, for one reported as having an indurated udder.

CONCLUSION.

The results so far obtained confirm the suspicion that it is not possible to detect udder disease in cows by the examination of a mixed milk for number of leucocytes alone. The results by the Stewart method are so erratic that while an occasional count, which would be regarded as high for that method, may indicate trouble, the low counts seem to indicate only the failure of the method to show the leucocytes present. If the results by the Stewart method were consistent, all counts might be significant in spite of the fact that they show only a small proportion of the leucocytes present. We have no observations to show that a combination of large numbers of leucocytes and streptococci may not indicate that the milk is contaminated. We have encountered this condition very rarely and much less often than the condition of the herds would lead us to expect.

We do not regard the circumstance of finding diseased udders in a herd whose milk has been condemned by the Stewart test as a confirmation of the value of that test in locating udder diseases.

In the first place, udder trouble can usually be found in a large dairy. In an inspection of 9,200 cows in 86 dairies about San Francisco, made under the direction of one of us, 31 per cent of the dairies were reported as showing cows with udder disease. The inspection of dairy cows on a wholesale scale, with reference to the existence of udder disease, undoubtedly does not reveal the whole amount of such disease. The matter of udder disease was a small detail in the inspection of most of the 86 dairies, for the inspectors were primarily studying sanitary conditions.

The presence of streptococci in milk can not be regarded as proof of the existence of active mammitis in the cow. Reed and Ward⁷ have observed the constant presence of streptococci in the milk of a healthy cow in the Cornell University dairy. The fact that she had not, so far

⁷ Reed and Ward. The significance of the presence of streptococci in market milk. *American Medicine*, Vol. VII, p. 256.

as known, shown symptoms of the disease, lent special interest to the observation. The milk record of the cow showed a steady increase from 1892 until 1898, when the observation was made, which fact indicates that she had not suffered a serious attack of mammitis. Bergey (*loc. cit.*) found streptococci in samples of milk of cows in which no inflammation of the udder could be discovered. Heinemann⁸ has made examinations "finding that streptococci are invariably present even in milk obtained with unusual precautions and from healthy cows." He reaches the conclusion: "Since *Streptococcus lacticus* is invariably present in market milk and in milk collected with good precautions, the sanitary significance of streptococci in market milk will need further investigation." Savage (*loc. cit.*) found streptococci present in 42.5 per cent of the samples of milk of individual cows, and found them in the mixed milk invariably.

The microscopic examination of milk for staphylococci is likewise of questionable value. There are plenty of micrococci almost invariably present in milk, that have the microscopic appearance of pyogenic organisms and even simulate them in cultural characteristics. The udders of healthy cows contain these micrococci and other organisms. Observations on the bacterial flora of the udder have been recorded by Bergey (*loc. cit.*), Ward⁹, Harrison¹⁰, Freudenreich¹¹, and others. The presence, then, of bacteria in even freshly drawn milk is no justification for the assumption that the organisms in question are pathogenic.

The Doane-Buckley test is far more consistent in every respect than that of Stewart. Examination of the milk of individual healthy cows by the Doane-Buckley method has shown such large numbers of leucocytes present in the milk of healthy cows that a narrow margin exists between the leucocyte count of the milk of healthy and of diseased cows. A distinction might be made in the examination of milk of individual cows, but when the milk of one diseased cow is diluted with others with a lower count, as in the case of a mixed herd milk, the result upon the average is impossible to detect.

In view of all these observations we feel that the numerical determination of leucocytes in mixed milk, for the purpose of detecting the existence of mammitis among the cows of the dairy, does not rest upon a firm experimental basis.

⁸ Heinemann. The significance of streptococci in milk. *Journal of Infectious Diseases*, Vol. III, No. 2, p. 173.

⁹ Ward. The invasion of the udder by bacteria. *Bulletin 178, Cornell University Agricultural Experiment Station.*

¹⁰ Harrison. The bacterial contamination of milk, and its control. *Transactions of the Canadian Institute*, Vol. VII, 1902-3, p. 467.

¹¹ Freudenreich. Ueber das Vorkommen von Bakterien im Kuheuter. *Centralblatt f. Bakteriologie, II Abteilung, X Band, 1903, s. 401.* Also, Ueber die Bakterien im Kuheuter und ihre Verteilung in den Verschiedenen Partien des Melkens *Landwirtschaftlichen Jahrbuch der Schweiz, 1904.*

REPORT

OF THE

STATE FORESTER

FOR THE PERIOD

JULY 12, 1905, TO NOVEMBER 30, 1906

Being the First Public Report of the Office, Established by the
Act of March 18, 1905 (Chapter 264, Statutes 1905),
for the Preservation of California Forests.



SACRAMENTO:

W. W. SHANNON, : : : SUPERINTENDENT STATE PRINTING.
1906.

STATE BOARD OF FORESTRY.

GEORGE C. PARDEE.....GOVERNOR.

C. F. CURRY.....SECRETARY OF STATE.

U. S. WEBB.....ATTORNEY-GENERAL.

G. B. LULL.....STATE FORESTER.

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SACRAMENTO, CAL., November 27, 1906.

To His Excellency, GEORGE C. PARDEE, Governor of California.

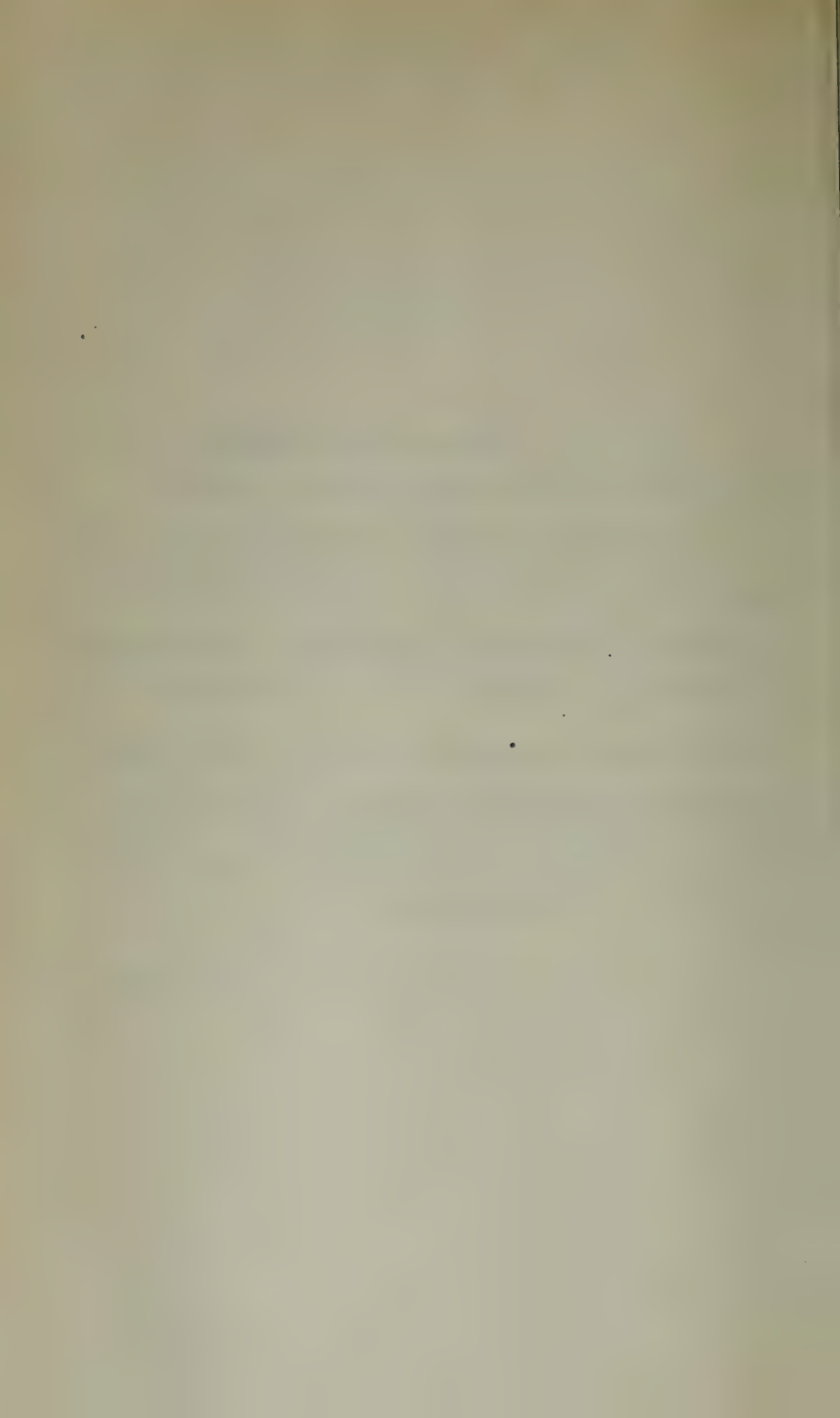
SIR: I have the honor to transmit to you this first public report, reviewing the work of this office under the Act of March 18, 1905, and recommending legislative action along specified lines to broaden the scope and increase the efficiency of the forest laws. These recommendations are embodied in an amended forest bill which accompanies this report.

A detailed report of particular value for office use was submitted to you by Mr. E. T. Allen on his resignation, as State Forester, on July 1, 1906. For obvious reasons much of the information and many recommendations which appear here were taken from this earlier report.

Very respectfully,

G. B. LULL.

State Forester.



REPORT OF THE STATE FORESTER.

In this report it is proposed to treat in a practical way of the decline of the forests of California and their increasing importance to the industrial life of the State. The attitude of the State toward them will be defined and the experiences gained under the laws enacted to preserve them will be recorded. Particular emphasis will be placed on the limitations and defects of the laws, in the hope that those interested in the permanent welfare of the industries dependent on forest preservation will unite to secure more effective forestry legislation.

THE DECLINE OF THE FOREST.

To gain a clear idea of the change in the condition of the forest that has occurred in the course of settlement it will be helpful to compare its present state with the virgin forest. Picture a forest of unbroken continuity cloaking from summit to plain the mountains on both sides of the great interior valleys from the Oregon border southward to the Tehachapis where the two branches united to extend a long, hook-shaped arm over the uplifted areas surrounding San Bernardino Valley and the adjacent plain! The quality of the forest varied greatly in different localities, because numerous species were confined to certain regions by the natural factors, soil, climate, and elevation. The redwood forest occupied an area along the northwest coast over which ocean fogs drifted in summer; spruce and fir grew in the higher elevations; next below came the cedar with sugar and yellow pine, while nearer the valley, as a fringe to the heavy forest, was a belt of shrubs, or chaparral, intermixed with oak and drought-resisting pines. This magnificent resource, covering approximately 34,000,000 acres, or one third of the State, was unequaled by that of any other State in either the size and perfection of individual trees or its location on lands unfit for other uses.

The area of forest land in the State to-day is practically identical with the original area, very little having been turned to other uses. The changes, therefore, have resulted solely in a reduction of the area of merchantable timber. Two causes have operated to effect this change, lumbering and fire.

Lumbering.

The vast amount of material taken from the forest to supply the demands of settlement and development has been duplicated or exceeded by useful timber of lesser value, which has been sacrificed and rejected. The woods are full of moss-covered trunks from which only the butt log has been taken. When only the best material would bear the cost of milling and marketing the inferior had to be left, even if there had been a thought of taking it, which is improbable, for the supply seemed inexhaustible. As a result, lumbering has left the forest in an unsightly and deplorable condition. Lumbermen have been called "vandals" because of it, yet they have simply catered to the wants of a fastidious public. Their actions have been determined by economic conditions.

It is estimated that twenty per cent of the redwood area has been cut over. Fire has been used there as a necessary step in the operation, but as a coppice growth follows in spite of it, it is doubtful if the merchantable area of redwood timber would have been permanently reduced had succeeding fires been prevented. A relatively small portion of this area, when cleared, has been turned to other uses.

In the yellow and sugar pine belt two methods of cutting have been followed: a culling method, whereby only the larger trees are removed, and clean cutting, which results in complete removal. Practically all of the accessible portions of the Sierra forest have been worked over according to one or the other of these methods.

Fire.

The condition of the forest after lumbering is ripe for fire, the danger from which is multiplied by the protracted drought of California summers. Engines, campers, prospectors, lumbermen and, in fact, every possible source of fire, combine with these conditions to cause conflagrations. Following fire, chaparral species invade the burned area, and the composition of the forest changes from merchantable timber to brush. Thus the fringe of chaparral, which formerly bordered the forest, has invaded it to the permanent exclusion of other species, unless artificial replacement is resorted to. Chaparral now holds the land on whole townships which formerly produced merchantable timber, and the cause of its extension remains unchecked.

It must not be inferred that land encroached upon by chaparral is worthless and unworthy of care. In general, it is true that such areas will never bear merchantable timber again unless planting is resorted to, but as a protective cover to watersheds heavy chaparral is almost as good as a stand of forest species. Hence, for this reason alone the areas now occupied by chaparral should receive full protection, while

unusual care should attend lumbering to prevent fires from causing the brush to enroach still further on areas producing merchantable timber.

THE DIRECT VALUE OF THE FOREST.

The value of the forest as a source of useful material is so evident that it will be sufficient to dwell briefly on this important province. It is impossible to imagine a civilization without wood. Even the commonest articles used habitually require wood for their manufacture, although usually only the channels of greatest consumption, such as railroads, buildings, mines, etc., are considered. Moreover, the uses of wood, multifarious now, are steadily increasing.

Some conception of the direct financial significance of the forest may be gained from the following incomplete figures collected by the Forest Service:

The total cut of lumber in California during 1905 approximated 1,219,000,000 board feet, or 4.4 per cent of the total cut in the United States.

In the production of shingles California stood second, being credited with 562 million.

Virginia was the only State to exceed the 48,144 cords of tanbark supplied by California.

California's standing timber to-day probably represents an intrinsic value of much more than \$200,000,000. When manufactured it will be worth fifteen times as much, and this immense wealth will be distributed into the pockets of every citizen, because it will be created by labor and the wages will be paid into circulation. It is roughly estimated that even now the forest products of the State bring an annual revenue of \$20,000,000. Considered thus alone, as a financial resource, the value of the forest to the State assumes tremendous importance.

THE INDIRECT VALUE OF THE FOREST.

It might be possible, although perhaps prohibitively expensive, to import forest products from other states; but water must be had at home, and it is unnecessary here to dwell upon either its paramount part in the life of California or its dependence on forest-covered sources.

Although there is great divergence of opinion among laymen regarding the importance of forests in regulating run-off, general opinion is unanimous in conceding that the removal of forests is followed by the disturbance of water levels. Whenever the demand for water makes this question acute, a lucid explanation showing the almost irrevocable damage done by denuding the watersheds is commonly followed by nervous haste to repair it. This, however, requires a long period of time and often vast expenditures.

Where other industries monopolize the attention of the greater part of a community, even temporarily, so that need for water for irrigation is not pressing, forest destruction is allowed to proceed, unmindful of the future, although present populations must concede that the ultimate employment of all tillable lands will be for agriculture, and that this will be impossible without water. The two conditions can be forcibly illustrated by comparing the sentiment for forest protection and forest planting in the intensively cultivated San Bernardino Valley with the apathy existing in certain undeveloped sections of Northern California.

The awakening in the south came when Mr. W. C. Mendenhall* of the Hydrographic Survey showed conclusively that the water level of San Bernardino artesian basin is being lowered rapidly as the result of over-use, explaining further that the denudation of the tributary watersheds caused the water to pass over the valley in floods without giving it time to filter through the porous soil into the underground reservoir. Concerted action for forest replacement has characterized the south ever since.

In forested areas the mechanical force of falling rain is dissipated when it strikes the foliage, consequently the soil is not compacted. The water then drips on to the litter-covered soil or runs down the trunks to the ground, where it is prevented from following the slope to the valley by obstructing vegetation. The absorbing humus underneath the trees keeps the upper layers of soil loose and friable, while the retreating roots afford channels along which the water seeks lower levels, percolating through the soil slowly, instead of passing over it rapidly, to points below, where it is forced to the surface by an impervious stratum and released. Thus streams from forested watersheds receive their supplies slowly and regularly, which accounts for their uniformity throughout the year.

On non-forested watersheds the mechanical force of the drops compacts the upper layers of soil, which are usually hardened at the outset by exposure to sun and wind. No obstructing vegetation prevents the rapid escape of the water to the stream below along small depressions, from which, owing to its velocity, it is enabled to carry heavy loads of material. Thus streams from denuded watersheds are subject to floods immediately following every rain, which during their short duration incumber the valley below with all manner of débris, succeeded by lapses into drought conditions until the next rains. The City of Hollywood expends several thousand dollars every year to clear away débris deposited from this cause. Facts bearing on the part played by forests in regulating stream flow were brought out by some measurements made for the Forest Service in the San Bernardino Mountains in 1899 and

*The Hydrology of San Bernardino Valley. Water-Supply and Irrigation Paper No. 142.

published in a paper by Prof. J. W. Toumey, Yale Forest School, entitled "The Relation of Forests to Stream Flow." The essence of the paper is contained in the following extract:

In a careful study of the behavior of the stream flow on several small catchment areas in the San Bernardino Mountains it has been found that the effect of the forest in decreasing surface flow on small catchment basins is enormous, as shown in the following tables, where three well-timbered areas are compared with a non-timbered one:

Precipitation and Run-off during December, 1899.

Condition as to Cover.	Area of Catchment Basin.	Precipitation.	Run-off per Square Mile.	Run-off in Percentage of Precipitation.
	<i>Sq. Miles.</i>	<i>Inches.</i>	<i>Acre-feet.</i>	<i>Per Cent.</i>
Forested	0.70	19+	36—	3
Forested	1.05	19+	73+	6
Forested	1.47	19+	70—	6
Non-forested .....	.53	13—	312+	40

At the beginning of this rainy season, in early December, the soil on all four of these basins was very dry as a result of the long dry season. The accumulation of litter, duff, humus, and soil on the forest-covered catchment areas absorbed 95 per cent of the unusually large precipitation. On the non-forested area only 60 per cent of the precipitation was absorbed, although the rainfall was much less.

Rainfall and Run-off during January, February, and March, 1900.

Condition as to Cover.	Area of Catchment Basin.	Precipitation.	Run-off per Square Mile.	Run-off in Percentage of Precipitation.
	<i>Sq. Miles.</i>	<i>Inches.</i>	<i>Acre-feet.</i>	<i>Per Cent.</i>
Forested	0.70	24	452+	35
Forested	1.05	24	428+	33
Forested	1.47	24	557+	43
Non-forested .....	.53	16	828+	95

The most striking feature of this table, as compared with the previous one, is the uniformly large run-off as compared with the rainfall. This clearly shows the enormous amount of water taken up by a dry soil, either forested or non-forested, as compared with one already nearly filled to saturation. During the three months here noted on the forested basins about three eighths of the rainfall appeared in the run-off, while on the non-forested area nineteen twentieths appeared in the run-off.

Rapidity of Decrease in Run-off after the Close of the Rainy Season.

Condition as to Cover.	Area of Catchment Basin.	Precipitation.	April Run-off per Square Mile.	May Run-off per Square Mile.	June Run-off per Square Mile.
	<i>Sq. Miles.</i>	<i>Inches.</i>	<i>Acre-feet.</i>	<i>Acre-feet.</i>	<i>Acre-feet.</i>
Forested	0.70	1.6	153—	66—	25—
Forested	1.05	1.6	146—	70—	30—
Forested	1.47	1.6	166+	74—	30+
Non-forested .....	.53	1.	56+	2—	0

The above table clearly shows the importance of forest in sustaining the flow of mountain streams. The three forested catchment areas, which during December experienced a run-off of but 5 per cent of the heavy precipitation for that month

and which during January, February, and March of the following year had a run-off of approximately 37 per cent of the total precipitation, experienced a well-sustained stream flow three months after the close of the rainy season. The non-forested catchment areas, which during December experienced a run-off of 40 per cent of the rainfall and which during the three following months had a run-off of 95 per cent of the precipitation, experienced a run-off in April (per square mile) of less than one third of that from the forested catchment areas, and in June the flow from the non-forested area had ceased altogether.

A less tangible effect of denuding catchment areas and one that escapes general observation is based on the physical law of capillary attraction. The compacting effect of falling rain, together with that of wind and sun, causes the upper layers of soil to harden and effects the formation of numerous capillary tubes, along which whatever water reaches underground retreats is carried to the surface by capillarity, where it is evaporated. The ground cover of forested land prevents these tubes from reaching the surface by keeping the upper layers of soil loose, as previously explained. Agriculturists recognize the losses from this cause and cultivate frequently to break up the tubes, exactly as a leaf mulch prevents their formation.

With these facts in mind the reason why reclamation engineers insist upon forested watersheds as a primal condition of dam construction is readily understandable. Just now California is looking to the Reclamation Service to install systems of irrigation, and upon the results of the work done within the next few years the growth of the State will depend in great measure. And in this connection it should not be overlooked that neither the Reclamation Service nor the State of California can maintain successful irrigation if fires are allowed to effect the frequent denudation of important watersheds. The willingness of both parties to spend money for this purpose is not sufficient; certain favoring conditions must be maintained or no permanent achievement will be possible.

THE FUNCTION OF THE STATE.

These facts form the basis for State concern, for, unlike the individual, who is interested in the welfare of his industry during his own lifetime only, the State must insure the perpetuity of all industries for succeeding generations. The pioneer epoch has always been marked by the squandering of resources with a wanton disregard for future needs. But as settlement progresses, attended by the establishment of industries requiring permanent sources of material, the period of exploitation is succeeded by that of utilization, gradually becoming more intensive, and in this tendency toward conservatism organized society precedes the individual. How often do we see the inclinations of the individual curbed when the common good is endangered!

Likewise, when the followers of any industry pursue their occupation

to the point which endangers dependent industries it becomes the duty of the State to determine which industry shall survive or take restrictive action favoring the weaker which will permit both to continue. By extending this conception of governmental function somewhat it may be quite as firmly stated that the State's duty does not end when it becomes the arbiter of present generations; it is likewise the guardian of the rights of future generations. Its policy must be planned along broad lines to secure the welfare of all generations and the perpetuity of all industries by conserving the natural resources upon which these industries depend.

According to this postulate what attitude should California assume toward her forest resources? Manifestly it would not be just to legislate against the followers of the lumbering industry unless it could be positively foreseen that their methods, if unchanged, would wreck other industries equally dependent on the forest. Moreover, such action would arouse protest on the ground of restricting personal liberty, besides having a baneful effect on individual initiative. The extent of forest removal, for the present at least, must be determined by the economic law of supply and demand.

Without imposing any restrictions on the amount or methods of cutting, however, the State may prolong the life of her forest resources by effective legislation against the careless use of fire, assuming, in behalf of her continuing interest, some responsibility in the protection of forest property.

ACTION BY THE STATE.

Realizing something of the disaster invited by allowing wholesale forest destruction without replacement, and particularly the ravages of fire to go unchecked, as early as 1885 the State, preceding any other in this particular, passed an Act entitled "An Act to create a State Board of Forestry, and to provide for the expenses thereof." This State board, which was functionally a bureau of education, was endowed with police powers in 1887 and given an appropriation of \$29,500 for salaries and expenses. Three botanical reports were issued by the Board, which at first did faithful work. Later, however, it succumbed to political influence and was abolished in 1893. Under this Act the first and only forest experiment stations in the United States were established at Chico and Santa Monica. When the Act was repealed these were transferred to the Agricultural Department of the University of California.

From 1893 to 1903 forestry in California was at a standstill, yet this period was one of marked need and of rapid development along other lines. It was the decade during which the lumbermen from the Lake

states and Southern pineries flocked to California to invest in timber lands, and during which time California disposed of the bulk of her sole forest possessions by the sale of school lands at the ridiculously low price of \$1.25 per acre. Similarly it was the period during which land fraud flourished, whereby much of the public timber land in California was lost to the National Government and the State.

In 1903 sentiment in favor of forest preservation was expressed in a different and more practical form when the Legislature provided for a thorough investigation of the forest resources of the State by the Forest Service, the expenses of which were to be borne equally by the State and Federal governments. A detailed account of the work done under this contract forms a separate chapter in this report.

Based on the studies of the fire problem and the recurring expressions of sentiment for forest preservation as shown by earlier legislation, an Act was passed by the Legislature in 1905 "to provide for the regulation of fires on, and the protection and management of public and private forest lands within the State of California, creating a State Board of Forestry and certain officers subordinate to said board," etc. An appropriation of \$17,600 was made to defray all expenses incurred under this Act for two years.

THE FEDERAL FOREST RESERVES.

During the decade of State inactivity in forestry the Federal Government instituted its policy of reserving for the purposes of forest production such portions of the public domain as proved, on expert examination, to be of greatest use for that purpose. The needs of California were considered among the earliest states, as practically shown by the creation of San Gabriel forest reserve on December 29, 1892. During the succeeding interim the number of reserves in California has been increased to twenty, aggregating 18,877,110 acres. In the examination and location of reserves the utmost care has been exercised, so far as possible, to include only actual forest land which, by its location, is of particular importance in protecting streams of present or future value for irrigation. As a consequence, the reserves cover the high Sierras and their continuations where the streams of the San Fernando and San Bernardino valleys have their sources.

Each reserve is patrolled by mounted men to prevent fires and administered by a local officer to maintain its greatest usefulness to the industries affected. California need feel no anxiety lest its interests there are not subserved. On the other hand, all energies should be directed toward aiding the Forest Service in its task of protection, for it is a well-known fact that more than half the damage to reserve resources is caused by fires entering from adjacent, unprotected areas.

A desire to coöperate with the State in preventing fires has led the Forester to direct that supervisors and rangers on the several reserves accept appointments as fire wardens. On numerous occasions rangers have left their districts to extinguish fire burning on private land, even when the reserve was not in particular danger. Moreover, their independence of local factions has enabled forest reserve officers to be of especial aid in apprehending violators of the laws and securing their conviction. Nearly half the convictions secured are due to their efforts.

COOPERATIVE WORK BETWEEN THE FOREST SERVICE AND THE STATE.*

By an Act of the Legislature, passed in 1903, the State Board of Examiners was empowered to enter into a contract with the Forest Service of the U. S. Department of Agriculture, for the purpose of investigating the forest resources of the State, determining the best means of conserving them, and formulating a State forest policy. By the same Act, \$15,000 was appropriated for carrying on the work the first two years, with the provision that the Forest Service should contribute a like amount. This contract has been twice renewed since the conclusion of the first two years, with an additional appropriation of \$5,000 by both the State and the Forest Service for each succeeding year.

Actual work in the State was begun by the Forest Service July 1, 1903. The coöperative work is, therefore, now in its fourth year and sufficient time has elapsed to make it possible to point to results, although certain lines of work are as yet incomplete.

General Lines of Work.

The contract outlines in a general way the lines which the work has followed, namely: A determination of the character and extent of the State's forest resources; the best methods of conserving them, and the formulation of a State forest policy.

For all of the above-mentioned purposes the first step necessary was the acquiring of a knowledge of the general condition and extent of the forests of the State. Accordingly, an examination of 21,000,000 acres of forest and brush land was made. This included the North Sierras, the Sierra Nevadas, Southern California mountains, and the greater part of the redwood belt. The work included also a general classification and description of the forest by types and a description of the timber resources by counties. As a result of the work a forest map of the State was prepared, showing the extent and location of the commercial forest, woodlands, and brush lands.

*By A. W. Cooper, Forest Service.

One of the most interesting questions in the preservation of the forest, both to the State and to private lumbermen, has been the protection of the forest lands from fire. This has been the subject of an extended investigation into the character, causes, and extent of forest fires, the purpose being to devise both general and special measures for checking them and preventing their occurrence. This investigation revealed the fact that the prevalence of fires might, to a great extent, be attributed to the non-enforcement of the State fire laws. The methods best adapted to fire prevention on individual tracts were found to be by patrol, fire lines, and the disposal of slash on logged lands.

In Southern California the question of water supply is all important and bears a close relation to the forest cover. On this account two more or less related lines of work were undertaken in the southern mountains. The first was a study of the chaparral or brush areas for the purpose of determining the possibility of their natural reforestation and their relation to the water supply. This study was later extended to similar areas in the northern part of the State. It revealed the fact that a brush cover is a very good conserver of moisture in the absence of a tree cover, that natural reforestation of such areas is a very slow and at best uncertain process, only taking place at all where fire is kept out for a long period, and that fire is the chief factor in the formation and spread of such areas.

The second study in this connection dealt with the reforestation of important watersheds by planting. Here the conclusion was reached that planting on the Southern California mountains, except in favored localities, will be a very expensive undertaking and of doubtful success, but that a careful choice of species for planting may make gradual reforestation possible in portions of the mountains.

State Forest Policy.

As a result of these general lines of investigation, which occupied largely the first two years of coöperative work, measures were formulated which, it was believed, the State should embody in its forest policy. These measures were submitted to the Legislature in the form of a bill, in the winter of 1905, and led to the Act of March 18, 1905, which revised the fire laws and created a State Board of Forestry and the office of State Forester.

Commercial Tree Studies.

While the general work already outlined was in progress a number of special lines of work were started. Among these were a number of commercial tree studies, the purpose of which was to provide accurate data regarding the habits and growth of the more important commercial trees, with the object of securing their continued presence in the forest

by interesting timber owners in adopting methods of lumbering favorable to their reproduction. Studies of this sort were made of sugar pine, yellow pine, and white fir. A similar study had been made of redwood previous to the commencement of the coöperative work.

These studies showed that the rate of growth and character of the various species made them well adapted to conservative lumbering and the securing of successive crops of timber.

Studies somewhat similar to the above were made of eucalyptus and of tanbark oak. The eucalyptus study included the collection of growth figures from the principal eucalyptus groves, as well as estimates of the yield and the financial returns from planted eucalyptus in various localities. As eucalyptus is an introduced tree, the question of its propagation and extension was also important, and the study has dealt thoroughly with these points and with the uses and commercial value of the different species. It became apparent early in the study that the genus was one of increasing importance and great future value in sections of the State climatically adapted to its production. This led to the establishment by the Forest Service of an experiment station at the University of California for the purpose of testing the mechanical and physical properties of the different species of eucalypts, particularly in relation to their use for special purposes. These tests are still in progress, but have already revealed the fact that eucalyptus closely approaches Eastern hickory in its strength, toughness, and general durability.

Tests to determine the practicability of applying preservative treatment to eucalyptus were also made on fence posts. Creosote was the preservative used, and the tests demonstrated that eucalyptus could be successfully and cheaply treated. Sufficient time, of course, has not elapsed to determine the effect of treatment on the life of the timber.

The study of tanbark oak was botanical and dendrological in its character, but included a thorough study of the tanning industry and the present and future supply of tanbark oak. It showed that the supply now available would last thirty-five years at the present rate of consumption, and that the excellent productive capacity of the tree made the outlook for a continued supply excellent, provided a few simple measures were adopted in cutting the present crop.

Other Special Studies.

As a knowledge of the methods and cost of lumbering and of the lumber market in general is essential to perpetuate the forests, a study of lumbering and the timber market was made for all of the important commercial species of the Sierras. The study dealt with the relation of supply and output in different lumber centers and the extent and

effect of outside competition, as well as with the different steps in and the cost of manufacture. The whole study has been an additional argument in favor of conservative lumbering.

Next to fire the most important question in the protection of California's forests is grazing. Therefore, this has been the subject of a separate investigation for the purpose of determining the effects of grazing on the forests and on watersheds and what regulations were necessary to prevent damage to both. The results of this investigation have been largely embodied in the present grazing regulations in force on the Federal reserves within the State.

At the request of the State two other special pieces of work have been undertaken. The first of these was the estimate and appraisal of the Calaveras grove of big trees, which was made pending the event of its purchase either as a State or National Park.

The other piece of work was the investigation of the amount and character of the State's delinquent tax lands. This investigation revealed the fact that nearly 500,000 acres of land in the forest regions of the State are delinquent and that the operation of the present tax laws are often defective, in that they virtually place a premium on delinquency and delay the acquisition by the State of a clear title.

The lands involved were found to be scattered in small lots, and a large part of them were within the boundaries of the Federal forest reserves. A system of exchange between the National and State government was, therefore, suggested, by which the State might consolidate its holdings, and, if desirable, establish State reserves.

Assistance to Private Owners.

The fate of the lumber supply in California depends in no small degree upon the lumbermen, who own a large portion of the State's forested area. It was recognized early in the work that practical examples of protection, conservative lumbering, and planting were the best means of arousing the general interest of lumbermen and private owners in these questions.

Plans for fire protection were accordingly prepared for a tract of 80,000 acres in the Sierras belonging to one of the large lumber companies of the State. A system of patrol, telephone lines, trails, and burning the slash on logged areas formed the basis of this particular plan, which was later extended to include marking trees for cutting.

Another plan for a still larger tract in the North Sierras had as its basis a system of fire lines for protecting the young growth; it also included a patrol, telephone lines, tool stations, and slash burning, and was later extended to cutting timber to a diameter limit. Both of these plans are in successful operation. A number of planting plans, for both large and small tracts and in one or two instances for city watersheds, have also been prepared from time to time.

Work in Progress.

As has been stated, certain lines of work have not been completed. The chief object of the coöperative work has been accomplished in the establishment of a State forest policy; but in order that the State work may be on a firm basis, with room for growth, it is necessary that the State Forester be amply provided with data and information on the character and resources of the State's forests. Such data are in large part received already, and all that remains is to round this out as much as possible. For this purpose one or two lines of work begun in former years are being extended. The study of eucalyptus and the tests on the timber are still in progress. The study of planting has been extended to the whole State, so as to include both agricultural and forest lands. This work is now nearing completion and it is hoped that the results can be embodied in a planting manual for the State.

An investigation of cut-over forest lands was begun this year, the purpose of which was to determine the extent of such lands, their present condition and use, and the attitude of the owners of such lands toward them. On this information it will be possible to base suggestions for their future improvement and disposal. The study of lumbering and market conditions has been extended to include the redwood belt.

The results of the past coöperative work between the State and the Forest Service have been embodied in some seventeen comprehensive reports and maps and in about forty-five special papers, most of which are now in the hands of the State Forester. A few of the results have been published by the Forest Service and others will be published from time to time.

REVIEW OF STATE FORESTRY WORK.

On July 12, 1905, a State Forester was appointed and actual forestry work begun by the State. Recognizing that relative security against fires is of paramount importance in determining the feasibility of forestry, all energies were directed to this end. And in this connection education and publicity were emphasized rather than rigid enforcement of the penal sections, both because no machinery for the latter could be secured without approval of the public, expressed by coöperation, and because it was deemed unwise to imperil the popularity of the movement, particularly in the beginning. Accordingly correspondence, calling attention to the State's forestry work, in the form of personal and circular letters, pamphlets, newspaper articles, etc., was commenced with all manner of organizations from San Diego to Siskiyou. The results quickly showed that the public was ready to assist.

The efforts of the State Forester to awaken interest in the sections providing for county coöperation were ably seconded by powerful

organizations in all quarters. The Water and Forest Association continued the yeoman service it had performed in urging legislation to induce county boards to coöperate. The California Promotion Committee displayed its interest by making the State Forester a member of its advisory committee. Boards of trade and chambers of commerce throughout the State expressed a willingness to aid, while associations of lumbermen, stockmen, miners, and water-users were quick to volunteer. Independent lumbermen, ranchers, stockmen, and others throughout the State sought appointment as fire wardens, ignoring the fact that no compensation accompanied it, simply to protect their own and their neighbors' interests. Favorable action by county supervisors, however, did not follow without an appeal from the State Forester in person, and often not then.

As a result, largely on account of the lateness of beginning forestry work under the new law and the imperative demands made on the time of the State Forester by preliminary work, the season of 1905 closed with Santa Cruz County the only one pledged to coöperation. During the winter agitation was continued untiringly, with such encouraging results that on the opening of the fire season of 1906 immediate attention was given to several counties that were practically prepared to fall in line. As a consequence, the support of four more counties had been secured by June 30, 1906, when the resignation of the first State Forester occurred.

Since that time the established policy of the office has been consistently pursued. No work, however important, has been allowed to prevent attendance at the meetings of county supervisors, where every possible argument has been used to secure support. Twenty-three boards have been interviewed, some two or three times when hopes of ultimate success seemed to warrant it, and five counties have been added to the list, making a total of ten. In personal justification it must be added that this number is in no proportion to the effective work done and doubtless considerably smaller than it would have been had the season been less disturbed politically. In more than one case a single opposing member has effectively prevented favorable action by boards when the other four were willing to ordain in favor of the ordinance presented. In other cases failure has resulted when a petition signed by a majority of prominent taxpayers has been submitted to prove the favor of the people. As an instance of the apathy of county officers may be cited the case of one board in the San Joaquin Valley which has failed to recommend a single citizen for appointment as fire warden, in spite of several insistent requests from this office since the passage of an ordinance in August appropriating \$500 for this purpose. From a neighboring county, where an identical condition obtains, names have been received from but one supervisor.

Coöperative work with landowners for forest replacement has been commenced, but little can be done at present, owing to lack of technically trained assistants. If the State were equipped for the work much good could be done, for the Forest Service has recently changed its coöperative offer and now requires that landowners pay both the salary and expenses of its agents. Formerly only the expenses were asked, and often not even them.

During the summer a patrol force of six men has been maintained by the State Forester on the proposed Stony Creek reserve. This force was supported by a joint appropriation made by Glenn and Colusa counties and the Stockmen's Defense Association for the purpose of protecting the area from fire pending its re-examination by the Forest Service. The results showed plainly the efficacy of patrol, despite the fact that the patrolmen were collected hastily and without much choice.

Through circular letters to lumber companies valuable data have been gathered on the annual cut of various species and the attention given to fire prevention. These reports show that but very few of even the best equipped companies take any steps to protect their standing timber.

ATTITUDE OF THE PUBLIC.

As was expected, recognition came first from the element which was responsible for the passage of the laws: organized forest and water interests, outdoor clubs, students of political economy, and forestry enthusiasts; these needed no convincing and gave their aid immediately in more or less practical ways. The test, however, is the response from other classes, particularly those whose support was needed to give the movement practical results. While the test is still in progress, it has been quite satisfactory so far. Indifference still prevails in some quarters; passive approval with small results in others; but indorsement is the rule. In no case has there been an unfavorable demonstration.

Attitude of Lumbermen.

The more practical lumbermen regarded the step critically at first. Believing in the object sought, they waited to see the methods employed. They knew the need for checking fires, but feared State forestry meant something less practical, if, indeed, not a direct attack on their own freedom. Some enthusiastic nature-lovers, who call their tenets forestry, are not charitable to lumbermen, so the latter waited to see the State's interpretation.

A few months showed a visible change, and a year a most decided one. The California Sugar and White Pine Agency, the most powerful lumber association in the State, offered its facilities and has been of much assistance. Independent lumbermen throughout the State,

through constant correspondence with the State Forester, are of mutual assistance. Judging from the progress already made it can be safely predicted that close coöperation, instead of random effort, between the State Forester and members of the lumbering industry to reduce the damage from fires is an attainment soon to be realized. In this connection it can not be emphasized too strongly that *organized* effort on the part of all industries concerned is the only practical way to cope with forest fires.

Attitude of Kindred Organizations.

Not only the Water and Forest Association, but numerous power and irrigation companies have given indorsement and substantial help in many ways. The California Promotion Committee, representing all commercial organizations, recognized the business importance of the office and passed strong resolutions indorsing the work and urging counties to coöperate. Boards of trade, chambers of commerce, and women's clubs have taken similar action. Stockmen, miners, land-owners, and water-users have all come to see that for the first time means exist by which they can get protection for their property, and are availing themselves of it.

Attitude of County Supervisors.

It can be stated at the outset that the personal attitude of county supervisors has been favorable without a single exception. Unfortunately, however, a favorable personal attitude does not always predicate official approval. Some boards are prevented from acting by the poverty of the counties they govern; others object to the provision that the State shall receive the fines collected, saying the State is imposing a burden on the counties to increase her own revenues. These arguments are doubtless well grounded.

Frequently those who are unused to organizations contend that volunteers appointed to act individually without pay or direction are quite as effective as a system supported by county appropriation. Some hesitate to approve such an innovation, fearing lest it react to unsettle their political security, while others plead for a month in which to consider it. It is safe to say that no argument will prevail in such cases, for the vision of such men is so circumscribed politically that their best attempts at evasion amount to begging the question.

Throughout the southern part of the State and the more enlightened counties of the San Joaquin Valley, however, the desire for protection and the prosperity of the counties has overridden the arguments of the first class, while those of the second have been deemed unworthy. Even here the attitude of the State has been deprecated, however, in spite of the fact that coöperation has been secured.

It can not be gainsaid that the conditions under which the State offers "coöperation" (which is a misnomer, for there is actually no coöperation, since the State retains all authority but accepts no responsibility) leave abundant room for objection, if personal or political reasons prompt the supervisors to make them.

Attitude of Magistrates.

According to Section 12 of the forest law, magistrates with proper authority must prosecute all cases brought to their attention with diligence and energy, under penalty of fine. In the actions of these officers the attitude of the supervisors is reflected very clearly. If the supervisors favor coöperation by appropriating the county's funds, the district attorney needs no urging to prosecute violators of the laws. If, on the other hand, supervisors evade coöperation the district attorney seeks legal subterfuges why prosecution should not be attempted. Of course, the position of the magistrate is so untenable usually that prosecutions might be secured by pressure, although it must be admitted that the probabilities of securing convictions through the agency of an unwilling officer are rather poor, while the chances would be that the county would be antagonized by being forced to accept an unsought burden to the extent that ultimate coöperation would be impossible. While no flagrant violation has been allowed to go unpunished, considerations of expediency have somewhat modified the State Forester's actions, for it has been fully realized that the present law is not perfect enough to stake the popularity of the forestry movement on. For this reason and because the ethical position of local officers has often been sound, forbearance has been the watchword.

Attitude of the Press.

The hearty coöperation of the press of the State is especially gratifying. Without a known exception favorable comment has followed every hampered attempt to enforce the laws. Many editors have voluntarily urged county supervisors to coöperate with the State for protection, both by commenting favorably on the action of other counties and by editorials. Many more have cheerfully given space for the publication of information of very general nature. It is safe to say that the activities of no other single department of the State receive more extended comment.

TECHNICAL FORESTRY.

Despite the fact that the Act contemplates the development of technical forestry in California by advice to landowners, and provides specifically for the preparation of plans for replacement and management of forests, the work of the first year included no aid of this kind.

This was largely due to the fact that the time of the State Forester was occupied in other ways and to the lack of assistants. Henceforth outside the fire season the policy will be to extend all possible assistance to applicants for expert advice.

In accordance with this policy a planting plan for the Union Lumber Company, Fort Bragg, California, is now in preparation. Although the basic data have not all been gathered, the object of the plan is to furnish complete directions for the formation of an eucalyptus plantation on unused portions of a cut-over redwood tract. The company has virgin supplies sufficient for several decades' cutting, and aims, on the exhaustion of these supplies, to have material grown for further operations.

Two other applications have been received recently. One for the establishment of a protective forest on an important watershed in Fresno County; the other for scenic planting on a large tract in Santa Cruz County. These applications will be attended to as time permits.

Beyond distributing copies of the forest laws, absolutely no publicity has been given the State's coöperative offer, for two main reasons: First, the low statutory salary allowed assistants does not permit the securing of technically trained men, hence all technical work devolves on the State Forester; and second, it is certain that the issuance of this offer would immediately invite so many applications that but few could receive attention.

The warm, equable climate prevalent throughout the greater part of California presents conditions, possessed by no other State, for the rapid production of many species of eucalypts. In the past the blue gum (*E. globulus*) has been planted more extensively than any other species, but mainly for windbreaks and fuel. The recent experiments with this species, made by the Forest Service in coöperation with the State, show that its mechanical properties are not unlike those of second-growth hickory. This fact has directed attention to the possibilities of growing it for furniture, implement and wagon stock, etc.

Experiments have also been made which prove that this species can be impregnated with a preservative very simply and cheaply. Time enough has not elapsed to show the comparative length of life of treated and untreated timber, yet judging from the known effects of preservatives on other species it is safe to predict that the life of treated timber will be multiplied two or three times. If this is the case the near future will see extensive plantations of eucalyptus for the production of railroad ties, fence posts, telephone and telegraph poles, piles, etc. The Santa Fé Railroad Company has recently purchased a ranch of 8,330 acres near San Diego, where it will produce material for its own use.

While a great deal of attention has already been given the production of blue gum, very little has been devoted to other species. The sugar gum (*E. corynocalyx*), while of somewhat slower growth than the blue gum, produces a much more shapely bole, especially for tie, pole, and post use, and will thrive with less moisture. Under proper care in the beginning there seems no reason why extensive plantations of this species should not be made over the lower foothills. Many other species of eucalypts deserve attention.

Another possibility worth considering is the establishment of the naval stores industry in California. By the introduction of the "cup and gutter" system in the southern pineries the Forest Service has completely revolutionized the methods of turpentineing. Under the new system the damage to the forest has been reduced to a minimum, and at the same time the product has been increased over 25 per cent. Recent analysis of crude resin collected from California give from 20 to 22 per cent of turpentine, which is 1 or 2 per cent above the average yield from the standard turpentine pines of the South.

COUNTY CO-OPERATION.

As stated elsewhere, there are ten counties coöperating with the State for fire protection. These are San Diego, Riverside, San Bernardino, Los Angeles, Santa Barbara, Kern, Tulare, Fresno, Santa Cruz, and Tuolumne. They deserve all credit for willingness to do what the law permits.

According to the plan most generally followed the county supervisors appropriate from the general fund a sum sufficient to pay citizens 25 or 30 cents an hour for actual services performed in extinguishing fires. The amounts appropriated vary from \$500 to \$1,000, depending on the size of the county and its financial condition. The supervisors then recommend such citizens for appointment as fire wardens as they desire, and on this recommendation the men are immediately appointed. Each fire warden is furnished with a badge, book of burning permits, a supply of law circulars for distribution, and a number of warning notices for posting.

Another plan, followed by Los Angeles, Santa Barbara, and Santa Cruz counties, is to increase the salary of the game warden and make him chief fire warden, with patrol duties. The chief fire warden then recommends the names of citizens whom he wishes appointed.

Of the two plans the latter is by far the more effective, because there is then a man who has partial control of the system and some sort of organization results. Where fire wardens are appointed at the request of supervisors, absolutely no organization is secured. A fire warden works or not as he wants to, and submits his bill to his super-

visor for payment. The State Forester has absolutely no control over either system, can give no aid except on request, and offer only suggestions, which the fire wardens may follow or not as they choose. Usually the posting of warning notices is the only attempt made to prevent fires. If a fire occurs in a grain field or pasture, vigorous efforts are usually made to check it. This is no advance, however, for property owners did this before the office of fire warden was created. If chaparral on a watershed is burning little attention is paid to it, for few understand its importance.

To sum up, neither system does harm and may do good, depending entirely upon the personal equation of the fire wardens. This is exactly what must always be expected from lack of organization.

In the matter of arrests the systems are even less satisfactory. Usually fire wardens are engaged with other duties and know nothing about a fire until it has a good start and the one who caused it, if a hunter or camper, has had ample time to escape. If caused by a resident on friendly terms with the warden, the offense is overlooked. Should their relations be strained for any cause, however, an arrest usually follows, after which a conviction depends entirely upon whether the offender will plead guilty. If not, the warden is usually too busy to collect evidence, and the case is dropped. In other words, personal considerations usually determine the action taken.

Moreover, the provisions of the laws militate directly against the interest of magistrates. No county magistrate can be expected to involve the county in expense to collect a fine which must be forwarded to the State. If a flagrant case is called to a magistrate's attention, and no excuse exists for failure to prosecute, he ordinarily takes the action commanded by law. If any excuse exists, or can be created, the case is overlooked. Here both personal and political considerations determine results.

To sum up, county coöperation is about the weakest possible excuse that can be conceived for an organization in any way capable of securing immunity from fires. And it will continue to be so long as the county is required to do, unaided, work which benefits both the county and State. Any attempt on the part of the State to urge county officials to greater efforts immediately strengthens their aroused suspicions that the State wants more money from fines. Before anything resembling satisfactory protection is secured the State must assume equal expense with the counties, share the fines equally, and retain the right to direct the work of salaried men with no other but warden's duties. The forest bill appended to this report differs from the present law principally by providing patrolmen. Too strong emphasis can not be placed upon the fact that unless this machinery for enforcing the laws

and preventing fires is secured the usefulness of the State Forester will soon end. County coöperation under present conditions is intolerable.

The State can exercise the control which its duty demands only by amending the laws and making financial provision to insure protection. At present the State Forester can not incur expense to prevent and extinguish fires, even in emergencies and where such action would go far to strengthen public approval. He can not hire a man to enforce the punitive laws, although failure to enforce them frequently results in contempt and disbelief in their force and efficacy. Even the very cost of trial and punishment must be borne wholly by the counties. In effect, this means that the State has recognized its duty to the extent of imposing certain laws on the counties without their consent, but stopped there, and not only left the entire burden of prosecuting on them, but expected them to voluntarily increase this burden by paying fire wardens to hunt up trouble. It may be contended that the same is true with regard to other penal laws, but there are two differences: the counties are expected to maintain a fire warden force in addition to the ordinary judiciary machinery, and they are not permitted to retain the fines collected.

FOREST FIRES.

Before discussing the principal causes of forest fires or the means of preventing them, it will be instructive to consider briefly their effects on the following classes of land:

1. Virgin forest land;
2. Culled forest land;
3. Clean-cut forest, or brush land.

On virgin forest land fire destroys all ground cover and reproduction, and in the case of a top fire destroys even the larger trees. A slower fire will burn through the bark at the base of the trees, in the case of firs and pines, and destroy the cambium, thus killing the tree. In redwood usually the second or third fire succeeds in getting through the bark and burning out what is known as a "goose pen" in the base. If there is a draught, or if the tree is hollow, the heart is burned out and a chimney results. In any case a high percentage of such timber must be rejected in lumbering, if, indeed, not all of it. Moreover, the destruction of the young growth delays for a long period or prevents entirely the starting of a second crop, depending on the extent of the fire and the proximity of unburned areas from which seeds may come.

On culled forest land the soil and humus covering is burned from the bases of the remaining trees and they are thrown by ensuing winds. The possibility of their seeding up the area is thus precluded. All small growth is consumed, together with the débris left from lumbering, leaving the soil exposed to erosive action. The fertile surface soil is

generally lost before chaparral species have a chance to enter and prevent further erosion. Once the chaparral has secured possession the chances that a forest growth will follow are very meager, indeed.

On clean-cut forest or brush land the damage is entirely to the watershed. This consists first in the loss of all vegetable covering of the soil, and, second, the erosion of the soil itself. Successive fires effect the removal of all soil, so that the rock is exposed and no further chance remains for even the hardy chaparral species to cloak the ground.

Causes of Fire.

Data on the principal causes of forest fires have been gleaned from 120 reports made by fire wardens in twenty-three counties during the past season. While such a limited number of reports from one season are not sufficient to establish reliable percentages, they will serve to indicate the principal sources of forest fires.

Cause.	Number.	Per Cent.
Sparks from engines.....	17	14.18
Clearing land.....	12	10.00
Camp fires.....	12	10.00
Lightning	10	8.33
Maliciousness	5	4.16
Logging	3	2.50
Unknown and *miscellaneous.....	61	51.02
Totals	120	100.00

Occurrence of Fires.

The percentage of fires by months is also interesting in this connection.

Month.	Number.	Per Cent.
May	2	1.66
June	11	9.17
July	31	26.31
August	35	29.15
September	18	15.00
October	22	18.34
November	1	.83
Totals	120	100.00

Fires burning 1,000 acres or more have occurred as follows:

Month.	Number.	Estimated Area Burned (Acres.)
June	1	1,000
July	5	7,480
August	3	42,100
September	6	54,900
October	7	44,840
November	1	2,000

*Includes dropping lighted matches, cigars, cigarettes, fire crackers, sulphuring, etc.

While these data are very incomplete, particularly as regards the northern counties, reports showing the destruction of 650,000 acres outside the forest reserves have been received. Without considering the loss of material more valuable than watershed cover, one can readily see how necessary it is to reduce this annual loss to the State. In many cases, however, valuable timber has been lost, crops have been burned, cattle destroyed, and homes swept away, which men have spent years in accumulating.

Prevention of Fires.

Forest fires should be prevented just as any other crime against society, namely, by enacting laws restricting the dangerous use of fire under penalty, and by employing officers whose sole duty it is to see that the laws are obeyed. The State has taken legislative action in this direction, but has failed to provide executive machinery. Until this is done the forest laws will remain unused, except in particularly flagrant cases. Experience has proven adequately enough that other laws are not automatic. Why should the forest laws be an exception?

Moreover, there is no logical reason to expect men throughout the State to accept appointments as fire wardens and fulfill the prescribed duties when such action will cause trouble to a neighbor. It has followed in practically every case that men so appointed have performed yeomen service in distributing circulars containing the laws, in posting warning notices, and in fighting fires, but seldom has one been found who will cause his neighbor trouble. This is readily understandable when one considers that the desire for the esteem of one's fellow men is one of the strongest factors determining human behavior. Furthermore, the daily duties of voluntary fire wardens preclude the possibility of their giving attention to preventing fires. One is rarely found who will not use every effort and even incur personal expense, besides loss of time, to extinguish one already burning, but prevention is not emphasized, except as the law circulars distributed and the warnings posted increase public caution.

FIRE WARDENS.

There are 367 citizens in the State who have accepted appointments as fire wardens. Of these, 136 are volunteers, 128 are employed by the Forest Service, and 103 are paid by the counties in which they reside for actual services performed in extinguishing fires.

When appointed, every fire warden is required to take an oath of office, which in California costs him 50 cents. Thus it will be seen that the volunteer wardens and those employed by the Federal Government have actually paid for the privilege of being fire wardens, for which

they can receive no compensation. Does the State appreciate such loyal service? County wardens also deserve great credit, for they are paid only for time actually spent in fighting fire, though most of them devote a considerable amount to posting notices, for which there is no compensation. The fire wardens are located as follows:

County.	Number.	County.	Number.
Alameda	14	Placer	5
Butte	17	Plumas	12
Calaveras	4	Riverside	14
Colusa	1	Sacramento	2
El Dorado.....	3	San Bernardino.....	38
Fresno	7	San Diego.....	33
Glenn	3	San Joaquin.....	1
Humboldt	2	San Luis Obispo.....	8
Inyo	1	Santa Barbara.....	14
Kern	25	Santa Clara.....	3
Lake	2	Santa Cruz.....	13
Lassen	1	Shasta	4
Los Angeles.....	45	Sierra	3
Madera	8	Siskiyou	21
Marin	2	Sonoma	10
Mendocino	1	Tehama	2
Modoc	6	Trinity	9
Mono	2	Tulare	8
Nevada	11	Tuolumne	6
Orange	1	Ventura	5

Although it is unreasonable to expect unpaid men to display much activity in extinguishing fires which do not endanger their own lands, fire wardens have done good work on 76 of the 120 fires reported.

ARRESTS AND CONVICTIONS.

From the following list an idea can be gained of the attempts made to enforce the punitive laws and the localities most active in this respect. The preponderance of arrests in San Bernardino County is not an index of greater criminality there, as might be supposed at first glance, but of the energetic efforts of the Forest Supervisor, backed by public sentiment. The names of the offenders are withheld.

No.	County.	Law Violated.	Magistrate.	Action.
1	Calaveras	Stats. 1905, Sec. 16 ..	Justice Marsh	Case dropped.
2	Los Angeles	Stats. 1905, Sec. 16 ..	Justice Pierce	Fined \$50. Sentence.
3	Los Angeles	Stats. 1905, Sec. 16 ..	Justice Crawford	Fined \$50.
4	Los Angeles	Stats. 1905, Sec. 14 ..	Justice Crawford	Fined \$50.
5	Mono	Penal Code, Sec. 384 ..	Justice Montrose	Fined \$10.
6	Placer	Stats. 1905, Sec. 16 ..	.....	Pending.
7	Plumas	Stats. 1905, Sec. 17 ..	Justice Hughes	Pending.
8	Santa Cruz	Stats. 1905, Sec. 16 ..	Justice Page	Fined \$50.
9	San Diego	Stats. 1905, Sec. 14 ..	Dist. Att'y Carter	Pending.
10	San Diego	Stats. 1905, Sec. 14 ..	Dist. Att'y Carter	Pending.
11	Santa Clara	Stats. 1905, Sec. 16 ..	Dist. Att'y Campbell	Pending.
12	Siskiyou	Stats. 1905, Sec. 14 ..	Dist. Att'y Luttrell	Case dropped.
13	Siskiyou	Stats. 1905, Sec. 14 ..	Dist. Att'y Luttrell	Imprisoned during earthquake holi- days.

No.	County.	Law Violated.	Magistrate.	Action.
14	Siskiyou	Stats. 1905, Sec. 10 ..	-----	Case dropped.
15	San Luis Obispo	Stats. 1905, Sec. 16 ..	-----	Pending.
16	Sacramento	Penal Code, Sec. 384 ..	-----	Pending.
17	San Bernardino	Penal Code, Sec. 384b ..	Justice Paddock	Fined \$5.
18	San Bernardino	Penal Code, Sec. 384 ..	Justice Paddock	Fined \$10.
19	San Bernardino	Stats. 1905, Sec. 14 ..	Justice Paddock	Fined \$50.
20	San Bernardino	Stats. 1905, Sec. 15 ..	Justice Belden	Fined \$50.
21	San Bernardino	Stats. 1905, Sec. 16 ..	Justice Glover	Fined \$50.
22	San Bernardino	Stats. 1905, Sec. 16 ..	Justice Gifford	Pending.
23	San Bernardino	Stats. 1905, Sec. 16 ..	-----	Pending.
24	San Bernardino	Stats. 1905, Sec. 14 ..	Dist. Att'y Sprecher ..	Fined \$50.

As shown above, \$425 has been collected from the 16 cases disposed of. Those pending will probably yield \$200 more.

The minimum fine has been imposed in every case, so far as known. Some hesitancy has been evinced by magistrates to imposing a fine so large as \$50, and had the offenders not pleaded guilty it is doubtful if so many convictions would have been secured. A fine of \$25 is punishment enough for the ordinary violator. This represents a distinct loss great enough to induce caution in future, but does not become a severe burden. For this reason the minimum fine should be reduced to \$25 in Sections 14, 15, and 16.

DESIRABLE CHANGES IN THE FOREST LAWS.

In order to accomplish the ends for which they were designed and become workable, the forest laws should be changed along three distinct lines:

1. Broadened, to include machinery for the enforcement of the legislative provisions.
2. Adjusted, to fit other laws by eliminating portions providing for action already covered by laws previously enacted or portions in direct conflict with provisions of prior laws.
3. Clarified, by avoiding references to subjects not germane to the particular theme under treatment.

The future efficiency of the laws will depend entirely upon whether machinery for the enforcement of the legislative provisions is granted. The last Legislature deemed a period of education a necessary step before commencing active work. That period is drawing to a close and the results of agitating rational forestry are apparent. This report is unnecessary to make the fact known that people in all quarters are taking a more active interest in forestry than ever before, because they understand its aims. Certain lumbermen, who two years ago assumed a helpless attitude toward fires, are now casting about hopefully to find the best means to protect their property. Others who formerly declared fires did little harm and were usually not very destructive now

speak of the enormous loss caused by the destruction of young growth. In other cases the loss of watershed cover is lamented. Mention is made of the lesser volume of streams now than formerly, and the reason for it is recognized. More and more attention each year is being given to the utilization of inferior species and by-products. People are becoming satisfied with poorer grades and smaller dimensions, and timber owners, realizing this, are giving more thought to general protection. Increasing number of landowners are asking advice on planting forests for supplies and protection. In other words, the fundamental steps for the success of the forestry movement have been taken. Further development is necessary in some quarters, but this may safely be counted on to accompany actual work, which should begin while the people are expectant.

To provide immunity from fires salaried patrolmen should be distributed over the State, whose sole business is to prevent and check fires. The State Forester should decide where the greatest need for protection exists, should be given authority to employ patrolmen, and held absolutely responsible for results. This will necessitate the districting of the State and the securing of district fire wardens. It is estimated that twenty can be used at once and more as soon as the results of the work are demonstrated. Only district fire wardens should be empowered to compel assistance in putting out fires. This work should be paid for at the uniform rate of 25 cents per hour, just as men who do similar work on forest reserves are paid. Where counties are large, or the means of travel are primitive, each county should be made a separate district. Under opposite conditions, two or three counties should be grouped. In some cases it may be advisable to ignore political units and follow natural divisions.

Where one county forms a separate fire district it should be assessed one half the cost of patrol and in addition one half the expense incurred by securing assistants to put out fires. Counties now pledged to coöperation will doubtless be glad to abandon the present lax system for a practical plan of this kind. Others, who have looked with disfavor on the old scheme, will fall in line. There will always be a few, however, who will be opposed to any plan. When this condition obtains, yet protection is necessary. The State should be empowered to provide protection and assess the district for its share of the expense. When counties are willing to meet the State half way the net returns of fines collected should be divided equally. But if the county or counties composing a district needing protection will not coöperate, the entire sum collected by fines should be taken by the State.

In addition to salaried patrolmen, reliable citizens desiring the powers of fire wardens should be appointed, but should not be given authority

to compel assistance, except in the case of forest reserve officials. The payment of men summoned by reserve officials will be made by the Federal Government.

To prove the State's belief in its own teachings, executive machinery should be supplied to meet the increasing number of applications for technical advice along the lines of replacement and management. One technical assistant is an immediate necessity for the work.

Certain sections of the Act of 1905 are almost identical with sections of the Penal Code. Hence, local magistrates may choose which law they will follow in prosecuting. This is true of Section 14, which differs but slightly from Sections 384, 384*a*, and 600 of the Penal Code. Likewise, Section 15 is like Section 384*b* of the Penal Code and Section 3, Stats. 1875-6:408. To avoid confusion the Penal Code should be amended to include whatever additional provisions are necessary, instead of having certain parts almost duplicated in the forest laws, as at present.

The necessity for clarifying sections to avoid reference to subjects not covered by the Act of 1905 exists particularly in Section 3, where the Mount Hamilton tract and the Chico and Santa Monica experiment stations are alluded to, although none of them are governed by the State Board of Forestry. This ambiguity should be removed, having reference only to California Redwood Park and providing for the administration of any forest tracts which may be acquired later.

These recommendations are incorporated in the proposed legislation appended to this report.

SUMMARY OF CONCLUSIONS.

The effect of settlement and development on the forests of California has been to reduce the area of merchantable timber very materially, leaving the area of actual forest land practically unchanged. The temporary reduction of the merchantable area, caused by lumbering, becomes permanent when lumbering is followed by successive fires, which prevent the reproduction of tree species and cause the invasion of chaparral.

The sale of forest products produces an immense annual revenue, hence forest protection, so that complete utilization may accrue, is imperative.

The denudation of watersheds is always followed by floods and drought. This matter is particularly vital in California, where every other industry is directly dependent on a cheap and abundant supply of water.

The State is the arbiter of present and the guardian of future generations. Its function is to preserve present resources, not only for pres-

ent use, but also for future use. In the case of the forest, it should take effective action to prevent losses by fire.

The State has in the past made sporadic and half-hearted attempts to practice forestry, but with little success until 1903, when a contract with the Forest Service was made for a thorough study of forest conditions and the formulation of a State forest policy. The Act of 1905 was based on conclusions thus obtained, but owing to amendments its usefulness was greatly impaired. As enacted, it amounted simply to a propaganda instrument, without machinery to enforce its provisions.

The attitude of certain elements toward forestry was cordial from the beginning. Others have been won over, until now there is widespread sentiment for forestry practice.

Technical forestry has been commenced, and the possibilities of extensive work are limited only by lack of technically trained assistants.

Ten counties have appropriated sums for the payment of wardens. Others are deterred only by the inconsistent attitude of the State as expressed in its coöperative offer. Owing to lack of control, poor organization has followed and small results have been secured.

The forest laws should be broadened to include machinery adequate to cope with forest fires; adjusted to other laws, and clarified to eliminate ambiguous references.

EXPENSES OF STATE FORESTER'S OFFICE,

July 1, 1906, to October 31, 1906.

Salaries	\$1,695 00	
Traveling expenses.....	710 62	
Printing and stationery.....	402 75	
Postage	83 00	
Office rent.....	57 35	
Incidentals	197 91	
	<hr/>	
Total		\$3,146 63
Annual appropriation.....	\$8,800 00	
Unexpended balance from fifty-seventh fiscal year.....	4,449 53	
	<hr/>	
Total		13,249 53
		<hr/>
Balance		\$10,102 90

CALIFORNIA REDWOOD PARK.

The California Redwood Park represents a public investment of a little over \$250,000 and a public benefit many times greater. It is the only retreat within easy reach of the population centers of the State that combines unexcelled natural beauty with unrestricted freedom at an expense within the means of all classes of people. Moreover, its benefits, although widely enjoyed now, will attain increasing impor-

tance as urban populations become larger and rural regions become fewer. To meet these growing demands the California Redwood Park must be administered to insure its permanent usefulness by protecting it from destruction by fire and improving it as rapidly as public needs demand.

Protection.

In keeping with this policy, the administration of the park has been directed toward securing immunity from fire before attempting other than the most pressing improvements. About 28 miles of fire lines, varying in width from 30 to 60 feet, have been cleared. These lines now encircle the park, excepting for a distance of approximately $1\frac{1}{2}$ miles, which will be cleared this winter. The fire lines have followed the rim rock of the basin and smaller spurs practically all the way. In places this necessitated clearing on private lands outside the park, in which cases the owners have exhibited a gratifying willingness to aid in the work, both as a public service and because partial protection to their own property resulted. Some have contributed labor and others money toward the work. No fires have crossed the park boundaries during the last two dry seasons.

In constructing the fire lines last year an attempt was made to cover as much ground as possible. As a result, the early work was hastily done and will need to be gone over again. A strip several feet wide was grubbed along both sides of the fire lines, but in the middle the brush was cut but not grubbed, the idea being that when the material piled along the middle was burned the heat would kill the stumps and prevent coppice from springing up. This did not follow, however, hence these lines now have a strip of young brush through the middle, on both sides of which the line is open. In some cases, too, the lines were left too narrow in places, owing to the haste to get around the basin. Before these lines are fully satisfactory the stumps will need to be grubbed from the middle and the width of the line increased.

This year it was possible to give more time to the work, and greater permanence has resulted. All species except tanbark oak and redwood have been cut and grubbed from the lines, together with all trees of these two species that were deformed or less than 8 or 10 inches in diameter. The brush has been piled in a windrow along the middle of the line, where it will be burned at favorable times, when dry.

In addition to the fire lines surrounding the park, several short secondary lines from 20 to 40 feet wide have been cut along cross spurs inside the park, to form further barriers in case a fire crosses one of the outside lines. Strict watch over campers and visitors is kept by the warden and other employés, to guard against an outbreak within the park. A supply of fire-fighting tools is kept on hand.

The fire lines are not intended to be automatic, except the fire is slow, but to serve as vantage points along which to fight a fire or from which back-firing can be done safely. When the present system of fire lines is completely cleared of material only unusually fierce fires need cause any great apprehension.

In view of the density and large size of the timber through which the fire lines have been cut, the cost of clearing and grubbing has been moderate at about \$150 per mile. Approximately $18\frac{1}{4}$ miles were cleared during the last fiscal year, at a total cost of \$2,744.90. Those cleared since July 1 have cost somewhat more, because of the greater care taken to render them permanent. At the present time the fire lines are costing close to \$175 per mile.

Future Protection.

The presence of workmen on the rim surrounding the park has obviated the necessity of keeping men stationed at prominent points to give warning of fires from which damage might result. When the fire lines are completed it will be necessary to keep three or four men at work along them during the dry season, to maintain a lookout. Each beat should be connected with the warden's headquarters by telephone, so that he can be warned at once if a fire is approaching. The cost of installing and maintaining this signal system will be very small, for wires can be strung on the smaller trees and the men can be profitably employed in keeping the lines cleared of grass and weed growth. The utmost vigilance will be necessary, during the next three or four years in particular, for several companies owning timber adjacent to the park are about to commence lumbering.

Improvements.

Despite the fact that protective measures have been given first attention, several important improvements have been made since July 1, 1905, when the State Board of Forestry assumed the administration of the park.

Of first importance was the construction of about $\frac{1}{2}$ mile of road from Sempervirens Camp to Flea Potrero, and the widening of the road from Sempervirens Camp to Governor's Camp. This road is from 16 to 20 feet in width at almost all points, and built on a uniform grade not exceeding 6 per cent. Permanent repairs have also been made on two large slides and several small ones caused by heavy winter rains. A thoroughly good job was done in widening the road, making it possible for teams to pass at almost any point.

The permanent buildings at the park have been increased by the erection of a substantial log barn at the entrance and a combination tool and bunk house at Governor's Camp. The former was built of unhewn

redwood logs of uniform size, and has been much admired by visitors. The latter, although less elegant in appearance, has supplied a needed shelter for tools and employés.

Several new trails and improvements to old ones have opened up the park to such an extent that visitors stopping several weeks in the park always find new places to visit. Considerable work of much importance, although less noticeable, has been done to rid the camping sites of dead brush, fallen limbs, and poison oak.

At the present time two important jobs are under way. One is the construction of a private telephone line from Boulder Creek to Governor's Camp; the other, a survey of the park boundaries. The telephone will supply a long-felt need for communication with neighboring towns, for assistance in case of fire and for the use of visitors to the park. The survey will define the boundaries and enable fencing to be done in some places against straying stock. The boundary lines will be cleared of brush and furnished with guideposts wherever crossed by trails.

Improvements Projected.

In addition to the lines of work now under way, the principal improvements scheduled for the immediate future are the construction of a lodge for the warden, the installing of a water system for Governor's Camp and the warden's lodge, and a road-sprinkling system.

The warden's lodge will be built at the park entrance opposite the new log barn, on a five-acre tract donated to the State for this purpose by Mr. H. L. Middleton. Plans for the lodge have been submitted and considerable material has been gotten out in preparation for its erection early in the coming summer.

In view of the fact that water for household uses can be obtained in the park only by carrying it from the streams and other means quite as primitive, and especially since companies owning the timber in the upper watershed of the stream from which the supply is obtained are preparing to begin cutting, it becomes necessary to install a permanent system for camp use. Abundant water of excellent quality can be obtained from a living spring a short distance above Governor's Camp. This work should receive attention during the coming summer.

It will be necessary also to obtain water for use at the warden's lodge before it is occupied. Here the water will have to be raised from the creek below, consequently an engine and pump will have to be put in. A tank should be erected above the lodge to hold water for use in emergencies.

Desirable Improvements.

There is pressing need of a moderate-sized hotel inside the park, where employés may board and visitors may obtain accommodations.

The present lack of accommodations burdens the warden with the responsibility of boarding employés and very often providing for visitors. This is undesirable, because it is liable at any time to arouse criticism on the ground that the warden is making a profit from keeping a boarding-house. More important from the standpoint of the State, however, is the fact that this work takes up some of the time which the warden owes the State. The only way to remedy the situation is to induce some hotel-keeper to open a hotel there. This is of immediate importance.

Quite a large area near the eastern side of the park was burned over in 1904 and many large redwood trees were killed. These should be cut in order to improve the appearance of the park and to remove the danger from falling limbs. At present all money obtained from the sale of such material must be turned into the general fund. If this clause is amended by the coming Legislature to permit the proceeds from such material to be reinvested in the park, steps should be taken immediately to dispose of all dead timber. Probably the most satisfactory way will be to set up a small mill on the tract, temporarily, and cut the lumber into shingles.

Visitors.

During the past summer the park has been visited by about half the normal number of people. This reduction is attributable to the earthquake which destroyed the tunnels on the narrow-gauge railroad from San Francisco to Santa Cruz, causing the road to be blocked all summer, and to the partial destruction of the City of San Francisco. Fewer people have cared to take the trip since it has been increased by the long detour via San José, and fewer from San Francisco have been in a position to afford recreation. There is no doubt that the opening of this road and the betterment of conditions in the city, which will prevail next summer, will bring the number of visitors up to those of former seasons, at least.

During the summer months a daily stage was run from Boulder Creek to Governor's Camp by W. M. Elsom, under permission from the State Board of Forestry.

Further Acquirement of Land.

The north boundary of the park is indented by a half-section of private land, known as the Harrington claim, owned by the McAbee Brothers Timber Company. This is largely good redwood, very attractive scenically, and especially important as the source of one of the main streams which traverse the park. It could not be acquired when the park was purchased, because one of the joint owners refused to sell.

Now, however, it can be acquired, and should be if a reasonable price will be accepted, for it is useless to the owners for any purpose but logging, and this would damage the park immeasurably.

Between the park and the coast are several parcels of vacant Government land of too small commercial value to have attracted claimants. Senator Perkins has been asked to induce Congress to grant these to the State as additions to the park. This project should be agitated, for eventually the intervening lands can be secured at a small price after being logged, and reforested by a few years' protection, then the whole will make a most valuable addition to the park. This is desirable, not only to increase the area, but to perfect control and thus be able to guard the more valuable portions from outside fires and loss of wild game.

EXPENSES OF CALIFORNIA REDWOOD PARK.

July 1, 1906, to October 31, 1906.

Warden's salary.....	\$500 00	
Labor on fire lines.....	1,315 79	
Labor on clearing.....	345 75	
Labor on telephone line.....	258 50	
Supplies, tools, lumber, etc.....	165 06	
Labor on lodge material.....	92 40	
Repairs	35 75	
		<hr/>
Total		\$2,713 25
Balance July 1, 1906.....		11,389 13
		<hr/>
Balance November 1, 1906.....		\$8,675 88

TWENTIETH AND TWENTY-FIRST ANNUAL REPORTS

OF THE

BOARD OF DENTAL EXAMINERS

OF THE

STATE OF CALIFORNIA.



SACRAMENTO:

W. W. SHANNON, : : : SUPERINTENDENT OF STATE PRINTING.
1906.

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TWENTIETH ANNUAL REPORT
OF THE
BOARD OF DENTAL EXAMINERS
OF THE
STATE OF CALIFORNIA
TO THE
GOVERNOR OF CALIFORNIA.

December 1, 1904.

MEMBERS OF THE BOARD OF DENTAL EXAMINERS
OF THE STATE OF CALIFORNIA—1904.

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TWENTIETH ANNUAL REPORT

OF THE

BOARD OF DENTAL EXAMINERS OF CALIFORNIA.

To his Excellency GEORGE C. PARDEE,
Governor of the State of California,

SIR: The Board of Dental Examiners of California has the honor of submitting the following as the twentieth annual report of its proceedings, together with an account of all moneys received and disbursed, in compliance with the requirements of that certain Act of the Legislature approved March 23, 1901, and amended and approved March 20, 1903, entitled "An Act to insure the better education of practitioners of dental surgery, and to regulate the practice of dentistry in the State of California, providing penalties for the violation hereof, and to repeal an Act now in force relating to the same, and known as 'An Act to insure the better education of practitioners of dental surgery, and to regulate the practice of dentistry in the State of California,' approved March 12, 1885."

During the month of August the following appointments were made by your Excellency: Dr. E. G. Howard, to succeed Dr. F. R. Cunningham, resigned; Dr. George A. White, to succeed Dr. H. R. Harbison, term expired; Dr. Arthur B. Mayhew, to succeed Dr. G. E. Schillig, term expired; and Dr. C. A. Herrick, to succeed himself.

Since issuing the last report the Board has held two regular meetings: one in San Francisco, commencing on May 23, 1904, and continuing to May 28, 1904, inclusive; and the other in Los Angeles, from June 13, 1904, to June 20, 1904, inclusive.

The Executive Committee of the Board has held twelve regular meetings for the purpose of attending to such business as could not be deferred until the regular meetings of the Board.

At the meeting of the Board commencing on May 23d, eighty-four applicants appeared for examination, of whom the following sixty-eight were granted licenses:

Ricks, C. C.	Rhoades, C. E.	Farley, R. E.	Rawlins, G. E.
Rohner, F.	Simms, T. F.	Corwin, L. T.	Middleton, J. E.
Wuellimin, P. M.	Moore, H. T.	Rule, R. W.	Kelly, A. G.
Heller, L. C.	Fleckenstein, W. J.	Doll, C. V.	Chase, W. J.
Bacigalupi, J.	Clarke, J. P.	Scott, M. E.	Veckie, V. J.

Dinsmore, A. M.	Bennett, Guy	Blosser, E. E.	Weider, J. E.
Letcher, I. W.	McFarlin, R. F.	Scott, E. W.	Elworthy, F. W.
Pegot, L. C.	Mentz, H. C.	Rees, F. G.	Rion, C. L.
Callaghan, T. B.	Walton, W. McK.	Marks, L. H.	Alsberge, E. W.
Irgens, L. S.	Sobey, A. W.	Blauer, R. J.	Lane, C. C.
Wing, G.	Castle, R. R.	Schultz, C. H.	Grütner, A. T.
Kline, A. E.	Peters, E. K.	Dornberger, E. L.	Burbank, G. C.
Smith, J. C.	Davis, S. C.	McLaughlin, G. V.	McKinney, C. W.
Frederich, C. J.	Ashby, S. J.	Scott, C. W.	Moore, Roy
Minahen, G. E.	Badgley, E. E.	Howard, E. J.	Wallace, L. E.
Graham, L.	Rodolph, F. E.	McDaniel, G. T.	Yount, G. B.
Dungan, F. L.	Steinwand, A. R.	Brown, A.	Yant, G. A.

There were fifty-one applicants for examination at the Los Angeles meeting. The following thirty-six were granted licenses:

Packard, L. M.	Kirby, A. H.	Maiden, W. R.	Brizuis, W. J.
Viney, A. W.	Fulsom, H. A.	Shaw, A. A.	Stewart, J. H.
Jarvis, C. C.	Gillespie, D. S.	Hosmer, E.	Bachman, C. W.
Sprague, G. H.	Miller, G. G.	Prince, A. D.	O'Connor, D.
Engstrom, C. J. R.	Miller, W. C.	Acker, A. V.	Day, R. A.
Ritz, R. A.	Evans, E. E.	Craycroft, W. W.	Mueller, F. E.
Thornburg, F. S.	Smith, H. D.	Lewis, M. J.	Hathaway, G. E.
Williams, C. C.	Smith, J. G.	Savage, A. H.	Garver, W. M.
Cole, C. E.	Goodrich, V. A.	Chapline, W. E.	Merritt, C. H.

Prior to the first examination, committees from the Board visited all of the reputable dental colleges in California and inspected their books and facilities for the teaching of dental surgery. After hearing reports from the various committees the Board decided to indorse the Dental Departments of the University of California, the College of Physicians and Surgeons, and the University of Southern California.

Since the last report one forfeited license has been restored.

Following the arrest of a number of illegal practitioners, as stated in the last report of this Board, a petition for a writ of habeas corpus was filed on December 15, 1903, in the Supreme Court by Charles H. Whitley, and made returnable December 16, the object being to test the constitutionality of the Dental Act as passed by the Legislature of 1901 and amended by the Legislature of 1903. The case was set for January 4, 1904, and after argument on that date it was agreed that briefs should be filed. A decision was not given by the Supreme Court until July 22, 1904. On August 11, a petition for rehearing was filed, and on August 22 an order was made by the Supreme Court denying the petition.

The following-named dentists have since then been arrested in San Francisco on the charge of practicing without a license from the Board of Dental Examiners: C. H. Whitley, H. C. Huck, A. J. Breckenridge, G. C. Farmer, M. H. Schord, J. C. Perry, S. L. Brasch, Robert Dunn. These have all demanded jury trials, and are being tried as rapidly as the calendar of the police court will permit.

In addition to the above, the following illegal practitioners have been arrested, either on complaint of the Board or of a citizen: H. Daam, in Coalinga, found guilty and fined \$50; A. Brown, in Sanger, acquitted; H. Smith, in Chico, case pending; A. L. Faulkner, in San José, case pending; E. F. Bathrich, in Los Angeles, found guilty and sentenced to pay a fine of \$150 or be confined in the city prison 150 days. He was afterward released, because of a technical error in the complaint.

Evidence is now being gathered for a number of other cases.

In addition to the foregoing, the Secretary has communicated with all violators of the law reported to him, warning them against practicing dentistry illegally. As a result of these communications and the prosecutions, information has reached the Board that many of the above have either left the State, or engaged in another vocation, or have commenced to properly qualify themselves for the practice of dentistry.

The Attorney-General of California, who is the legal adviser of the Board, and also attorney for the Board in cases in which the Board is defendant, submits the following report:

STATE OF CALIFORNIA—OFFICE OF ATTORNEY-GENERAL.

U. S. WEBB, Attorney-General.

SAN FRANCISCO, November 16, 1904.

DR. F. G. BAIRD, *Secretary State Board of Dental Examiners, 502 Sutter Street, City,*

DEAR SIR: Replying to your inquiry of November 9, 1904, permit me to say that the legal services rendered by this office to your Board since December 1, 1903, may be briefly epitomized as follows:

Clifford A. Covalt vs. H. R. Harbison, et al., as Board of Dental Examiners, etc. An action in the Superior Court of the City and County of San Francisco for mandate compelling issuance to petitioner of license to practice dentistry. An answer to the petition was filed by this office, on behalf of your Board, and the plaintiff gave notice of motion to set the cause for hearing, which motion was continued from time to time until, on December 7, 1903, it was ordered off the calendar. Since that date nothing has been done by the petitioner to bring the matter to a hearing, and it has probably been abandoned.

On October 11, 1904, I rendered you an opinion relative to the granting of temporary licenses by individual members of your Board, such opinion being based upon a communication received by you from Dr. E. G. Howard of Los Angeles.

On November 2, 1904, I rendered you an opinion advising you as to the powers of your Board concerning an institution purporting to be a dental college; also, relative to the practice of dentistry by a company or corporation.

Very truly yours,

(Signed:) U. S. WEBB,
Attorney-General.

FINANCIAL STATEMENT.

The following is an account of the funds received and disbursed by the Board from December 1, 1903, to December 1, 1904:

GENERAL FUND.

RECEIPTS.

Balance on hand December 1, 1903	\$202 69
Five restoration fees	125 00
135 examination fees, at \$25	3,375 00
Two duplicate license fees	10 00
Miscellaneous	13
	<u>\$3,712 82</u>

DISBURSEMENTS.

One fee returned, at \$25	\$25 00
Stamps, storeroom supplies, etc.	77 85
Typewriting	4 55
Janitors	35 00
National Association	15 00
Experting books	50 00
Secretary's salary and clerical assistance for seven months	175 00
Mileage compensation of members	2,163 15
Treasurer's salary	100 00
American Surety Co.	25 00
Cash on hand	1,042 27
	<u>\$3,712 82</u>

REGISTRATION FUND.

RECEIPTS.

Balance on hand December 1, 1903	\$1,545 85
1,012 fees, at \$2	2,024 00
	<u>\$3,569 85</u>

DISBURSEMENTS.

Legal services and securing evidence	\$808 85
Typewriting	58 55
Collecting and clerical assistance	150 00
Printing briefs	59 50
Supplies, stamps, exchange on checks	68 65
Cash on hand	2,424 30
	<u>\$3,569 85</u>

The Supreme Court decision on the constitutionality of the Dental Act as passed by the Legislature of 1901, and amended by the Legislature of 1903, is appended in full to this report.

All of which is respectfully submitted by the Board of Dental Examiners of California.

December 1, 1904.

F. G. BAIRD,
Secretary.

Certified correct:

C. A. HERRICK,
President.

DECISION OF THE SUPREME COURT ON THE CONSTITUTIONALITY OF THE DENTAL LAW.

Crim. No. 1115. In Bank. July 22, 1904.

Ex parte C. H. WHITLEY on *Habeas Corpus*.

Application for writ of *habeas corpus* prayed to be directed against George W. Wittman, Chief of Police of the City and County of San Francisco, State of California, who holds and restrains petitioner of his liberty in pursuance of a warrant issued by A. J. Fritz, Police Judge, upon a sworn complaint of one C. C. Hamilton.

William M. Cannon and Arthur W. Perry, for petitioner.

E. Myron Wolf, for Board of Dental Examiners, and Jordan, Treat & Brann, on behalf of the State Central Committee on Dental Legislation, *amicus curiæ*.

James F Peck and Charles C. Boynton, *amicus curiæ*.

Petitioner was arrested for practicing dentistry without a license, contrary to the dental law of this State, and prosecutes this writ, claiming that said law is unconstitutional for several reasons.

The history of our dental law is found in enactments by the Legislature at its sessions in 1885, 1901, and 1903, and in order to properly appreciate the points made by petitioner it will be necessary to refer to some of the provisions of all these Acts. The original Act regulating the practice of dentistry was passed in 1885 (Stats. 1885, page 110), and it was provided in Section 1 thereof that "it shall be unlawful for any person, who is not at the time of the passage of this Act engaged in the practice of dentistry in this State, to commence such practice, unless he or she shall have obtained a certificate as hereinafter provided." Section 4 provided that, "within six months from the time this Act takes effect, it shall be the duty of every person who is now engaged in the practice of dentistry in this State, to cause his or her name and residence or place of business to be registered with the Board of Examiners."

The Act further provided for the examination by the Board of Examiners of applicants for dental certificates other than those engaged in practice at its passage, and provided that if the Board should determine that they possessed the requisite knowledge and skill in dental

surgery, they should issue a certificate, which would entitle them to practice, and might also indorse as satisfactory diplomas from any reputable dental college, and issue certificates for the same purpose thereon.

In 1901 (Stats. 1901, page 564), an entirely new Act regulating the practice of dentistry in this State was passed—one more full, complete, and detailed than that of 1885, which it thereby repealed.

Section 1 of this latter Act provided that: "It shall be unlawful for any person to engage in the practice of dentistry in the State of California, unless said person shall have obtained a license from the Board of Dental Examiners, duly authorized and appointed under the provisions of this Act to issue licenses; *provided*, that this Act shall not affect the right, under the laws of the State of California, of dentists to practice dentistry, who have a lawful right to practice dentistry at the time of the passage of this Act."

Subsequent sections of this Act also provided, as in the Act of 1885, for issuance to others desiring to engage in the practice of dentistry, certificates or licenses entitling them to do so, upon compliance with certain prescribed conditions as to examination and so forth, which it is unnecessary to state now, as they will be referred to more fully hereafter when we come to an examination of further objections particularly urged against the provisions of the Act of 1901 and sections amendatory thereof in the Act of 1903.

This, too, is all the reference required to the particular sections of the Acts of 1885 and 1901, so as to fully understand and discuss petitioner's first contention.

1. He insists that Section 1 of the Act of 1885 was unconstitutional because it discriminated between two classes, in this, that it made it unlawful for any person to engage in the practice of dentistry after the passage of the Act without first obtaining a license, and, on the other hand, dispensed with the necessity of first obtaining such license in favor of those practicing at the time the Act was passed.

Notwithstanding this Act of 1885 was repealed *in toto* by the Act of 1901—and for that reason construction of its provisions would seem unnecessary—petitioner nevertheless claims that its construction is most important, and that a determination in favor of its validity is vital to the integrity of the Act of 1901. That if Section 1 of the Act of 1885 is unconstitutional, then he contends Section 1 of the Act of 1901 is equally so, because the persons provided for in the latter section, as a class exempt from obtaining a license, namely "persons who have a lawful right to practice dentistry" at the time of its passage, can only exist and be ascertained by virtue of the validity of the Act of 1885, and must necessarily consist, in the aggregate, of those who were prac-

ticing dentistry when it was enacted, and who were exempted by its terms from obtaining a license, and those to whom licenses had been issued on examinations, in compliance with its conditions, at the time the Act of 1901 was passed; that consequently in order to ascertain what dentists had "lawful right" to continue in practice at the passage of the Act of 1901, without an examination, there is necessarily involved a determination of the validity of Section 1 of the Act of 1885.

And that, unless the Act of 1885 was valid, there could exist no particular class in whose favor the Act of 1901 would operate as an exemption, because if it was void, then, as at the time the Act of 1901 was passed, every person who saw fit to do so had an unrestricted and absolute right to practice dentistry, the exemption by the Act of 1901 in favor of all those who had a "lawful right to practice dentistry" amounted to nothing. As everybody had a lawful right to practice, if there was no valid law prior to 1901, an exemption of all persons having "lawful right" from the provisions of that Act, left nobody upon whom the law could operate, because, if all had a lawful right, all were exempt. The Act of 1901 would, therefore, in its opening section, unless the Act of 1885 was constitutional, be meaningless, inoperative, and self-destructive.

Aside from this, a similar and independent attack is made upon the Act of 1901 that is made on the Act of 1885 as equally discriminating between classes, in requiring the procurement of a license by one, and exempting the other from doing so.

If, however, the Act of 1885 was valid, notwithstanding it exempted dentists practicing at the time of its passage from obtaining a license, and requiring others to do so, then certainly the Act of 1901, in so far as it carried into its provisions and also exempted those same persons as being within the class "having a lawful right to practice" under the Act of 1885, was also valid. As to the other members of the exempt class, under the Act of 1901, being those who had obtained a license under the Act of 1885, it can not be successfully contended that it was not proper to exempt them. They had already complied with the conditions of the law and obtained a license, and it was unnecessary, if not also unfair, to require them to do so again.

So that it will be sufficient to address ourselves to a consideration of the validity of Section 1 of the Act of 1885, because the law which determines that question will apply with equal force, and dispose of the similar objection to Section 1 of the Act of 1901, at least to the extent that it is claimed to be discriminating in this particular.

While counsel for petitioner attacks both these Acts upon the ground generally that they are discriminatory, he particularizes in that regard that they are obnoxious to various provisions of both the constitution

of this State and of the United States; that they are violative of the provisions of the one, because they constitute special legislation; make an arbitrary distinction in a class between dentists practicing at the time of the passage of the Act and those seeking to practice afterwards, when it should equally apply to all dentists, and when there exists no natural, intrinsic, or constitutional reason why the discrimination between them should be made; that it is violative of the provisions of both constitutions in that it attempts to grant special privileges and immunities to one class of dentists which it denies to another.

Approaching now the discussion of these propositions.

It is not questioned by counsel for petitioner but that the State has the right to regulate the practice of dentistry; to provide measures for the protection of the public against the incompetency and ignorance of those who, while they would assume the duties and responsibilities of that profession, are yet unfitted and unqualified to discharge them.

In fact, it must be conceded that it is a common and valid exercise of legislative power to prescribe regulations under which only those persons possessing proper qualifications shall be admitted to the practice of any profession or calling requiring special skill.

This right of legislation is always recognized as a salutary and wise exercise of the police power of the State for the protection and safety of the public against unskillful and incompetent persons.

And it is the fact that the State has this power which must largely enter into a determination of the validity of the sections in question. The legislation of the State of California on this subject is not new. Similar legislation has obtained in a large number of the states, and in some of these the courts have had occasion to pass on the identical question presented here. In some instances the question arose under Acts regulating the practice of medicine; in others, as here, regulating the practice of dentistry; but the same reasoning would apply and the same constitutional principles govern as to the validity of provisions of a dental as of a medical Act, because the profession of dentistry is but a special branch of the medical profession, and the power of the State to regulate as to both in the interest of the public is equally clear.

An examination of these authorities shows that an exemption in favor of those practicing at the time of the passage of an Act regulating the practice of dentistry, and which requires all others to obtain a license and certificate for that purpose, is open to none of the constitutional objections urged in the case at bar.

Such legislation has been uniformly upheld.

And, as the reasons therefor are stated in the opinions, it is unnecessary to discuss the point any further than to quote from them. They deal with all the objections urged by petitioner, both as to the pro-

visions of the Acts in controversy being special and discriminatory legislation, and as being a grant of special or exclusive privileges or immunities.

In the case of *State vs. Randolph*, 23 Oregon 74, involving the validity of an Act concerning physicians and surgeons, which exempted physicians in practice at its passage from its operation, the Supreme Court of that State said: "The first point is based on the assumption that this Act, or Section 13 of the Act, is in conflict with Section 20, Article I, of the State Constitution, which provides that 'no law shall be passed granting to any citizen or class of citizens privileges or immunities which, upon the same terms, shall not equally belong to all citizens'; and the second point is based on a like assumption that Section 13 of the Act is in conflict with Section 2 of Article IV of the Constitution of the United States, which provides that 'the citizens of each State shall be entitled to all privileges and immunities of citizens in the several States,' and also in conflict with that portion of the fourteenth amendment thereto which provides that 'no State shall make or enforce any law which shall abridge the privileges or immunities of the citizens of the United States.' Both of these contentions involve the same principle, and the discussion of one necessarily includes the other, so that their separate consideration is not necessarily to be pursued. Both proceed upon the hypothesis that the Act grants privileges or immunities to one class of persons while it denies the same privileges or immunities to another class. It is not thought that either of these contentions is tenable, or that the section referred to is in conflict with the Constitution of the State or of the United States. The right of every person to pursue any lawful business, occupation, or profession he may choose to pursue, subject to such restrictions as the Government may impose for the protection of the health, welfare, and safety of society, is unquestioned. * * * To provide means for the protection of the public health from the ignorance and incapacity of those who are unfitted to discharge the duties of a physician, our State, as other States have done, enacted the law in question; and unless it grants to some citizen or physician, or class of them, some right or immunity which, upon like terms or under similar circumstances, it denies to another, it is a valid exercise of the police power and must be upheld. Section 13 of the Act, in effect, only permits physicians who were engaged in the practice when the law took effect, upon registering as required by its proviso, to apply to the Board and obtain a certificate of qualification authorizing them to practice medicine or surgery without an examination. In a word, it permits persons who were engaged in the practice when the law took effect to continue in the practice without an examination. As it is the right of the State

to prescribe qualifications based on knowledge or professional skill, necessarily the State must be the judge of such qualifications, and if the rule established to determine them is reasonable and appropriate for that purpose, it can not operate to deprive any one of the privilege or right to practice his profession. The test of qualification, under the Act, is based on medical skill and knowledge. If the person seeking to practice medicine has a diploma or license from some reputable institution, it is sufficient evidence, under the Act, of the requisite qualifications to entitle him to practice. It is only when the person wishing to practice has no such evidence of his qualification that the Act requires that he shall submit himself for examination by the Board. In establishing this rule the State saw fit, for reasons satisfactory to itself, to except from its provisions, by Section 13, those physicians who were engaged in the practice at the passage of the Act. In doing this it made the fact of being so engaged in the practice at that time sufficient evidence of qualification—equivalent to a diploma—rendering an examination unnecessary.”

In *State vs. Creditor*, 44 Kan. 565, it is said relative to a similar provision in the dental law of that State: “No arbitrary or capricious conditions are imposed. The profession and practice are open to every citizen of the United States who is qualified, and who can produce evidence of the same. The Legislature saw fit to permit those practicing in the State when the Act was passed to continue to practice without diploma or other evidence of competency. * * * The Legislature proceeded upon the theory that the fact that they had been engaged in the practice within the State was sufficient evidence of their proficiency in the profession. This fact was made by the Legislature an evidence of skill and competency equivalent to a diploma from a dental college; and the wisdom of either test is a question for the Legislature and not for the courts. The Act can not be held to duly discriminate between persons or classes, and unconstitutional because it exempts those engaged in the practice within the State when the law was enacted from the necessity of obtaining a diploma.”

In *Ex parte Spinney*, 10 Nev. 323, where an Act exempting dentists who had been practicing for a period of ten years next preceding its passage was involved, in sustaining the validity of the law, it is said: “It in effect declared that the physician or surgeon who was engaged in the practice immediately preceding the passage of the Act, was as well qualified, in the judgment of the State, to continue the practice of his profession, as the student coming fresh from the halls of college with his diploma was to commence it. But in establishing this rule as to these physicians and surgeons, the State did not deny the privilege or the right of practicing medicine or surgery to any one. No class of

citizens of this State is prohibited from the practice of medicine or surgery by the Act, provided they have the proper qualifications, and comply with the law in relation thereto. The error of the defendant's contention consists in assuming that the Act grants 'privileges or immunities' to one class of citizens or physicians of this State which it denies to other citizens of the State or other States. The Act does not grant privileges or immunities to any citizen or class of citizens, either within or without the State. It only establishes a rule of evidence by which qualification to practice medicine and surgery is to be determined. It makes the fact of a person being engaged in the practice when the law took effect sufficient evidence of his fitness to continue the practice of his profession without an examination, in the same way that the diploma of the student is accepted as sufficient evidence of his fitness to commence the practice without an examination."

In *People vs. Phippen*, 70 Mich. 6, construing an Act excepting physicians who had practiced five years before its passage, the court said: "Statutes very similar to this have been upheld in many of the States where their constitutionality has been brought in question, and in many of the States very similar statutes have been enforced without question, and we are unable to find a case in the courts of any of our sister States, or in the Federal courts, where such statutes have been overturned upon constitutional grounds as abridging the privileges and immunities of citizens of the United States or as depriving any person of property without due process of law, or as being in conflict with Section 2 of Article IV, providing that the citizens of each State shall be entitled to all the privileges and immunities of the several States."

In the same line will be found the cases of *State vs. Green*, 112 Ind. 462; *State vs. Vandersluis*, 42 Minn. 129; *West vs. Clutter*, 37 Ohio, St. 348. Citation is also made to the Am. and Eng. Ency. of Law, vol. 22, 2d ed., page 781.

Several cases are cited by counsel for petitioner in support of his contention; those nearest approaching the point at issue being *State vs. Hinman* and *State vs. Pennoyer*, 65 N. H., pages 104 and 102 respectively, and *Scholle vs. State*, 90 Md. 740. The first two cases involved the validity of an Act regulating the practice of dentistry, which exempted all persons from an examination who had resided and practiced dentistry continuously in the same town or city of the State for five years last past. The Act construed in *Scholle vs. State* exempted physicians from examination also because of residence in one place. These Acts were declared unconstitutional, and properly so. The language used in *State vs. Hinman* points the defect in all: "By an arbitrary test having no reference to skill, learning, or fitness for the practice of the profession, certain persons are exempt from the payment of a

license fee to which others of equal and perhaps superior acquirements and experience are subjected. It is a discrimination founded solely upon the accidental circumstances of residence, or of a change of residence, and falls within the prohibition of the Constitution."

In these cases last cited, particular individuals of a class of practicing dentists were exempted by reason of locality, and given special privileges. It was the exemption of a class within a class for purely local reasons.

In the cases we have cited, however, fitness and learning are alone taken into consideration, and the fact of a person being in practice when the law took effect was deemed by the Legislature sufficient evidence of fitness to continue in the practice without further examination.

We think the cases we have quoted from and those we have cited fully sustain the view, that the exemption from examination under the Act of 1885, carried into the Act of 1901, of those who were practicing the profession of dentistry when they were passed, and exacting from those who sought the right to practice after its passage, an examination as to their qualifications, is not discriminatory.

All sections of the Act operate equally upon all the actually practicing dentists in the State, which was the only existing class at its passage, and which was the only class concerned, and the only one upon which they could operate.

They simply made the fact of actual practice at its passage such sufficient evidence of competency, as a successful examination of those applying to practice after its passage.

Without discussing this matter further, we think these cases sustain the propositions that the legislation complained of is neither special nor class, and that thereby no privileges or immunities are conferred upon one class to the detriment of another, and, as a consequence, that neither Section 1 of the Act of 1885, nor the similar section of the Act of 1901, is violative of any of the provisions of the State or Federal constitution, as insisted upon by petitioner.

2. It is next claimed by petitioner that Section 12 of the Act of 1901, as amended by the Act of 1903, arbitrarily creates three classes of persons who may practice dentistry in the State after examination by the State Board of Dental Examiners, namely, first, graduates of reputable dental colleges, and, second, graduates of high schools, or similar institutions of learning in this State, or any State of the United States, requiring a three years' course of study, who have served an apprenticeship of four years with licensed practitioners within this State; third, dentists from other States in the United States who have been licensed practitioners for five years.

We find no merit in this claim of petitioner. It is entirely within the power of a legislature to fix any reasonable standard for determining the competency of an applicant for admission to the practice of dentistry. It might, as under the Act regulating the practice of medicine and surgery in this State (Stats. 1901, page 56), where only those who are graduates from a medical college can be admitted to practice, have also made a similar single standard, limiting admission to practice dentistry to those alone who had graduated from some dental college. As this might have been the sole condition upon which an applicant could be examined, it can not be said that legislation which enlarges the right and extends it to others is discriminatory. The law does not operate to exclude any one from the profession. The field is left open to all who are in possession of the required qualifications. It simply fixes the standard under which all persons who desire to enter the profession are brought as nearly as possible to the same degree of professional competency.

The law, no doubt, is discriminatory, but not in any constitutional sense. It does not discriminate between classes. The discrimination goes to the degree of learning and skill which all applicants for examination must possess. It discriminates between those who have the necessary degree of learning and skill, and those who have not; between those who are able and those who are unable to acquire it. It is not an unreasonable or capricious discrimination applying to classes as such, or members of a class, but is based solely upon professional qualifications. It is a discrimination which, in the interest of the public welfare, it is the duty of the Legislature to make, and concerning the necessity for which, and its nature and extent—whether an examination and right to practice shall depend on the possession by the applicant of a diploma of a dental college only, or be extended to others and how far—depends primarily upon the judgment of the Legislature, which, when reasonably exercised, the courts can not control.

These principles will be found fully discussed and sustained in *State vs. Vandersluis*, *supra*, and *Dent vs. West Virginia*, 129 U. S. 122, as also in *Ex parte Gerino*, the decision in which case was filed June 1st of this year, and is reported in Vol. 27 Cal. Dec., page 978.

3. It is further claimed that the operation of Section 12 of the Act of 1903, which provides that "No person shall be eligible for examination by the State Board of Dental Examiners who shall not furnish satisfactory evidence of having graduated from a reputable dental college, which must have been indorsed by the Board of Dental Examiners of California," is unconstitutional and void, and a delegation of power of a judicial nature to the Board of Examiners, which, if exer-

cised in an arbitrary and unlawful manner, it is beyond the power of the court to control.

There is no foundation for the claim that the statute attempts to confer judicial power upon the Board in the sense that it is prohibited by the Constitution.

It is not at all uncommon for inferior boards or officers to be invested with power which calls for the determination of facts, and the exercise of discretion, in the discharge of the duties of their office. This power, it is true, is in a sense judicial, but it can not be said that it is an exercise of "judicial power" as that term is used in the Constitution in conferring judicial power upon courts. The question is, however, not an open one in this State, and seems to have been settled adversely to petitioner's contention in *County of Los Angeles vs. Spencer*, 126 Cal. 670.

Upon the other point, that the power conferred on the Board is of such a character as, if exercised arbitrarily, it will be beyond the power of the court to control it, it may be said that petitioner does not seem to have applied to the court on any complaint that the Board has taken such arbitrary action. He has not complained to any court that the Board has unjustly and arbitrarily dealt with him, but is here contending that the law is unconstitutional, and that, under it, his right to practice is not subject to action or determination by the Board at all. If he has been unjustly and arbitrarily dealt with, and should apply to the courts for redress, it will be doubtless found, as is stated in *Dent vs. West Virginia*, 129 U. S. 124, where the same objection was raised as to power conferred on the Board of Medical Examiners of West Virginia, that, "If in the proceedings under the statute, there should be any unfair or unjust action upon the part of the Board in refusing him a certificate, we doubt not that a remedy would be found in the courts of the State." (*Reetz vs. Mich.*, 188 U. S. 505; *Wisconsin vs. Chittenden*, 112 Wis. 558.)

It is further insisted that this Section 12 of the Act of 1903 is obnoxious to the constitutional provisions because it delegates to the Board of Examiners the power to decide what colleges are reputable, not from any standard furnished by the Legislature, but from their own arbitrary view upon the subject.

But it must be remembered that the Act regulating the practice of dentistry and similar Acts are not passed to promote the personal ends of individuals, but as salutary enactments in the exercise of the police power of the State to legislate for the safety, health, and welfare of the people. The boards which are selected under such legislative power are to that extent agencies of the State, and the Board of Dental Examiners under the Dentistry Act is a particular instrumentality selected as a State agency in the regulation of the practice of dentistry.

While the Legislature, in conserving the public welfare, recognized that the possession of a diploma from a regular dental college, where acquiring the theory and practice of medicine fully engaged the time and attention of the student, was a high evidence of his ability to practice dentistry, it also assumed that there might be institutions whose required standard of scholarship was so low that the possession of a diploma from them would be little, if any, evidence of proficiency in dentistry. Or, that there might be pretended dental institutions requiring no preparation and fraudulently issuing diplomas after a perfunctory, if any, examination, and in sole consideration of a fee. In this condition of things, while the Legislature intended that only diplomas from a reputable dental college should be recognized by the Board, it realized that it was impracticable, if not impossible, for it to adopt any fixed standard by which that matter could be determined in advance. It realized, as said by the court in *Wisconsin vs. Chittenden*, *supra*, that "What is reputable in a dental college must necessarily be determined from a standpoint of men of scientific attainments in the line of work it represents, not from that of mere laymen," and committed the determination of that matter to the State agency it created, consisting of dentists, presumably learned, trained, and eminent in the profession, and obligated, under the law, to deal fairly and justly with all applicants and the colleges from which they presented their diplomas. We do not perceive that in so doing any provision of the organic law was violated. The power to determine whether a college was reputable had to be lodged somewhere, and it was properly committed to the only body which could fairly and intelligently determine, not only as to the qualifications of the applicant, but upon the reputation of the college whose diploma he claimed to possess. This is a power which seems to be usually given by the Legislature to boards of examiners, and its commission is sustained by the courts. (*State vs. Chittenden*, 112 Wis. 569; *Williams vs. Dental Examiners*, 93 Tenn. 627; *People vs Dental Examiners*, 110 Ill. 180; *Dent vs. W. Va.* 129 U. S. 124; *State vs. Call*, 121 N. C. 646; *The State vs. Francis*, 57 Ohio State 15; *Gothard vs. People*, 74 Pac. Rep. [Colo.] 891.)

Practically the same point was made by the petitioner in *Ex parte Gerino*, *supra*, and decided adversely to him.

The case of *Van Vleck vs. Board of Dental Examiners*, 48 Pac. Rep. 223, is cited by both sides, in the case at bar, on the question just disposed of. That was a department decision in which a rehearing was granted, and, before any hearing or further decision was rendered by this court, the proceeding was dismissed on motion here, hence the department decision in that case is not authority.

This disposes of the principal and main points urged by the peti-

tioner against the validity of the various sections of these Acts as affecting their constitutionality. The objections leveled against Section 12 of the Act of 1903, that it is discriminatory between classes, and unconstitutional, for the other reasons suggested, are equally asserted against similar provisions in the Acts of 1885 and 1901, so that, without descanting particularly on those provisions, it may be said, generally, that the views we have expressed and the conclusion we have reached apply equally to them as to Section 12 of the Act of 1903.

Other objections urged against the provisions in several of these Acts we deem untenable and requiring no special notice.

The writ is dismissed and the petitioner remanded to the custody of the Chief of Police of the City and County of San Francisco.

LORIGAN, J.

We concur:

McFARLAND, J.

ANGELLOTTI, J.

SHAW, J.

HENSHAW, J.

VAN DYKE, J.

TWENTY-FIRST ANNUAL REPORT

OF THE

BOARD OF DENTAL EXAMINERS

OF THE

STATE OF CALIFORNIA

TO THE

GOVERNOR OF CALIFORNIA

December 1, 1905.

MEMBERS OF THE BOARD OF DENTAL EXAMINERS OF THE STATE OF CALIFORNIA—1905.

FRED G. BAIRD, D.D.S., <i>President</i> ,	-	-	-	San Francisco.
C. A. HERRICK, D.D.S., <i>Secretary</i> ,	-	-	-	-
E. G. HOWARD, D.D.S., <i>Treasurer</i> ,	-	-	-	-
JOHN M. DUNN, D.D.S.,	-	-	-	-
RUSSELL H. COOL, D.D.S.,	-	-	-	-
GEORGE A. WHITE, D.D.S.,	-	-	-	-
ARTHUR B. MAYHEW, D.D.S.,	-	-	-	-

TWENTY-FIRST ANNUAL REPORT

OF THE

BOARD OF DENTAL EXAMINERS OF CALIFORNIA.

To his Excellency GEORGE C. PARDEE,
Governor of the State of California,

DEAR SIR: The Board of Dental Examiners of California submits the following as the twenty-first annual report of its proceedings, together with its financial accounts, in compliance with the requirements of that Act of the Legislature approved March 23, 1901, and amended and approved March 20, 1903, and amended and approved March 20, 1905, entitled "An Act to insure the better education of practitioners of dental surgery, and to regulate the practice of dentistry in the State of California, providing penalties for the violation hereof, and to repeal an Act now in force relating to the same, and known as 'An Act to insure the better education of practitioners of dental surgery, and to regulate the practice of dentistry in the State of California,' approved March 12, 1885."

Since the last report the Board has held three regular meetings: one from December 15 to December 23, 1904; one from June 12 to June 17, 1905, and the last from June 19 to July 1, 1905; all dates inclusive.

The Executive Committee has held seven meetings for the purpose of transacting necessary business.

At our meeting of December 23, 1904, held in San Francisco, officers were elected as follows: Dr. F. G. Baird of San Francisco, President; Dr. E. G. Howard of Los Angeles, Treasurer; and Dr. C. A. Herrick of Jackson, Secretary.

At this meeting of the Board, December 23, 1904, thirty applicants presented themselves for examination. Before beginning one withdrew, and two were rejected. Of the remaining twenty-seven the following were successful and were granted licenses:

Numbers, S. Guy	Waggoner, Lloyd B.	Holcombe, John D.	Billings, Wall M.
Cook, John A.	Packard, H. R.	McAlpin, Amos C.	Long, George E.
Spencer, Roy L.	Cushing, S. R.	Colgan, Albert J.	Bartlett, U. G.

At our meeting held in San Francisco in June, 1905, eighty-four applicants presented themselves for examination; of these, sixty-two passed, as follows:

Scannavino, John A.	Evans, Amos O.	Sobey, A. L.	Rogers, Thos. L.
Marizuya, Carlos J.	Cummings, N. C.	Leong, Faith S. S.	Neto, Joseph R.
Mazza, Joseph H.	Potter, Fred W.	Harvey, Chas. A.	Keogh, Joseph B.
Bullock, Walter M.	Kumle, Lambert	Lane, Wm. R.	Murphy, C. V.
Fox, Clarence E.	Cureton, Horace	Minor, Isaac S.	Young, R. J.
McClaskey, F. T.	Young, Chas. E.	Gray, Herbert J.	Hyatt, Frank
Montague, James S.	Arner, Milton E.	O'Connell, Geo. D.	Steele, Judge F.
Wise, Chas. F.	Tufts, Le Roy	Stoffet, John H.	Weisbach, Lewis C.
Zeller, M. J.	Leslie, Wm. W.	Kidian, Wm. H.	Smith, Wm. C.
Brooks, John A.	Stevens, Andrew J.	Carroll, J. M.	Davis, H. P.
Nordlund, Walter J.	Swain, Homer	Howatt, G. A.	Moore, Harry W.
Cosad, Albert B.	Freuzel, F. H.	March, H. D.	Beem, Guy O.
Davenport, D. D.	Howe, Albert B.	Wilson, Chas. W.	Tolton, Chas. J.
Curtiss, Fred A.	Pescia, A. F.	Morehead, Roy F.	Mallett, Albert
Marshall, Lewis C.	Mingus, Geo. W.	Eidenmüller, F. H.	Flood, Wm. A.
Dowell, Walter J.	De Martin, A. D.		

At the Los Angeles meeting of the same year, the following forty-one were granted licenses:

Gresham, J. L.	Neel, Ross E.	Allen, C. A.	Flanders, G. H.
Ransom, H. E.	Giguette, F. A.	Shepherd, H. B.	Stare, Chas. B.
Metzger, E. S.	Hallock, C. H.	Smith, H. A.	Heseman, Chas. E.
Mosher, Geo. H.	Baldwin, I. F.	Anderson, W. H. B.	Morgan, T. H.
Higby, N. G.	Goodrich, G. A.	Brown, H. G.	Dobson, Wm. E.
O'Connor, P. H.	Ball, A. E.	Guthrie, J. E.	Hyde, E. C.
Lauer, L. A.	Bailey, A. S.	Harrell, T. P.	Irying, A. E.
Sparks, E. F. K.	Jessup, A. H.	Leavelle, A. B.	Beazley, W. S.
Homan, W. W.	Gates, W. G.	Goodman, N. W.	Arnold, B. C.
Salisbury, S. E.	Dixon, M. M.	Brown, H. E.	Markey, C. E.
Chase, H. E.			

The constitutionality of the State Dental Law having been attacked, and the Supreme Court having rendered a decision July 22, 1904, upholding the law, it seemed proper for the Board to compel the strict enforcement of the Act. To that end, at the December meeting, 1904, the State was divided into seven districts, and each member of the Board, or his successor, was appointed a committee of one to look after his district, and was authorized and instructed to use all means toward the prosecution of illegal practitioners. Further, each member was instructed to render a written report at each regular meeting of the Board of all work in his district, including an account of all expenditures. This plan of dividing the State into districts is to remain unchanged until further action of the Board. Each member by district with his name is as follows:

Dr. E. G. Howard—Los Angeles County.

Dr. J. M. Dunn—Alameda County, and Sutter street, San Francisco.

Dr. R. H. Cool—Spring Valley Building, and district west of Powell street and north of Market and Castro streets (except Sutter street), San Francisco.

Dr. F. G. Baird—The district east of Powell street and south of Market and Castro streets (except Sutter street and Spring Valley Building), San Francisco.

Dr. C. A. Herrick—The following counties: Stanislaus, Tuolumne, Siskiyou, Modoc, Shasta, Lassen, Tehama, Glenn, Butte, Plumas, Sierra, Colusa, Sutter, Yuba, Nevada, Placer, Yolo, Sacramento, El Dorado, Amador, Alpine, San Joaquin, and Calaveras.

Dr. G. A. White—The following counties: Monterey, San Benito, Kings, Tulare, Fresno, Inyo, San Luis Obispo, Kern, Santa Barbara, Ventura, San Bernardino, Orange, Riverside, and San Diego.

Dr. A. B. Mayhew—The following counties: Lake, Napa, Del Norte, Trinity, Humboldt, Mendocino, Sonoma, Solano, Marin, Contra Costa, San Mateo, Santa Clara, Santa Cruz, Merced, Mariposa, Madera, and Mono.

Criminal prosecutions have been many. The majority arrested plead guilty or were convicted on trial. The results obtained must prove satisfactory to the profession. We submit a short synopsis of each case and append a detailed report on another page:

San Francisco County—Jimmy Poy, found guilty; J. C. Perry, convicted; S. L. Brasch, convicted and judgment reversed; George C. Farmer, dismissed; Robert Dunn, acquitted; H. C. Huck, acquitted; A. J. Breckenridge, acquitted; M. H. Schord, found guilty; W. S. Lee, found guilty (sentence suspended); O. B. Hewitt, Charles Fong, A. J. Breckenridge (second arrest), John Doe Kesseling, Valdamar Cavalsky, and J. B. Landon, pending.

Los Angeles County—N. Araki, plead guilty; M. Kuninagu, plead guilty; N. Kuns, case pending; H. B. Boal, case pending; Walter J. Hodson, plead guilty; Douglas Creighton, plead guilty; M. Wright, plead guilty; J. E. Guthrie, plead guilty; Lem Sue It, convicted and fined \$100, on appeal the judgment was reversed; E. F. Bathrick, convicted and fined \$50, on appeal the judgment was reversed, and a second arrest was dismissed.

Calaveras County—J. M. Wallace, plead guilty.

Tehama County—H. G. Nixon, plead guilty.

San Diego County—R. J. Walker, acquitted; W. S. Burnell, dismissed.

Santa Barbara County—J. B. Arrellanes, guilty.

San Bernardino County—A. W. McDavitt, pending; F. A. Couch, pending.

Monterey County—J. A. Chappell, acquitted.

Santa Clara County—D. P. Cameron, plead guilty; John A. Rice, plead guilty; R. G. Moss, plead guilty; John Doe Jacobs, found not guilty.

Santa Cruz County—F. P. Chrisman, plead guilty.

Sonoma County—W. T. Peoples, plead guilty; W. Stacey, plead guilty; Geo. P. Lovejoy, pending.

Alameda County—E. Conn, first arrest—discharged, second arrest—acquitted; Jas. Nordlund, arrested, but subsequently died; S. C. Hornef, arrested and case pending.

By an error of the detective engaged to prosecute an illegal man by the name of Shiefer, Dr. S. G. Schaefer of Los Angeles was arrested. As soon as the Board was notified of the error, the attorney in the case was instructed to dismiss the case against Dr. S. G. Schaefer, the Board also tendering its apologies. Dr. Schaefer, however, immediately brought suit against the Board of Dental Examiners, and each member thereof, for \$50,000. The case was dismissed in the Superior Court.

At the June meeting in Los Angeles, the Board on motion dispensed with the services of Mr. E. Myron Wolf, as attorney for the Board.

Since the last report, the Board has deemed it proper to restore eleven licenses and to issue four duplicates.

J. J. Walk, having been in practice prior to the enactment of 1885, and presenting the necessary affidavits that he had made application to a former Board, was granted a license upon the opinion rendered by the Attorney-General.

During the year, the licenses of W. S. Covington and G. H. Kriebbaum were suspended for thirty days from July 5, 1905, for employing unlicensed dentists. This was done according to Section 21½ of the Dental Law. The case against G. Willis Price, investigated by this Board on the same charge, was dismissed.

During the year, all dental colleges in this State have been officially visited and the standards adopted by them found to meet the requirements of the law.

As a matter of precaution, the Board, at a former meeting, ordered the Secretary to make a duplicate of "The Great Register of Licensed Dentists of California" and to place the original in a safe deposit. This duplicate has just been completed.

In June last, Acting Governor Alden Anderson appointed a commission, consisting of Hon. A. J. Pillsbury, Hon. F. R. Devlin, and Hon. F. A. Cromwell, to investigate the official conduct of the members of the State Board of Dental Examiners.

On June 24th last, each member of the Board received, through the commission, a communication from Hon. Alden Anderson, Acting Governor of California, quoted in part as follows:

There have been allegations and considerable crimination and recrimination made to this office, and also given wide publicity through the mediumship of the daily press, in relation to the affairs and administration of the State Board of Dental Examiners in general, and in regard to alleged dishonest practices in connection with the examination for licentiates in particular.

The commission appointed to make this investigation duly rendered its report, which is herewith presented in full.

REPORT OF THE COMMISSION APPOINTED TO INVESTIGATE THE CONDUCT OF THE STATE BOARD OF DENTAL EXAMINERS.

To the HON. GEORGE C. PARDEE, Governor of California,

DEAR SIR: We, the undersigned, Frank R. Devlin, F. A. Cromwell, and A. J. Pillsbury, commissioners, beg leave to report to your Excellency as follows:

That on or about the 25th day of June, 1905, we severally received from Hon. Alden Anderson, Acting Governor of California, a communication dated June 24th, of the following tenor and effect:

There have been allegations and considerable crimination and recrimination made to this office, and also given wide publicity through the mediumship of the daily press, in relation to the affairs and administration of the State Board of Dental Examiners in general, and in regard to alleged dishonest practices in connection with the examination for licentiates in particular.

This matter has received some attention from Hon. Geo. C. Pardee, Governor, who is now temporarily absent from the State on public business, and after consideration and consultation with him, it was deemed proper and necessary that an investigation of this Board be made, as the good name of same has been brought into question, and, therefore, its public usefulness greatly impaired. As per the above, it is the belief of the Governor and myself that a committee or commission of three members should be appointed to make such an investigation.

I deem it best to leave to your own good judgment as to the method of making such investigation, and will add only a few words to indicate in a general way my own idea and the idea of the Governor as to the purposes and scope of the inquiry.

The allegations, alleged charges, criminations, and recriminations, having been widely circulated, injure the standing of this State Board, and impair its public usefulness as beforesaid, and if there is no basis of truth in them, it is desirable that such fact should be known and the members of the Board individually and collectively vindicated, if administration has at all times been above board, honest, and upright; but if, on the other hand, there has been dishonesty or other dishonest procedure or practice by the Board, or by any member thereof, the wrong which has been committed should be exposed, and the offenders or offender punished.

The main purpose of the investigation, therefore, should be to ascertain the absolute facts, without fear or favor, and to make known the present standing of the Board and all its members in all of its and their relations to the public in general and to the dental profession in particular.

Your investigation should be broad enough to cover all causes of controversy among the members, and all other matters which affect its usefulness and good standing.

At the proper time, after you have finished your investigation, I request that you make to Hon. Geo. C. Pardee, Governor, a report embracing the statement of the facts elicited by the inquiry, together with whatever conclusions and recommendations which may seem to you to be pertinent and proper in the premises.

That we forthwith severally signified our willingness to perform the services required, and accordingly assembled at Sacramento on June 30th, and then and there organized said Commission by electing A. J. Pillsbury chairman, and F. A. Cromwell secretary.

That the chairman was instructed to secure a place and make all other necessary arrangements for holding such inquiry, and to subpoena all interested persons, and especially all candidates for dental certificates who attended the examination at San Francisco June 12 to 17, 1905—together with the members of the State Board of Dental Examiners—to attend the inquiry at San Francisco, August 1, 1905.

That pursuant to said instructions the Commission of inquiry met in the "Board Room" (Room 18), Ferry Building, San Francisco, at 10 o'clock, August 1st, and then and there proceeded to hold a public inquiry in accordance with instructions received, as stated above.

That in prosecuting said inquiry we examined ninety-one witnesses under oath, some of them more than once; that the hearing occupied fourteen days exclusive of Sundays and a necessary intermission on one Saturday.

That the testimony was taken down by Mr. Edward Lehner in shorthand and afterwards transcribed into longhand, a copy of which will be placed in your hands without delay.

That the State Board of Dental Examiners, consisting of Doctors

Baird, Herrick, White, Howard, and Mayhew, were represented before the Commission of Investigation by Attorney Walter H. Brann of San Francisco, and Doctors Cool and Dunn by Hon. G. R. Lukens.

Such representation was of high character and conducive to thoroughness of the investigation.

The duties imposed upon this Commission, according to our interpretation of the above letter of instructions, were as follows:

1. To ascertain the absolute facts underlying the unhappy controversy prevailing in the State Board of Dental Examiners and set them forth.

2. To expose dishonesty, if it be found to exist.

3. To make known the present status of said Board and its individual members.

4. To vindicate those members who deserve vindication, and to specify those who deserve reproof.

5. To make such recommendations touching the whole matter as may seem pertinent and proper.

With the purpose of covering these specific requirements, we invite your attention to the following findings of fact and conclusions:

1. We find that the questions propounded at the San Francisco examination of applicants for dental certificates had not previously been given out to applicants, as alleged in the public press, although there was, in the case of the questions in anatomy, a similarity between questions that had been used by the applicants in quiz classes and some of which afterwards appeared upon the blackboard during the examination.

The similarity was entirely coincidental and accidental, except that those who conducted these quiz classes purposely intended, if possible, to cover the ground likely to be covered by the official examination, a thing not difficult to do where the examination questions were more than likely to be confined mainly to the anatomy of the head.

The foregoing relates to the "Steele-Minor-Howatt-Lou. T. Smith-Howard" series of questions, set out in full in the transcribed testimony.

The other series of questions in anatomy charged to have been given out in advance of the examination was alleged to have been given by Dr. Mayhew to his associate on the Board, Dr. J. M. Dunn, and by Dunn, given in part only, to applicant Papandre, and by Papandre to applicants O'Connell and Minor.

In regard to this series your Commission is of the opinion that Dr. Mayhew did, quite innocently however, in fact allow his associate, Dr. Dunn, to see his questions in anatomy before he placed them on the blackboard, but we do not find evidence warranting the conclusion that

Dr. Dunn consciously gave any of the Mayhew anatomy questions to applicant Papandre with the purpose of aiding him, or at all. His remarks to Papandre were general in character, by way of encouragement, and not to aid him specifically in passing the examination.

We think that Dr. Mayhew likewise, and not improperly, allowed his associate, Dr. Cool, to see his questions before placing them upon the blackboard, but there is no evidence of any sort that Dr. Cool made any use of the information thus confidentially placed in his hands.

2. We find that applicant Steele's signed statement to Dr. Russell H. Cool regarding examination questions being "out" did warrant Dr. Cool in demanding an investigation then and there, and that an almost irreparable mistake was made by the members of the State Board of Dental Examiners, collectively and severally, in not holding a full and frank investigation immediately. Had the examination been suspended and an investigation made in the proper spirit, the fact of mere coincidence in the Steele-Howard questions would have at once become apparent. Furthermore, we think that such an investigation would have been made if a spirit of mutual confidence, rather than of distrust and suspicion, had existed among the members of said Dental Board.

3. We find that the said "majority" was not warranted in refusing to consider Dr. Cool's charges unless in informal meeting of which no record should be made; that the law does not contemplate other than formal meetings, of which due records are made. If, as averred, the inculcation of a fellow member were made a matter of record, his exculpation could have been recorded with equal fullness so that his reputation would not have suffered thereby.

4. We find that Dr. Cool was not warranted in refusing to disclose the evidence in his possession seeming to show that the questions in anatomy had been given out prior to the examination, unless in a formal meeting of which a record should be made. The all-important concern was to have an investigation, full, fair, and frank, made without an hour's unnecessary delay, and all formality should have been waived and all evidence at once disclosed.

5. We find that Dr. Cool was not warranted in refusing to go with the other members of the Board to Secretary Herrick's room in the Grand Hotel, San Francisco, in order to examine the papers of applicants in the examination in anatomy, to see if such papers contained evidence of collusion between Examiner Mayhew and any of the applicants, such refusal being on the ground that it was Dr. Herrick's bedroom.

6. In regard to the relation of the "Psi Omega" Dental Fraternity to the examination and Dr. Mayhew's initiation into said society, we find that while certain Greek letter dental fraternities manifested an undue eagerness to have members of the examining board become members of their fraternities, such membership did not in fact influence, in

any perceptible degree, the conduct of the State Board of Dental Examiners or any of them. There was, however, no evidence to support the contention that, in any instance, such influence counted for anything for or against any applicant. We think that Dr. Mayhew, even though following the custom, was indiscreet in allowing himself to be initiated into a fraternity during the pendency of the examination, and we venture the hope that such initiations will not hereafter take place during examinations, to the end that the mere appearance of evil may be avoided.

7. We find that the examination of applicants for dental certificates, held at San Francisco, June 12 to 17, 1905, was conducted with substantial fairness and free from undue favoritism, and that no element of peculation entered therein.

We are of the opinion, however, that in conducting future examinations important reforms might be adopted with profit to the State and to the dental profession. With this end in view, we recommend that all examination papers be graded by at least one member other than the one who prepares questions and corrects papers in each particular topic.

The examination at Los Angeles should be far enough in point of time from the one at San Francisco to permit the business at San Francisco being completed, no matter what may occur, before the examination at Los Angeles takes place.

We recommend that a percentage method be devised for grading the clinical work, which, if not mathematically exact, will at least fairly approximate the proper result, and that the same be averaged as in the written examinations.

We recommend that this system likewise be extended to the oral examinations, upon which much emphasis should be placed, for the purpose of making it less possible for dental colleges (more concerned for their graduates passing the Board examinations than for the successful practice of their professions) to "coach" their student applicants for the final ordeal. This can scarcely be avoided in the written examinations, but the clinical and oral tests should be quite beyond the sphere of the "coach."

We also recommend that permanent records be made of the ratings of all applicants, and that these records, and the examination papers, be placed in the hands of the Secretary of the Board and by him retained for at least one year, and that each applicant, or his duly accredited representative, be permitted to scrutinize his own record at any time.

We think that the papers should be graded with reference to the applicant's ability to produce a fair English manuscript, and that bad spelling, capitalization, and an utter want of punctuation, as well as a

slovenly disregard for the appearance of the examination papers, should properly be counted against the ability of such person to uphold the dignity of an honorable profession. The law requires the equivalent of a high school education, and failure to write English with the efficiency of a common school graduate should be accepted as conclusive evidence of failure to meet the statutory requirements.

8. All the testimony we were able to obtain in regard to discrimination against dentists coming to California from other States with the view of practicing their profession, that seemed worthy of consideration, was to the effect that such discrimination does not exist. The Board of Dental Examiners aims to allow, in the written examinations, for lapses of memory on the part of those who have been several years out of school, but is correspondingly exacting in clinical work. Per contra, it expects recent graduates to be well up in theoretical parts of dentistry, but is more lenient with them in the clinical tests. We think this form of discrimination reasonable and praiseworthy.

9. The examination into the accounts of Dr. J. M. Dunn as treasurer of the State Board of Dental Examiners was made by expert accountants from the office of the State Controller, and shows that Dr. Dunn's accounts were square at the time he turned his funds over to his successor, and we do not think that the evidence obtained warrants the conclusion that he was at any time short in his accounts. He kept the Board funds in different banks, in his own name, and in a safe deposit box. He was not methodical nor prompt in his transactions, and we unhesitatingly attribute the unfortunate reports which became more or less current touching his financial integrity to laxity of methods rather than to any more serious dereliction of duty.

10. We find that there was some excuse for the majority members of the State Board of Dental Examiners suspecting that Dr. J. M. Dunn was short in his accounts as Treasurer of the Board, for the following reasons:

(a) As stated above, Dr. Dunn's methods were lax and unbusinesslike and wanting in promptness.

(b) He was the innocent victim of a combination of circumstances, among which was his father's protracted illness and subsequent death, which took him from his office a good deal for many weeks, and caused him to neglect Board business.

(c) Dr. Cool's suggestions to Dr. Baird and others regarding Dr. Dunn's accounts were not calculated to clarify the situation.

(d) Dr. Dunn's attending to Board business only after five o'clock, while a perfectly reasonable regulation, did not restrain persons from coming at all hours to have bills paid or preclude their grumbling because they had to come again and again.

(e) The confessed statement of expert J. B. Melvin, when asked if

Dr. Dunn was short in his accounts, that "it looks like it," afforded further warrant for injurious conclusions. This statement Melvin himself modified when on the witness stand.

11. We think that Dr. Dunn erred in not going at once before the full Board and demanding an investigation of his accounts when Dr. White and Dr. Herrick went to him, during an intermission in the Board session, and charged him with being, or having been, short in his accounts. By such error he further misled his associates into suspecting that he was, or had been, short in his accounts.

12. While we are aware of the opinion that the importance of the act of the "majority" in removing the office of Secretary of the Board to Jackson, Amador County, has been greatly exaggerated by their opponents, especially by Dr. Cool, we think that the best interests of the Board and of the dental profession would be subserved by having the Secretary's office more centrally located and books and records more ready of access. We think, also, that a paid assistant to the Secretary should be employed, in order that a more perfect system of records of the Secretary may be devised and maintained, unless the law shall provide for the collection of all moneys by a State official, as hereinafter recommended.

13. We are of the opinion that failure to establish the policy of rotation in the presidential office in order of seniority of membership on the Board constitutes the especial sore spot at the bottom of the ill feeling that has obtained on the Board. We believe that such a policy is not to be commended, and that the Board did not err in declining to establish it. The best man for President is the one to be elected President, and it would be a mistaken policy to choose as President one in whom a majority of the members lacked confidence, merely because he had been longest on the Board.

14. We find that the evidence fails to substantiate the charge that Dr. Dunn entered into an agreement with Dr. P. S. Coke, of the dental supply house of Burnell-Priest-Coke Company, to secure a dental license for Dr. George C. Farmer for \$250, or for any other sum; yet Dr. Dunn's lack of discretion in his conversation with Dr. Farmer and his brother R. H. Farmer in this matter gave color to the suspicion that he might be a party to the negotiations between the Farmers and Coke.

That this important issue may be clearly understood, it is necessary to recite the general course of the evidence in this regard. Dr. George C. Farmer had graduated from a dental college in California and had obtained a diploma entitling him to practice dentistry as the law then stood, but the law was subsequently so changed as to require this diploma to be registered with the County Clerk of the county within prescribed time. This Dr. Farmer failed to do, and was therefore prosecuted for practicing dentistry without a license. It had been several

years since Dr. Farmer had attended school, and he doubted his ability to pass an examination. He therefore went to Dr. Dunn for advice, and Dr. Dunn told him that inasmuch as he had slept on his rights he could see no way for him to do except to take the examination. Later, Dr. Farmer sent his brother, R. H. Farmer, an old acquaintance of Dr. Dunn, to see Dr. Dunn in his behalf. R. H. Farmer testified that Dr. Dunn referred him to Dr. Coke, whom he went to see, and when he did see Dr. Coke the latter said that he could fix the matter up, but that it would cost \$250.

Per contra, Dr. Dunn declared under oath that when R. H. Farmer came to him he told Farmer that there was no other way for his brother, Dr. George T. Farmer, to do except to take the examination, whereupon Farmer said, "Dr. Coke has a good deal of influence with the Board, hasn't he?" By way of reply, Dr. Dunn testified that he said to Farmer, "Well, why don't you go to see Coke, then?" and so dismissed the subject from his mind.

Dr. Coke's explanation of the incident is that he believed that the law depriving Dr. Farmer of his right to practice dentistry, because he had failed to register his diploma within the required time, was unconstitutional and void, and that he was trying to get a case for his brother, Attorney J. S. Coke, of Oregon, then visiting him, to test the law by a proper proceeding in the courts.

The evidence is conflicting throughout except as to one point, and that is that no money was in fact paid by Dr. George C. Farmer, or any other person on his behalf, to Dr. Coke or to Dr. Dunn, or to any other person, for the procurement of any advantage in the examination for a dental certificate, or to secure a certificate to practice his profession without taking the examination. The worst that can be said of Dr. Dunn in reference to the whole unfortunate incident is that he did in some way, the precise way being in dispute, refer Mr. R. H. Farmer to Dr. P. S. Coke. Surely this is not enough upon which to pass an adverse finding as to Dr. Dunn's character as a man and citizen.

We think, however, that there is evidence enough to show that Dr. P. S. Coke did hold himself out to credulous persons as possessing especial influence with the State Board of Dental Examiners, or some of them. It is to be presumed that he did this by way of making himself "solid" with prospective customers when such applicants should enter the practice of their profession; but at all events he seems to have obtained inside information from the Board not open to the public, and especially not open to his competitors in business. We feel, also, that the relations existing between Dr. Cool and Dr. Dunn and Dr. Coke were such as to permit the impression to be formed in the minds of applicants that such influence did in fact exist; and the existence of

this impression was instrumental in creating scandal and casting undeserved reflections upon the integrity of the Dental Board.

We doubt the existence of any material influence on the part of Dr. Coke over or with Dr. Cool or Dr. Dunn, or any other member of the Board, but there was an indiscretion on the part of Dr. Cool and Dr. Dunn in affiliating too freely with a person disposed to utilize such relations for commercial advantage.

15. The attitude of the members of the Board toward each other, and particularly of the "majority" against the minority and vice versa, has been one of extreme suspicion and intensified acrimony, and the official atmosphere has, at least since December, 1904, been deplorable. The wonder is that the antipathy has not resulted in personal encounter as well as scandal. For want of a little of the spirit of wholesome magnanimity and mutuality of confidence, the State of California has been besmirched by a nasty scandal, and great hardship has been inflicted upon many undeserving persons. The condition is intolerable, and in our judgment should not be permitted to continue.

16. We think that, as now constituted, the State Board of Dental Examiners has no future. Taken individually, your Commission esteems the members of the Board as gentlemen whose acquaintance would be an honor and whose friendship would prove a great satisfaction, but they are mutually incompatible and distempered toward one another.

Your Commission is not willing to absolve any member of the State Board of Dental Examiners from all responsibility for the existence of this state of affairs.

Whatever may be said regarding other individuals, the usefulness of Dr. Russell H. Cool as a member of the Board, unless such Board be wholly reconstructed, except as to himself and possibly Dr. Dunn, is at an end. We accord him high rank in his profession and in the society of gentlemen generally, and we believe that he has had the best interests of the profession greatly at heart, but his methods and activities have created discord within the Board, and we think that his retirement from it will be conducive to its harmony and efficiency.

17. Your Commission was unable to obtain evidence showing irregularity in the issuance of temporary certificates to practice dentistry, or anything worthy of especial criticism. The issuance of such certificates was mainly a matter of judgment on the part of the individual issuing them, and therefore left room for differences of opinion as to the wisdom of issuance in each particular instance.

In addition to the recommendations hereinbefore made, your Commission further recommends that the State Dental Law be so amended as to require all moneys collected for the use of the State Board of

Dental Examiners to be covered into the State Treasury, and to be drawn therefrom only upon warrants issued by the State Controller;

That all claims for the expenditures of said Board should pass through the regular State channels, for determining their legality and reasonableness before being certified to by the Controller for payment;

That the law should also provide for the collection, by either the State Controller or Secretary of State, of all assessments, dues, and income of whatever nature appertaining to the State Board of Dental Examiners, to the end that the business may be more systematically and efficiently conducted.

Having performed the commission assigned us with that measure of thoroughness and expedition of which we are capable, this report is very respectfully submitted.

(Signed:) A. J. PILLSBURY.
FRANK R. DEVLIN.
F. A. CROMWELL.

FINANCIAL STATEMENT.

The following is an account of the funds received and disbursed by the Board from December 1, 1904, to December 1, 1905:

GENERAL FUND.

Dec. 1, 1904—Balance on hand \$1,042 27

RECEIPTS.

168 examination fees	\$4,200 00
7 restoration fees	175 00
4 duplicate license fees	20 00
Part of J. M. Wallace fine	25 00
J. J. Walk license	25 00
Fines received by Treasurer	125 00
	<hr/>
	\$4,570 00

DISBURSEMENTS.

Typewriting, printing, postage, and stationery	\$124 50
Secretary's salary	330 00
Secretary's sundries	31 50
Bond premiums	30 00
Fees returned	50 00
Transfer to Registration Fund	70 00
Examination expenses	206 55
Mileage and compensation of members	3,322 89
Sundries	18 55
	<hr/>
	4,183 99
Excess receipts over disbursements	386 01
Nov. 30, 1905—Balance on hand	<hr/> <u>\$1,428 28</u>

REGISTRATION FUND.

Dec. 1, 1904—Balance on hand \$2,424 30

RECEIPTS.

1,826 fees, at \$2 each	\$3,652 00	
Transfer from General Fund	70 00	
Santa Clara fines	74 90	
Exchange	1 07	
		<u>\$3,797 97</u>

DISBURSEMENTS.

Typewriting, printing, postage, and stationery	\$429 77	
Secretary's salary	260 00	
Attorney's fees	1,122 00	
Delinquent notices	102 39	
Trunk	20 00	
Board compensation, in prosecutions	120 00	
Board sundries	219 75	
Detective services	918 55	
Fees returned	8 00	
Exchange deducted by bank	4 60	
		<u>3,205 06</u>
Excess receipts over disbursements		592 91
Nov. 30, 1905—Balance on hand		<u>\$3,017 21</u>

Appended to this report are a copy of the Dental Law of California, General Information, the "Code of Dental Ethics" recommended by the American Dental Association, report of prosecutions by districts, a list of the legal dental practitioners in California, and a list of deceased licentiates.

All of which is respectfully submitted by the Board of Dental Examiners of California.

F. G. BAIRD, D.D.S.,
President.

C. A. HERRICK, D.D.S.,
Secretary.

December 1, 1905.

DENTAL LAW OF CALIFORNIA.

*An Act to insure the better education of practitioners of dental surgery, and to regulate the practice of dentistry in the State of California, providing penalties for the violation hereof, and to repeal an Act now in force relating to the same and known as "An Act to insure the better education of practitioners of dental surgery, and to regulate the practice of dentistry in the State of California," approved March 12, 1885.**

[Approved March 23, 1901; amended and approved March 20, 1903, and March 20, 1905.]

The people of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. It shall be unlawful for any person to engage in the practice of dentistry in the State of California unless said person shall have obtained a license from a Board of Dental Examiners, duly authorized and appointed under the provisions of this Act to issue licenses; *provided*, that this Act shall not affect the right, under the laws of the State of California, of dentists to practice dentistry who have lawful right to practice dentistry at the time of the passage of this Act.

SEC. 2. A Board of Dental Examiners to consist of seven (7) reputable and ethical practicing dentists is hereby created, to be known as the Board of Dental Examiners of California, whose duty it shall be to carry out the purposes and enforce the provisions of this Act. The members of this board shall be appointed by the Governor of California, all of whom shall have been actively and legally engaged in the practice of dentistry in the State of California, for at least [five] (5) years next preceding the date of their appointment, and none of whom shall be members of the faculty of any dental college or dental department of any medical college in the State of California, or shall have any financial interest in any such college. The said seven (7) shall compose the Board of Dental Examiners of California. The term for which the members of said board shall hold office shall be four (4) years, except that two of the members of the board first to be appointed under this Act shall hold their term of office for the term of one year, two for the term of two years, two for the term of three years, and one for the term of four years, and until their successors are duly appointed and qualified. In case a vacancy occurs in the membership of said board, such

*Sections 10, 12, 14, 15, 19, and 25 amended; Sections 16, 17, and 18 repealed, and new section, numbered 21½, added in 1903. Section 11 repealed March 20, 1905.

vacancy shall be filled by appointment by the Governor, within thirty (30) days after such vacancy occurs.

SEC. 3. It shall be the power and duty of said board to organize by the election of one of its members president, another secretary, and another treasurer; to meet at least twice each year, at such time and place as the board may designate, for the purpose of transacting the business of the board, and at such other times as the board may elect, or on the call of the president of the board, or of not less than four (4) members thereof; a written notice of the time, place, and object of such called meeting to be mailed by the secretary of said board to all the members thereof not parties to the call, at least fifteen (15) days before the day of meeting; to examine all applicants for licenses to practice dentistry according to the provisions of this Act; to collect and apply all fees as directed by this Act; to keep a book showing the names of all persons to whom licenses have been granted by said board to practice dentistry, and such other books as may be necessary to plainly show all the acts and proceedings of said board; to have and to use a seal bearing the name "Board of Dental Examiners of California."

SEC. 4. Out of the funds coming into the possession of the board, each member of said board may receive as compensation ten dollars (\$10.00) for each day actually spent in attending to the duties of his office, and mileage at the rate of five cents (\$.05) per mile for all distances actually traveled in going to and coming from the meetings of the board. Said expenses shall be paid from the fees and fines received by the board under the provisions of this Act, and no part of the salary or other expenses of the board shall ever be paid out of the State Treasury.

SEC. 5. Each member of the board shall, upon his qualification and the organization of the board, file with the secretary his postoffice address, and thereafter any notice of any change therein. Any notice sent to the address so on file, shall be deemed to comply with the requirements of this Act as to notice to them.

SEC. 6. All books of said board shall be of public record and at all times during business hours open to public inspection. A certified copy of any part or all thereof shall be primary evidence in any court of this State. The original books shall be kept in the office of the secretary of said board, wherever he may reside, and he shall furnish to any person making application therefor a copy of any part thereof, upon the applicant paying a fee of twenty-five cents (\$.25) per hundred words so copied, the said fee to belong to the secretary. All copies shall be certified by the secretary.

SEC. 7. The Governor shall have the power to remove from office at any time, any member of the board for continued neglect of duty required by this Act, or for incompetency, unprofessional or dishonorable conduct.

SEC. 8. Said board shall examine all applicants for examination who shall furnish satisfactory evidence of having complied with the provisions of this Act relating to qualification for examination, and all persons satisfactorily passing such examinations shall be granted by said board a license to practice dentistry in the State of California. The examination of applicants shall be elementary and practical in character, but sufficiently thorough to test the fitness of the candidate to practice dentistry. It shall include, written in the English language, questions on the following subjects: Anatomy, physiology, chemistry, materia medica, therapeutics, metallurgy, histology, pathology, operative and prosthetic dentistry, hygiene and dental jurisprudence. The answers to which shall be written in the English language. Demonstrations of the applicant's skill in operative and prosthetic dentistry must also be given. All persons successfully passing such examinations shall be registered as licensed dentists on the board register, as provided in section three, and shall also receive a certificate of such registration; said certificate to be signed by the president and secretary of said board. In no case shall any applicant be examined or given a certificate who is not twenty-one years of age.

SEC. 9. Any member of the board may inquire of any applicant for examination concerning his character, qualifications or experience, and may take testimony of any one in regard thereto, under oath, which he is hereby empowered to administer.

SEC. 10. Every person now licensed to practice dentistry in this State, who has failed to register his license with the clerk of the county wherein his place of business is located, as provided by law, must register the same within sixty days after this Act takes effect, and every person who shall hereafter be licensed to practice dentistry in this State, shall within six months thereafter register in the office of the clerk of the county where his place of business is located, in a book kept by the clerk for such purpose, and called a register of dentists, his name, age, office address, the date and number of his license to practice dentistry, and the date of such registration, which registration he shall be entitled to make only upon showing to the County Clerk his license or a copy thereof certified by the secretary of the board over its seal, and making an affidavit stating his name, age, birthplace, the number of his license and the date of its issue; that he is the identical person named in the license; that before receiving the same he complied with all the preliminary requirements of this statute and the rules of the Board of Dental Examiners as to the terms and the amount of study and examination; that no money, other than the fees prescribed by this statute and said rules, was paid directly or indirectly for such license, and that no fraud, misrepresentation or mistake in a material regard was employed or occurred in order that such license should be

conferred. The County Clerk shall preserve such affidavit in a bound volume and shall issue to every licentiate duly registering and making such affidavit, a certificate of registration in his county, which shall include a transcript of the registration. Such transcript and license may be offered as primary evidence in all courts of the facts therein stated. A copy of such certificate of registration shall be sent by the County Clerk to the secretary of the board within five (5) days after it is made. The County Clerk's fees for taking such registration and affidavit and issuing such certificate of registration shall be one (1) dollar. A practicing dentist having registered a lawful authority to practice dentistry in one county of the State, and removing such practice or part thereof to another county, shall show or send by registered mail to the clerk of such other county his certificate of registration. If such certificate clearly shows that the original registration was of an authority issued by the Board of Dental Examiners, or if the certificate of registration itself is indorsed by the secretary of the Board of Dental Examiners as entitled to registration, the clerk shall thereupon register the applicant in the register of dentists of the latter county on receipt of a fee of fifty (50) cents, and shall stamp or indorse on such certificate of registration the date and his name preceded by the words "registered also in ——— county," and return the certificate of registration to the applicant. Any lawfully registered person who shall thereafter change his name according to law shall register the new name with a marginal note of the former name with the clerk of the county or counties where he is practicing. The clerk shall note upon the margin of his former registration in ink the fact of such change, and a cross reference to the new registration. The clerk shall forthwith notify the secretary of the board of such change. Any County Clerk who knowingly shall make or suffer to be made upon the register of dentists kept in his office any entry other than that provided for in this Act, shall be liable to a penalty of fifty dollars, to be recovered by and paid to the said State Board of Dental Examiners in a suit in any court having jurisdiction. Any failure, neglect or refusal on the part of any person holding such license to register the same with the clerk of said county as above directed for a period of six months after the issuance thereof shall *ipso facto* work a forfeiture of his license, and it shall not be restored except upon the payment to said board of twenty-five (25) dollars. Any suspension, revocation or reinstatement of a license shall with the date thereof be forthwith noted by the County Clerk on the margin of the registration thereof upon receipt of notice from the secretary of the board. [*Amendment of 1903.*]

[*Section 11 repealed March 20, 1905.*]

SEC. 12. No person shall be eligible for examination by the State Board of Dental Examiners who shall not furnish satisfactory evidence

of having graduated from a reputable dental college, which must have been indorsed by the Board of Dental Examiners of California; or who shall not have graduated from a high school or similar institution of learning, in this or some other State of the United States, requiring a three years' course of study, and who can not furnish to the Board of Dental Examiners an affidavit, containing his or her name, the name of his or her preceptor, and the names of at least two reputable witnesses, certified to in the State of California before a notary public, showing that he or she has completed an apprenticeship of four years of twelve months each, with a licensed practitioner of dentistry, in the State of California, or can not furnish to said Board of Examiners a certificate from the State Board of Dental Examiners, or similar body, of some other State in the United States, showing that he or she has been a licensed practitioner of dentistry in that State for at least five (5) years. [*Amendment of 1903.*]

SEC. 13. From and after the passage of this Act any and all persons desiring to enter upon the practice of dentistry in the State of California, without graduating from a reputable college in the United States, or producing satisfactory evidence of having been a licensed practitioner of dentistry in some other State for at least five years, must file with the Board of Dental Examiners an affidavit, certified to before a notary public of the State of California, of his intention to begin an apprenticeship with a licensed practitioner of dentistry in this State, and the said affidavit must certify that the affiant has regularly graduated from a high school or similar institution of learning in the United States, as provided in section twelve of this Act, and contain in full, the names of both affiant and his proposed preceptor and the names of two reputable witnesses, together with the date of beginning of his proposed term of apprenticeship; and the Board of Dental Examiners shall issue to affiant a receipt for same.

SEC. 14. Every person applying to the Board of Dental Examiners for a license to practice dentistry shall pay to the board a fee of twenty-five (25) dollars, which shall in no case be refunded. Every licensed dentist shall, on or before the first day of May of each year, except the one in which he is licensed, pay to the secretary of the Board of Dental Examiners a fee of two (2) dollars, which shall be used exclusively for the prosecution of violators of this Act and for expenses of collecting said fee. The year for which a fee shall be paid shall begin the July first following the May when it becomes due and end the succeeding June thirtieth. The board may reduce or remit altogether said fee for any year, but such reduction or remission must be made alike to all liable to pay the same. In case any person defaults in paying said fee, his license may be revoked by the Board of Dental Examiners on thirty days' notice in writing from the secretary, unless within said time said

fee is paid, together with such penalty not exceeding ten (10) dollars, as the board may impose. Upon payment of said fee and penalty the board shall reinstate the delinquent's license. On or before the first day of July of each year the secretary of the board shall send to the County Clerk of each county in the State a certified list of all practicing dentists therein who have paid said fee, and the clerk shall enter or paste the same in the register of dentists. Necessary expenses, per diem compensation and mileage of the members of the board incurred while in attendance on meetings not for prosecuting violators of this Act shall be paid out of the other fees and fines provided for in this Act. All moneys received under this Act shall be deposited in some reliable bank in the name of the board, and shall be withdrawn only on the joint check of the president and the secretary of the board. [*Amendment of 1903.*]

SEC. 15. Any and all persons shall be understood to be practicing dentistry within the meaning of this Act who shall for a fee, salary, or reward, paid directly or indirectly, either to himself or to some other person, perform operations of any kind upon, or treat diseases or lesions of the human teeth or jaws, or correct malimposed positions thereof, or display a sign, or in any way advertise himself as a dentist; but nothing in this Act contained shall prohibit bona fide students of dentistry from operating in the clinical departments or the laboratory of a reputable dental college, or an unlicensed person from performing merely mechanical work upon inert matter in a dental office or laboratory; or the student of a licentiate from assisting his preceptor in dental operations while in the presence of and under the personal supervision of his instructor; or a duly licensed physician from treating diseases of the mouth, or performing operations in oral surgery. But nothing in the provisions of this Act shall be construed to permit the performance of dental operations by any unlicensed persons under cover of the name of a regular practitioner of dentistry. [*Amendment of 1903.*]

[*Sections 16, 17, and 18 repealed in 1903.*]

SEC. 19. Any person, company or association shall be guilty of a misdemeanor, and upon conviction thereof shall be punishable with a fine of not less than fifty (50) dollars or more than five hundred (500) dollars, or by imprisonment for not less than five (5) days nor more than six (6) months in the county jail, or by both fine and imprisonment, who

1. Shall sell or barter, or offer to sell or barter, any diploma or document, conferring or purporting to confer any dental degree, or any certificate or transcript, made or purporting to be made, pursuant to the laws regulating the license and registration of dentists; or

2. Shall purchase or procure by barter, any such diploma, certificate or transcript, with intent that the same shall be used as evidence of the

holder's qualification to practice dentistry, or in fraud of the laws regulating such practice; or

3. Shall with fraudulent intent, alter in a material regard any such diploma, certificate or transcript; or

4. Shall use or attempt to use any such diploma, certificate, or transcript, which has been purchased, fraudulently issued, counterfeited or materially altered, either as a license or color of license to practice dentistry, or in order to procure registration as a dentist; or

5. Shall practice dentistry under a false or assumed name; or

6. Shall assume the degree of "doctor of dental surgery" or "doctor of dental medicine," or shall append the letters "D.D.S." or "D.M.D." to his or her name, not having duly conferred upon him or her, by diploma from a recognized dental college or school legally empowered to confer the same, the right to assume said title; or shall assume any title, or append any letters to his or her name, with the intent to represent falsely that he or she has received a dental degree or license; or

7. Shall in an affidavit, required of an applicant for examination, license, or registration, under this Act, willfully make a false statement in a material regard; or

8. Shall engage in the practice of dentistry under any title or name without causing to be displayed in a conspicuous manner and in a conspicuous place in his or her office the name of each and every person employed in the practice of dentistry therein, together with the word mechanic or apprentice after the name of each unlicensed person employed; or

9. Shall within ten days after demand, made by the secretary of the board, fail to furnish to said board the name and address of all persons practicing or assisting in the practice of dentistry in the office of said person, company or association, at any time within sixty days prior to said notice, together with a sworn statement showing under and by what license or authority said person, company or association, and said employé are and have been practicing dentistry, but such affidavit shall not be used as evidence against such person, company or association in any proceeding under this section; or

10. Is practicing dentistry in the State without a license, or whose license has been revoked or suspended. [*Amendment of 1903.*]

SEC. 20. It is hereby further provided, that the conferring of degrees and the bestowing of diplomas, by reputable dental colleges of this State, who have been indorsed by the Board of Dental Examiners of California, and are members of the National Association of Dental Faculties, are not included in the foregoing penalties, nor shall their rights and prerogatives ever be abridged in any manner whatsoever.

SEC. 21. All fines, penalties, or forfeitures, not including the examination fee, imposed or collected for the violation of any of the fore-

going provisions of this Act, unless otherwise specified, shall be paid as follows: One half into the common school fund in the county in which the prosecution is had, and one half to the treasurer of this board, to be turned into the regular funds of this board, and it shall be the duty of the County Treasurer of each county, upon the receipt by him of any such fines, penalties or forfeitures, to forthwith pay over the same one half to the treasurer of this board. Said board, or any member or officer thereof, may prefer a complaint for violation of the law regulating the practice of dentistry, before any court of competent jurisdiction, and may by its officers, counsel, and agents, aid in presenting the law or facts before said court, in any proceeding taken thereon; and it shall be the duty of the District Attorney of each county of this State to prosecute all violations of the aforesaid provisions of this Act in their respective counties in which such violations occur.

SEC. 21½. Any dentist may have his license revoked or suspended by the Board of Dental Examiners for any of the following causes:

1. His conviction of a felony or misdemeanor involving moral turpitude, in which case the record of conviction or a certified copy thereof, certified by the clerk of the court, or by the judge in whose court the conviction is had, shall be conclusive evidence.

2. For unprofessional conduct or for gross ignorance, or inefficiency in his profession. Unprofessional conduct shall mean employing what are known as cappers, or steerers to obtain business; the obtaining of any fee by fraud or misrepresentation; willfully betraying professional secrets; employing directly or indirectly any student or any suspended or unlicensed dentist to perform operations of any kind, or to treat lesions of the human teeth or jaws, or correct malimposed formations thereof, except as heretofore provided in section fifteen; the advertisement of dental business or treatment or devices in which untruthful, improbable or impossible statements are made, or habitual intemperance or gross immorality.

The proceedings to revoke or suspend any license under the first subdivision of section twenty-one and one half, must be taken by the board on the receipt of a certified copy of the record of conviction. The proceedings under the second subdivision of section twenty-one and one half may be taken by the board from the matters within its knowledge, or may be taken upon the information of another. All accusations must be in writing, verified by some party familiar with the facts therein charged, and three copies thereof must be filed with the secretary of the board. Upon receiving the accusation the board shall, if it deem it sufficient, make an order setting the same for hearing, and requiring the accused to appear and answer it at said hearing, at a specified time and place, and the secretary shall cause a copy of the order and of the accusation to be served upon the accused at least ten (10) days before

the day appointed in the order for said hearing. The accused must appear at the time appointed in the order and answer the charges and make his defense to the same, unless for sufficient cause the board assign another day for that purpose. If he do not appear the board may proceed and determine the accusation in his absence. If the accused plead guilty or refuse to answer the charges, or upon the hearing thereof the board shall find them or any of them true, it may proceed to a judgment revoking his license or suspending it. The board and the accused may have the benefit of counsel; and the board shall have power to administer oaths, take the depositions of witnesses in the manner provided by law in civil cases, and to compel them to attend before it in person the same as in civil cases, by subpoena issued over the signature of the secretary and the seal of the board and in the name of the people of the State of California. Upon the revocation of any license, the fact shall be noted upon the records of the Board of Dental Examiners and the license shall be marked as canceled, upon the date of its revocation.

[*New section added 1903.*]

SEC. 22. The members of the Board of Dental Examiners shall make an annual report of its proceedings to the Governor of California by the first of December of each year, together with an account of all moneys received and disbursed by them, pursuant to this Act.

SEC. 23. Four members of said Board of Dental Examiners shall constitute a quorum for the transaction of business at any meeting of the board.

SEC. 24. Nothing in this Act shall be so construed as to interfere with the rights and privileges of physicians and surgeons in the discharge of their duties.

SEC. 25. This Act shall take effect immediately, and all laws in conflict with this Act are hereby repealed. [*Amendment of 1903.*]

CODE OF ETHICS.

TRANSACTIONS OF THE NATIONAL DENTAL ASSOCIATION AT THE FIFTH ANNUAL SESSION HELD AT MILWAUKEE, WISCONSIN, COMMENCING AUGUST 6, 1901.

ARTICLE I.

THE DUTIES OF THE PROFESSION TO THEIR PATIENTS.

SECTION 1. The dentist should be ever ready to respond to the wants of his patrons, and should fully recognize the obligations involved in the discharge of his duties toward them. As they are in most cases unable to correctly estimate the character of his operations, his own sense of right must guarantee faithfulness in their performance. His manner should be firm, yet kind and sympathizing, so as to gain the respect and confidence of his patients; and even the simplest case committed to his care should receive that attention which is due to operations performed in living, sensitive tissue.

SEC. 2. It is not to be expected that the patient will possess a very extended or a very accurate knowledge of professional matters. The dentist should make due allowance for this, patiently explaining many things which may seem quite clear to himself, thus endeavoring to educate the public mind so that it will properly appreciate the beneficent efforts of our profession. He should encourage no false hopes by promising success when, in the nature of the case, there is uncertainty.

SEC. 3. The dentist should be temperate in all things, keeping both mind and body in the best possible health, that his patients may have the benefit of that clearness of judgment and skill which is their right.

ARTICLE II.

MAINTAINING PROFESSIONAL CHARACTER.

SECTION 1. A member of the dental profession is bound to maintain its honor, and to labor earnestly to extend its sphere of usefulness. He should avoid everything in language and conduct calculated to dishonor his profession, and should ever manifest a due respect for his brethren. The young should show special respect to their seniors; the aged, special encouragement to their juniors.

SEC. 2. It is unprofessional to resort to public advertisements, cards, hand bills, posters, or signs, calling attention to peculiar styles of work, lowness of prices, special modes of operating; or to claim superiority over neighboring practitioners; to publish reports of cases or certificates in the public prints; to circulate or recommend nostrums; or to perform

any other similar acts. But nothing in this section shall be so construed as to imply that it is unprofessional for dentists to announce in the public prints, or by cards, simply their names, occupation, and place of business, or, in the same manner, to announce their removal, absence from, or return to business, or to issue to their patients appointment cards having a fee bill for professional services thereon.

SEC. 3. When consulted by the patient of another practitioner, the dentist should guard against inquiries or hints disparaging to the family dentist, or calculated to weaken the patient's confidence in him; and if the interest of the patient will not be endangered thereby, the case should be temporarily treated, and referred back to the family dentist.

SEC. 4. When general rules have been adopted by members of the profession practicing in the same localities in relation to fees, it is unprofessional and dishonorable to depart from those rules, except when variation of circumstances requires it. And it is ever to be regarded as unprofessional to warrant operations as an inducement to patronage.

ARTICLE III.

CONSULTATIONS.

Consultations should be promoted in difficult or protracted cases, as they give rise to confidence, energy, and broader views in practice.

In consultations that courtesy and just dealing which is the right of all should be especially observed.

ARTICLE IV.

THE RELATIVE DUTIES OF DENTISTS AND PHYSICIANS.

Dental surgery is a specialty in medical science. Physicians and dentists should both bear this in mind. The dentist is professionally limited to diseases of the dental organs and adjacent parts. With these he should be more familiar than the general practitioner is expected to be; and while he recognizes the broader knowledge of the physician in regard to diseases of the general system, the latter is under equal obligations to respect his higher attainments in his specialty.

ARTICLE V.

THE MUTUAL DUTIES OF THE PROFESSION AND THE PUBLIC.

Dentists are frequent witnesses, and, at the same time, the best judges of the impositions perpetrated by quacks, and it is their duty to enlighten and warn the public in regard to them. For this and many other benefits conferred by the competent and honorable dentist, the profession is entitled to the confidence and respect of the public, who should always discriminate in favor of the true man of science and integrity against the empiric and impostor. The public has no right to tax the time and talents of the profession in examinations, prescriptions, or in any way without proper remuneration.

REPORT OF PROSECUTIONS BY DISTRICTS.

REPORT OF DR. GEORGE A. WHITE.

The case of R. J. Walker of Imperial was tried last April, and resulted in an acquittal.

W. S. Burnell of Oceanside was arrested in May of this year, and the case was dismissed on error in change of venue.

J. B. Arrellanes of Santa Maria was arrested in May last. He paid his fine and left the State.

J. A. Chappell of Salinas was arrested in May, and was acquitted.

The cases against A. W. McDavitt and F. A. Couch have been in the hands of the District Attorney of San Bernardino County since June, but he has so far declined to prosecute.

REPORT OF DR. A. B. MAYHEW.

D. P. Cameron of Mountain View was arrested in month of February, 1905. He plead guilty in the justice court of Palo Alto township and paid a fine of \$50.

John A. Rice of Los Gatos was arrested in February, 1905. He plead guilty and paid a fine of \$50.

R. G. Moss of San José was arrested in March, 1905. He plead guilty and paid a fine of \$50.

F. P. Chrisman of Santa Cruz was arrested. He plead guilty in the justice court of Santa Cruz township and paid a fine of \$50.

John Doe Jacobs of San José was arrested on June 9, 1905. He deposited a cash bail of \$50 for his appearance before Justice Charles of Palo Alto on June 12, 1905. The case was tried at a later date, and Jacobs was found "not guilty."

W. T. Peoples of Petaluma plead guilty.

W. Stacey of Guerneville plead guilty.

George P. Lovejoy of Petaluma has so far escaped prosecution, the District Attorney preferring to wait until after our December meeting.

REPORT OF DR. C. A. HERRICK.

J. M. Wallace was arrested at Mokelumne Hill, Calaveras County, in June, 1905. He plead guilty in the justice court and was fined \$50, which was paid.

H. G. Nixon was arrested in September, 1905, at Red Bluff, Tehama County. He plead guilty in the justice court and was fined \$50, which was paid.

Attorney R. T. McKisick, of Sacramento, on the 24th of last month reported that the judgment in the case of Edward X. Dias on appeal to the Superior Court was affirmed and that his fine of \$50 had been paid. The same disposition was made in the case of Takakazu Kamikawa in Judge Hart's court on the 18th of November, 1905.

John S. Albergaria was found not guilty in the justice court on May 13th last; and T. Nomura was discharged.

The case of Len King Son, alias B. L. Deane, an Americanized Chinese, and a graduate of the San Francisco Dental College on Folsom street, has been appealed to the Superior Court, and may not be reached until the end of the present month.

There was a peculiar move made in the case of Sydney Root, who entered a plea of guilty and paid a fine of \$50. My attorney informed me that "the court of its own motion set aside the judgment, remitted the fine, and stated that he would suspend judgment in Root's case, pending the outcome of the appeals to the Superior Court." The plea still stands, however, and ultimately Root's money will be paid into the county treasury.

REPORT OF DR. E. G. HOWARD.

Dr. E. G. Howard has secured eight convictions, including those that plead guilty—each being fined \$50. Three cases are still pending. In two of the cases, the Superior Court reversed the judgment of the lower court. The record of each case appears as follows:

N. Araki was arrested June 14th last. He plead guilty, and was fined \$50 in Police Judge Austin's court. The fine was paid.

M. Kuninagu was arrested June 22d last. He plead guilty, and was fined \$50 in Police Judge Chamber's court.

N. Kuns was arrested in January, 1904. The case is still pending.

H. B. Boal was arrested in January, 1904. The case is still pending.

Walter J. Hodson was arrested in January, 1904. He plead not guilty, but changed his plea to guilty on March 8, 1905. He paid a fine of \$50 in the Police Court, and has discontinued practicing.

M. Wright, employed by Dr. G. H. Kriechbaum, was arrested in January, 1904. He plead guilty, and paid a fine of \$50 in the Police Court.

Douglas Creighton, employed by Dr. W. T. Covington, was arrested in January, 1904. He plead not guilty, but changed his plea to guilty on April 16th and paid a fine of \$50 in the Police Court.

J. E. Guthrie was arrested, plead guilty, and was fined \$50.

Lem Sue It was arrested, and convicted in the Police Court, being fined \$100. The case was appealed to the Superior Court and the judgment was reversed.

E. F. Bathrick was arrested. He was convicted and fined \$50 in the Police Court. On appeal, the judgment was reversed. He was again arrested, but the case was dismissed on the score of a faulty complaint. He has left the State.

REPORT OF DR. F. G. BAIRD.

The following cases have been disposed of in San Francisco since December 1, 1905:

J. C. Perry had a jury trial, and was convicted on December 7, 1904, and fined \$50. The case was appealed to the Superior Court, and judgment reversed November 16, 1905.

S. L. Brasch had a jury trial, and was convicted December 16, 1904, and fined \$100. The case was appealed to the Superior Court, and judgment reversed November 16, 1905.

Robert Dunn had a jury trial, and was acquitted February 24, 1905.

H. C. Huck had a jury trial, and was acquitted February 24, 1905.

A. J. Breckenridge had a jury trial, and was acquitted January 6, 1905.

M. H. Schord had a jury trial, and was found guilty May 11, 1905, and fined \$50. The case was appealed.

Jimmy Poy was tried and found guilty May 11, 1905. He was fined \$50.

W. S. Lee was found guilty May 17, 1905, and the sentence was suspended, awaiting the Superior Court decision in another case.

The cases against O. B. Hewitt, Charles Fong, A. J. Breckenridge (second arrest), John Doe Kessling, Valdamar Cavalsky, and John Doe Landon, now under arrest, are pending in the Police Court.

IN DR. COOL'S DISTRICT.

George C. Farmer was arrested, and case dismissed July 22, 1905.

IN DR. DUNN'S DISTRICT.

There have been three arrests, all in Alameda County.

James W. Nordlund was arrested, but has since died.

H. C. Hornef was arrested, and case is pending.

E. Conn has had two trials. On first trial, he was discharged; on second trial, he was acquitted.

SINCE DECEMBER 1, 1905.

Since December 1, 1905, Dr. E. G. Howard of Los Angeles reports that R. D. Haas has been arrested, and that he plead guilty and was fined \$50.

J. R. McCready has been arrested and the case is pending (January, 1906).

Dr. G. A. White of Santa Barbara reports that he has finally succeeded in arresting an illegal practitioner by the name of Graff, and the case is pending. Dr. White has had evidence against this man for some time, but was unable to make the arrest, as the man had left the State.

Several of the illegal practitioners against whom the Board has gathered evidence have either left the State or have come before the Board for examination.

Members of the profession need have no hesitancy about making complaints of illegal practitioners to the Board, as the information will be considered strictly confidential, and the informant will not be used as a witness unless he so desires. All complaints should be made to the Secretary.

GENERAL INFORMATION.

One of the questions submitted to the Attorney-General and referred to in the preceding report was: "Are those portions of Section 14, requiring licensed dentists to pay annual fees and providing for the revocation of licenses in default of payment, constitutional?"

In answering the above question, the Attorney-General gave an exhaustive opinion, closing as follows: "I therefore conclude that the requirement that dentists pay an annual fee is a proper exercise of legislative authority."

Those asking for information should send a stamp for reply.

All money paid to the Board should be sent to the Secretary.

Any one failing to receive an official, numbered receipt for money paid will confer a favor by communicating such fact to the Secretary.

The law does not exempt a non-resident or retired dentist from the payment of the registration fee; however, if he does not wish to keep his license valid in California he may omit paying the fee.

Attention is particularly called to the following portion of Section 15: "But nothing in this Act contained shall prohibit * * * the student of a licentiate from *assisting his preceptor* in dental operations while in the *presence* of and under the *personal supervision* of his instructor." A student performing operations in a separate chair while his preceptor is conducting his own practice, or a student performing dental operations during his preceptor's absence, is violating the letter and the spirit of the law, and may be prosecuted for violating subdivision 10 of Section 19. His preceptor lays himself liable under subdivision 2 of Section 21½.

Diplomas from dental colleges or licenses from other States give their holders no right to practice dentistry in California without first passing an examination.

California does not interchange licenses with other States.

The Board does not give out any questions whatsoever.

In the even years, the summer examination will be held in San Francisco the second Monday in June, followed by an examination in Los Angeles the third Monday in June. In the odd years, the summer examination will be held in Los Angeles the second Monday in June, followed by an examination in San Francisco the third Monday in June. The winter examination will be held in San Francisco each year, beginning the second Thursday in December. Each applicant must come prepared to perform any operation in prosthetic or operative dentistry that may be assigned to him. All work must be done in the

presence of the Board. Applicants must furnish all necessary materials and patients. A complete set of rules and instructions governing the examinations will be given the applicants at the time of the examinations.

The following are the dental organizations in California:

San Diego Dental Society.
 Los Angeles Association of Dental Alumni.
 Alumni Association of the Dental Department of the University of Southern California.
 Southern California Dental Association.
 Santa Barbara County Dental Society.
 Santa Cruz Dental Society.
 Santa Clara Valley Dental Society.
 Alameda County Dental Society.
 San Francisco Dental Association.
 Sacramento Dental Society.
 Humboldt County Dental Association.
 Dental Alumni Association of the College of Physicians and Surgeons.
 Alumni Association of the Dental Department of the University of California.
 California State Dental Association.

Under our present law it is very necessary that the Board should have the correct addresses of all dentists licensed to practice in California, whether they reside in the State or not. The migratory habits of many dentists have made the task of securing change of address a very difficult one. We appeal to every member of our profession to assist the Board in this work.

In March, 1904, T. R. Woollard, who had been refused a temporary license because he had not passed a satisfactory examination, petitioned for a writ of mandate to compel F. G. Baird to issue a temporary license to him. The case has not been pressed to an issue by said Woollard, and is still pending in the courts.

In all suits brought against members of the Board, the attorney fees have been paid by the individual members of the Board, and not from the Board funds.

Since December 1, 1905, the date of the foregoing report, the Board has held an examination; and of the forty-one applicants, the following nineteen were successful and were granted licenses:

Morrison, John B.	Jennings, George P.	Foerster, Adam A. W.
Burkholder, Elmer C.	Peoples, John W.	Wright, Percy B.
Speer, George B.	Townsend, Wilbur	Chandler, Edgar D.
Kaufmann, Emil H.	Whomes, Arthur	Rogers, Wilmer W.
Ditty, Ames	Hopkins, John C.	White, Herbert C.
Beaser, Harry P	Cutler, James W.	Shores, Frank W.
Freeman, Charles E.		

On January 9, 1906, his Excellency, Governor George C. Pardee, appointed two new members of the Board of Dental Examiners of California, viz., Dr. Garrett Newkirk of Pasadena, to succeed Dr. R. H. Cool, term expired, and Dr. Joseph Loran Pease of Oakland, to succeed Dr. J. M. Dunn.

REGISTER OF LICENSED DENTAL PRACTITIONERS.

This Register does not include the names of those who have failed to register their licenses according to Section 10 of the Dental Law.

Name.	Place of Practice.	Name.	Place of Practice.
Abbey, William H.	Oakland.	Aten, R. R.	Fresno.
Abraham, Henry	San Francisco.	Aten, W. O.	San Francisco.
Abrams, George	San Francisco.	Atwater, H. G.	Los Angeles.
Acheson, N. B.	San Diego.	Atwell, Francis	Tacoma, Wash.
Acker, Arthur	Reedley.	Atwood, D. G.	Plainfield, N. J.
Adams, S. H.		Atwood, William A.	San Francisco.
Aiken, George S.	Paia, Maui, H. I.	Auble, E. F.	Adin.
Aiken, P. B.	Jackson.	Austin, A. B.	Long Beach.
Alberti, D. A.	San Francisco.	Austin, W. E.	Modesto.
Albright, F. H.	Red Bluff.	Austin, W. P.	Salinas.
Alderson, J. W.	San Francisco.	Avery, W. N.	San José.
Alexander, M. O.	San Francisco.	Axton, F. R.	San Francisco.
Alger, E. J.	Albuquerque, N. M.	Ayers, C. S.	Oakland.
Allen, Charles A.	Long Beach.	Bachman, C. W.	Los Angeles.
Allen, H. G.	San Francisco.	Bacigalupi, Julia	San Francisco.
Allen, R. H.	Oakland.	Backman, G. S.	San Francisco.
Allen, Mrs. R. McM.	San Francisco.	Bacon, A. A.	
Allen, W. E.	Baltimore, Md.	Bacon, Wm. R.	San Francisco.
Allin, Ernest	Los Angeles.	Badgley, A.	Sanger.
Alonsen, H., Jr.	Ashland, Or.	Badgley, A. R.	
Alsberge, E. W.	Eureka.	Badgley, E. E.	San Francisco.
Ames, G. F.	Oakland.	Baer, Adolph	San Francisco.
Anderson, D. P.	Santa Rosa.	Baer, Julius	San Francisco.
Anderson, F. W.	Winters.	Bagby, H. C.	Santa Maria.
Anderson, R. C.	San Francisco.	Bagley, W. S.	
Anderson, W. H. B.	Los Angeles.	Bailey, A. S.	Los Angeles.
Apablaza, C. J.	Durango, Mexico.	Bailey, G. E.	Whittier.
Arbogast, A. A.	San Francisco.	Bailey, I. R.	Pinole.
Archer, C. S.	Portland, Or.	Bailey, L. C.	Mazatlan, Mexico.
Archer, Ira B.	North San Juan.	Bailhachi, G. E.	San Francisco.
Argall, F. L.	San José.	Baird, E. E.	Sanger.
Armstrong, J. J.	Vallejo.	Baird, Fred G.	San Francisco.
Armstrong, W. H.	San Francisco.	Baird, Mary L.	San Francisco.
Arner, Milton E.	Vallejo.	Baker, A. W.	San Francisco.
Arnold, B. C.	Los Angeles.	Baker, W. A.	Santa Ana.
Arnold, E. B.	Culiacam, Mexico.	Baldwin, C. V.	Los Angeles.
Arnold, Otto		Baldwin, F. M.	San Francisco.
Arnold, F. N.	Sinaloa, Mexico.	Baldwin, I. F.	The Palms.
Arroyo, Jorge	Paris, France.	Ball, A. E.	Redlands.
Asay, Caspar E.	Visalia.	Barber, H. B.	
Ashby, S. J.	San Francisco.	Barber, John	
Ashina, T.	San Francisco.	Barber, W. C.	Downer's Grove, Ill.
Ashley, J. W.	San Francisco.	BarDue, W. N.	San Francisco.
Ashworth, F. D.	San Francisco.	Barham, W. W.	Yreka.
Ashworth, F. P.	San Francisco.	Barker, A. M.	San José.
Assay, J. L.	San José.	Barnett, E. S.	Salt Lake City, Utah.

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.	Name.	Place of Practice.
Barnett, Jos.	Los Gatos.	Blackwell, B. G.	Upland.
Barnes, A. M.	San Francisco.	Blair, C. L. ....	.....
Barnes, Bostwick	Douglas, Ariz.	Blain, J. C.	San Francisco.
Barnes, F. J.	San Diego.	Blaisdell, J. H. ....	.....
Barney, J. C.	Los Angeles.	Blake, A. E.	San Francisco.
Barr, T. I. C.	San Francisco.	Bland, J. H.	San José.
Barrett, C. G.	Eureka.	Bland, O.	San José.
Barrett, T. F.	San Francisco.	Blankman, Wm.	San Francisco.
Barringer, L. ....	.....	Blauer, R. J.	San José.
Bartlett, U. G.	San Francisco.	Bliss, C. L.	Santa Cruz.
Bartram, E. E.	Los Angeles.	Bliss, F. A.	San Francisco.
Basford, C. R.	Lakeport.	Bliss, F. W.	San Francisco.
Bates, C. P.	Ukiah.	Block, Constantin .....	.....
Bauer, Chas. F.	San Francisco.	Block, S. D.	San Francisco.
Bauske, R. E.	Oakland.	Blodgett, J. M.	Lodi.
Baxter, J. C.	Independence.	Blondin, L. D.	San Francisco.
Beach, W. S.	San Francisco.	Bloomer, E. O.	Los Angeles.
Beacom, Chas. W.	Crescent City.	Blossom, May	San Francisco.
Beals, C. H.	Angels Camp.	Blosser, E. E.	Santa Maria.
Bean, G. L.	San Francisco.	Boeseke, B. C.	Santa Barbara.
Beatie, A. L.	Oregon City, Or.	Bogart, S. C.	Los Angeles.
Beazley, W. S.	Los Angeles.	Bonstell, C. L.	Eureka.
Bebb, W. F.	Los Angeles.	Bonham, C. A.	McCloud.
Bedford, L. N.	San Bernardino.	Bonham, J. F.	Sebastopol.
Bedwell, J. L.	Point Richmond.	Bonnell, F. C.	Hollister.
Beem, Guy O.	Los Angeles.	Boone, N. I.	Red Bluff.
Beers, C. J.	Los Angeles.	Borger, J. N.	San Francisco.
Belfils, E. K.	Fresno.	Bostwick, E. C.	San Francisco.
Bell, Chas. H.	San Francisco.	Bourne, R. R.	Hopkinsville, Ky.
Bell, W. J.	Los Angeles.	Bowen, J. J.	New York, N. Y.
Belt, J. G.	Oceanside.	Bowers, R. H.	Sacramento.
Benbrook, C. M.	Los Angeles.	Bowker, R. Edith (nee Turner) ..	Modesto.
Benjamin, C. W.	Geyersville.	Bowman, Amy G.	San Francisco.
Benjamin, E. H.	San Francisco.	Bowman, C. H.	San Francisco.
Bennett, A. G.	San José.	Bowman, I. L.	Nevada City.
Bennett, Guy	Chico.	Boxton, Chas.	San Francisco.
Bennion, S. E.	Hutchinson, Minn.	Boyd, Bert B.	Los Angeles.
Berger, L. O.	San José.	Boyd, E. J. ....	.....
Bergman, N. A.	San Francisco.	Boyd, Ida Menges	Los Angeles.
Bergstrom, G.	San Francisco.	Boyd, S. A.	San Francisco.
Bernheim, J. R.	San Francisco.	Boyens, P. J.	San Francisco.
Berry, Chas. A. ....	.....	Boyes, E. B.	Oakland.
Best, J. P.	Long Beach.	Boyes, H. D.	San Francisco.
Best, B. C.	San Francisco.	Boys, H. S.	Paso Robles.
Bethel, F. J.	Tacoma, Wash.	Bradbury, E. P.	Santa Barbara.
Betterton, E. L.	Korbel.	Brainard, A. D.	Los Angeles.
Bettis, H. S.	Boise City, Idaho.	Bray, Geo. F. I.	San Rafael.
Beverton, D. W.	Pacific Grove.	Breadas, F. C. ....	.....
Biddle, E. W.	Healdsburg.	Breene, F. T.	San José.
Billings, W. M.	Oakland.	Brewer, B. B.	San Francisco.
Bills, A. V.	San Diego.	Brewer, F. A.	King City.
Binney, F. A.	San Francisco.	Bridges, J. S.	Chicago, Ill.
Bird, W. R.	Los Angeles.	Briggs, W. H.	Stockton.
Bishop, M. F.	Alameda.	Brigham, E. T.	Los Angeles.
Black, J. A. ....	.....	Brigham, K. A. ....	.....
Blackburn, D. E.	Pescadero.	Brizius, William J.	Los Angeles.

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.	Name.	Place of Practice.
Broad, E. J.	San Francisco.	Bush, F. J. H.	San Francisco.
Broad, Mrs. E. J.	San Francisco.	Bush, W. P.	Berkeley.
Broadwater, W. E.	Astoria, Or.	Bush, Louis	San Francisco.
Brodbeck, H. W.	Los Angeles.	Butler, W. N.	Hartford.
Brodnax, Bland	Guatemala, C. A.	Butterfield, C. L.	Santa Ana.
Bronson, O. E.	Madera.	Caffarata, A. J.	San Francisco.
Brooks, F. A.	San Francisco.	Cahill, S. D.	San Francisco.
Brooks, F. S.	Martinez.	Calder, H. F.	Los Angeles.
Brooks, J. A.	San Francisco.	Caldwell, C. L.	Ferndale.
Brooks, W. E.	San Francisco.	Caldwell, F. M., Jr.	Mare Island.
Brown, Albert	San Francisco.	Caldwell, W. L.	Stockton.
Brown, Alex.		Caler, P. B.	Los Angeles.
Brown, A. V.	San Francisco.	Callaghan, T. B.	Eureka.
Brown, C. D.	San Francisco.	Callender, M. N.	San Francisco.
Brown, C. H.	San Francisco.	Calmes, H. P.	Courtland.
Brown, E. E.	Fort Bragg.	Camicia, L. S.	Lookout.
Brown, E. J.	Seattle, Wash.	Camp, F. H.	Willits.
Brown, E.	New York, N. Y.	Campbell, R. E.	Watsonville.
Brown, F. T.	Oakland.	Cane, Alfred	San Francisco.
Brown, G. L.	Bakersfield.	Caranza, V. A.	Cocales, C. A.
Brown, Harry G.	Long Beach.	Card, Ira D.	
Brown, Henry	Butte, Mont.	Carew, J. A.	San Francisco.
Brown, Holmes G.	Los Angeles.	Carillo, Y. R.	Los Angeles.
Brown, Horace E.	Los Angeles.	Carlton, H. P.	San Francisco.
Brown, H. S.	Los Angeles.	Carlson, Adam	Los Angeles.
Brown, J. A.	San Francisco.	Carlyon, P. H.	Olympia, Wash.
Brown, James G.	Oakland.	Carmichael, F. E.	Eureka.
Brown, John	Sawtelle.	Carmichael, T. M.	San José.
Brown, M. A.	San Francisco.	Carpenter, B. L.	Porterville.
Brown, William	Calhoun, Ill.	Carpenter, O.	White Lake, N. Y.
Brown, William G.	San Luis Obispo.	Carr, George B.	Sacramento.
Browning, W. F.	San Francisco.	Carroll, J. C.	Sacramento.
Brun, L. E.	San Francisco.	Carroll, J. M.	San Francisco.
Bryant, F. A.	San Francisco.	Carroll, H. H.	San Francisco.
Bryden, N. B.	Sacramento.	Casaday, G. H.	Manila, P. I.
Buck, Kate D.	Los Angeles.	Case, C. E.	
Buckeridge, E.		Case, E. G.	Ukiah.
Buell, E. B.	Escondido.	Casey, T. F.	San Francisco.
Buell, Harry C.	Los Angeles.	Cassily, J. P.	
Bullard, J. A.	Chicago, Ill.	Castle, C. C.	Merced.
Bullock, W. M.	San Francisco.	Cauch, F. L.	San José.
Bundy, L.	Medford, Or.	Cave, D.	Los Angeles.
Bunnell, E. F.		Cavanaugh, C. S.	San Francisco.
Burfeind, W. M. H.	San Francisco.	Chalfant, C. W.	Willits.
Burgess, R. F.		Chalfant, John	San Francisco.
Burke, S. E.	Los Angeles.	Chambers, W. K.	Los Angeles.
Burkholder, Elmer C.	Los Angeles.	Chance, A. W.	Portland, Or.
Burnham, W.	San Francisco.	Chandler, H. S.	San José.
Burns, J. B.	Oakland.	Chapline, W. E.	Los Angeles.
Burns, O. B.	San Francisco.	Chapman, A.	
Burns, P. M.	Eureka.	Chapman, C. W.	Nevada City.
Burns, Robert, Jr.	San Francisco.	Chapman, I. H.	San Francisco.
Burns, R. E.	Los Angeles.	Chapman, Mrs. N. E.	Nevada City.
Burr, R. H.	Stockton.	Chapman, S. A.	Virginia City, Nev.
Burt, F. E.	Los Angeles.	Chappel, H. G.	Oakland.
Burton, Frank	Stockton.	Chappell, J. F.	Vallejo.

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.	Name.	Place of Practice.
Chappell, McCoy	Yerrington, Nev.	Conwell, C. C.	Berkeley.
Charles, M. S.	Alhambra.	Cook, A. R.	Salt Lake City, Utah.
Chase, G. M.	San Francisco.	Cook, Israel	Madera.
Chase, H. E.	Boston, Mass.	Cook, J. A.	Long Beach.
Chase, Maurice		Cook, J. Franklin	Los Angeles.
Chase, W. J.	San Francisco.	Cook, W. E.	Eureka.
Cheadle, E. M.	Roseburg, Or.	Cool, G. W.	Mexico.
Childs, J. E.	Arcata.	Cool, R. H.	San Francisco.
Childs, Mrs. M. M.	Santa Barbara.	Cool, W. P.	San Francisco.
Chilton, Jesse	Fullerton.	Coomes, A. M.	Cloverdale.
Chisholm, A. A.	San Francisco.	Coomes, F. E.	Sacramento.
Chismore, H. J.	San Francisco.	Cooper, A. F.	Arcata.
Christensen, G. A.	San Francisco.	Cooper, A. N.	San Francisco.
Christie, J. E.	San Francisco.	Cooper, E. M.	Napa.
Christopher, T.		Cooper, Geo. W.	
Ciley, J. L.	Maxwell.	Cooper, J. C.	Fresno.
Clark, F. E.	Honolulu, H. I.	Cooper, J. H.	
Clark, W. M.	Stockton.	Cooper, J. H.	Hanford.
Clark, Wm. N.	Los Angeles.	Cooper, M. L.	Modesto.
Clarke, W. H.	Porterville.	Copsey, A. N.	Ukiah.
Clarke, J. P.	San Francisco.	Copsey, H. B.	Eureka.
Clay, E. A.	San Francisco.	Corbett, W. F.	Middletown.
Clayton, W. E.	Los Angeles.	Corbiere, C. C.	Redding.
Clazie, F.	Oakland.	Cornwall, A. T.	Oakland.
Clement, C. E.	San Francisco.	Corwin, Cecil	Haywards.
Cline, F. J.	Covina.	Corwin, Lewis T.	Oakland.
Close, R. M.	Oakland.	Cory, B. B.	Fresno.
Cochrane, E. O.	San Francisco.	Cosad, A. B.	
Cockburn, E. A.	Eureka.	Cothran, M. H.	San José.
Cockerton, D. H.	Oakland.	Coulson, N. T.	San Francisco.
Cockrill, R. B.	Fresno.	Covert, A. T.	Long Beach.
Coe, C. S.	Palo Alto.	Covington, W. T.	Los Angeles.
Coffin, A. M.	Reno, Nev.	Cowan, E. L.	Los Angeles.
Cogswell, Thos.	San Diego.	Cox, G. E.	Los Angeles.
Coke, P. S.	San Francisco.	Cragie, Henry	San Francisco.
Colburn, O. M.	San Francisco.	Craig, H. T.	San Francisco.
Cole, Hiram	Santa Rosa.	Craig, Marion W.	San Francisco.
Cole, C. E.	Riverside.	Craig, W. H.	Oakland.
Colegrove, J. A.	Oakland.	Cranz, L. F.	
Coleman, B. F.	Gilroy.	Cranz, L. T.	San Francisco.
Colestock, L. A.	Pleasanton.	Crawford, E. H.	
Colgan, A. J.	Los Angeles.	Crawford, J. S.	Los Angeles.
Collins, A. W.	Redwood City.	Craycroft, W. W.	Fresno.
Collins, F. E.	Deming, N. M.	Creagh, J. W.	San Francisco.
Collins, G. W.		Criswell, Helen P.	San Francisco.
Collins, M. F.	Oakland.	Criswell, R. B.	San Francisco.
Combs, H. M.	Visalia.	Croall, A. B. P.	Larkspur.
Combs, J. E.	Visalia.	Croft, S.	Los Angeles.
Compton, G. T.	San Francisco.	Cronkhite, J. A.	Los Angeles.
Comte, G. A.	Los Angeles.	Cross, W. W.	
Coney, D. M.	San Francisco.	Crossett, E. T.	Jersey City, N. J.
Congdon, M. J.	Berkeley.	Crossett, Truman	
Conner, E. F.	Dinuba.	Crow, G. M.	Los Angeles.
Conner, G. S.	St. Helena.	Crow, Samuel H.	Sierraville.
Connolly, C. L.	Santa Rosa.	Crum, T. A.	Oroville.
Conradt, H. J.	San Francisco.	Cummings, C. H.	San Francisco.

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.	Name.	Place of Practice.
Cummings, Elizabeth	Berkeley.	DePuy, Lee	Pittsburg, Pa.
Cummings, Jude E.	San Francisco.	Derby, A. J.	Honolulu, H. I.
Cummings, M. F.	Berkeley.	Derby, Albert T.	San Francisco.
Cummings, N. C.	Redwood City.	Deuel, Ernest C.	Sacramento.
Cummings, P. S.	Aguas Calientes, Mexico.	Devlin, Chas. A.	San Francisco.
Cunningham, F. R.	Los Angeles.	DeVere, W. G.	Payson, Ariz.
Cunningham, R. G.	Los Angeles.	Dewey, J. S.	Alturas.
Cunningham, S. J.	San Francisco.	Dewlaney, C. W.	Santa Barbara.
Cureton, Edward	Stockton.	Diamond, P. T.	Chicago, Ill.
Cureton, Horace	San José.	Dick, A. N.	Woodland.
Curragh, J. M.	San Francisco.	Dick, A. Y.	Woodland.
Curran, J. F.	Los Angeles.	Dickover, J. J.	Santa Barbara.
Curtiss, F. A.	San José.	Dillman, I. F.	Pomona.
Cushing, S. R.	San Francisco.	Dimmick, Joseph	Oakland.
Custer, C. A.	Seattle, Wash.	Dimock, H. C.	Lompoc.
Cutlar, R.		Dinsmore, A. N.	Ferndale.
Dahleu, P. J.	Hartford, Conn.	Dixon, M. M.	Los Angeles.
Daly, T. H.	Mt. Carmel, Ill.	Dobbins, J. W.	Grass Valley.
Danforth, H. T.	Oregon.	Dobson, William E.	Los Angeles.
Daniels, G. E.	San Francisco.	Dodell, Xaivier	San Francisco.
Danziger, G. A.	San Francisco.	Dodge, H. D.	Monterey, Mexico.
Darneal, W. E.	San Francisco.	Dodson, E. M.	Sacramento.
Dart, E. K.	Santa Maria.	Dohrmann, William F.	
Davenport, D. D.	San Francisco.	Doll, C. V.	Eureka.
Davidson, J. E.	Oakland.	Dollin, A. F.	San Francisco.
Davidson, Rob		Domeniconi, James	San Francisco.
Davis, Alice M.	Bakersfield.	Donnelly, George S.	San Francisco.
Davis, C. A.	Los Angeles.	Doolittle, C. V.	Pomona.
Davis, C. E.	St. Helena.	Dornberger, E. L.	
Davis, E. L.		Douglas, G.	
Davis, E. N. W.	Tonopah, Nev.	Dovey, W. R.	Petaluma.
Davis, Emile Wm.		Dow, Edgar L.	Oakland.
Davis, F. B.	Oakland.	Dowling, Jerome	Ireland.
Davis, H. C.	San Francisco.	Downing, H. S.	Los Angeles.
Davis, H. E.	Papeeto, Tahiti, S. I.	Doyle, B. W.	Fresno.
Davis, H. P.	San Francisco.	Doyle, E. M.	Sacramento.
Davis, H. S.	San Francisco.	Drucker, A. C.	Fresno.
Davis, S. C.	San Francisco.	Drucker, G. I.	San Francisco.
Davis, W. E.	San Francisco.	Drullard, T. W.	Santa Cruz.
Davy, John W.	San José.	DuBois, C. H.	Sausalito.
Day, R. A.	San Francisco.	Duckett, C. S.	San Francisco.
Deacon, A. P.	Susanville.	Duckett, H. C.	Oakland.
Dean, C. O.	San Francisco.	Dunbar, L. L.	San Francisco.
Dean, G. S.	San Francisco.	Dunbar, P. H.	San Francisco.
Dean, J. S.	Redlands.	Dundass, E. G.	Los Angeles.
Dean, O. S.	Oakland.	Dungan, F. L.	Eureka.
Decker, Chas. W.	San Francisco.	Dungan, G. A.	Eureka.
Decker, J. H.	Point Richmond.	Dunn, J. H.	Pomona.
DeCrow, Warren	San José.	Dunn, John M.	San Francisco.
Deffenbacher, D. S.		Dunn, Martin J.	San Francisco.
Deichmiller, Conrad	San Francisco.	Dunn, R. K.	San Francisco.
Delucchi, J. A.	Sutter Creek.	Durham, J. H.	Irvington.
Deming, R. H.	Visalia.	Dyer, E. C.	San Francisco.
Dempsey, H. E.	Vallejo.	Earl, George W.	Gilroy.
Dennis, Cecil C.	San José.	Eason, J. A.	San Francisco.
Dennis, S. W.	San Francisco.	Eastman, W. W.	Sonora.

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.	Name.	Place of Practice.
Eaton, DuBois.....	Centerville.	Flanders, Geo. H.....	Whittier.
Eddy, E. D.....	Salinas.	Fleckenstein, W. J.....	Palo Alto.
Ede, L. G.....	Reno, Nev.	Fleissner, H. H.....	San Francisco.
Edmiston, B. T.....		Fleming, C. K.....	San José.
Edmonds, J. H.....	Los Angeles.	Fletcher, Thos.....	San Francisco.
Edmonds, J. M.....		Flood, A. M.....	San Francisco.
Edwards, A. L.....	San Francisco.	Flood, Wm. A.....	Huntington Beach.
Edwards, B. F.....		Floyd, M. J. Ayers.....	Kirby, Or.
Edwards, B. F.....	Oakland.	Foerster, A. A. W.....	San Francisco.
Edwards, C. O.....	Oakland.	Follansbee, H. E.....	River Falls, Wis.
Edwards, D. P.....	Crescent City.	Foote, C. I.....	San Diego.
Edwards, J. W.....	San Francisco.	Ford, A. J.....	San Francisco.
Eidenmüller, F. H.....	San Francisco.	Ford, Lewis E.....	Los Angeles.
Eisen, E. G.....	San Francisco.	Forrest, J. M.....	San Francisco.
Eisenbrand, G. F.....		Forrester, H. E.....	Pueblo, Colo.
Eller, H. C.....	Etna.	Foster, H. C.....	La Canared, Mexico.
Elliott, D. C.....	Mayfield.	Fountain, M. F.....	Blue Lake.
Ellis, A. J.....	Pasadena.	Fowler, A. A.....	San José.
Ellis, P. L.....	St. Albans, Vt.	Fowler, J. R.....	San Luis Obispo.
Ellis, W. A.....	San Francisco.	Fowler, W. S.....	San Francisco.
Ellwanger, G. J.....	Lompoc.	Fox, C. E.....	Bakersfield.
Elvidge, G. F.....	Madera.	Fox, C. H.....	Bakersfield.
Elworthy, F. W.....	San Francisco.	Fox, Geo. L.....	Fresno.
Emery, C. A.....	Jamestown.	Fox, H. B.....	Bakersfield.
Engs, John S.....	Oakland.	Fox, J. M.....	San Francisco.
Engstrom, C. J. R.....	Los Angeles.	Frain, C. A.....	Cleveland, O.
Ensign, J. H.....	San Francisco.	Fraser, W. E.....	San Francisco.
Epperson, H. V.....	Compton.	Frazer, I. A.....	San José.
Epperson, J. H.....	Ogden.	Frazer, T. J.....	San Francisco.
Epperson, J. W.....	Los Angeles.	Frazier, S. H.....	Berkeley.
Epsteen, Henry.....	San Francisco.	Frederick, C. J.....	Oakland.
Erhardt, P. C.....	Germany.	Frederick, H. A.....	San Francisco.
Eshbach, D. M.....		Free, G. W.....	Fresno.
Espenosa, M.....	Mazatlan, Mexico.	Freeburger, F. Q.....	Portland, Or.
Estes, W. B.....	San Francisco.	Freitas, E. L.....	Los Angeles.
Evans, A. O.....	San Francisco.	French, A. W.....	Saratoga.
Evans, E. E.....	Oakland.	French, H. W.....	Oakland.
Evans, J. H.....	Highlands.	French, L. W.....	Los Angeles.
Evans, W. H.....	Napa.	Fugler, C. A.....	San Francisco.
Everts, Charles P.....	San Francisco.	Fuller, C. H.....	San Mateo.
Ewing, F. L.....	Blackwell, Oklahoma.	Fuller, F. N.....	Sisson.
Fairweather, N. S.....	Honolulu, H. I.	Fulson, H. A.....	Los Angeles.
Fare, John.....	San Francisco.	Fulstone, J. W.....	Chihuahua, Mexico.
Farley, R. E.....	San Francisco.	Gabbs, E. S.....	Alameda.
Farman, C. E.....	Oakland.	Gabbs, M. F.....	San Francisco.
Farman, C. H.....	Napa.	Galbraith, M. D.....	Tarentum, Pa.
Farmer, E. W.....	San Francisco.	Galbreath, A. J.....	San Francisco.
Ferguson, G. C.....		Galeoto, S.....	San Francisco.
Ferguson, T. H.....	San Francisco.	Gallot, J.....	Sacramento.
Fiddymont, Geo. F.....	Lockport, Ill.	Gallup, Thos. E.....	San José.
Fischer, F.....	San Francisco.	Gambitz, L. R.....	San Francisco.
Fischer, L. W.....	San José.	Gambitz, M. R.....	San Francisco.
Fisher, F. H.....		Gammons, W. E.....	Alameda.
Fitch, O. P.....	Placerville.	Garcia, M. J.....	
Fitch, W. W.....	Pomona.	Gardiner, Thomas.....	Lakeport.
Fitzgibbon, J. G.....	San Francisco.	Gardner, Edmund.....	Redding.

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.	Name.	Place of Practice.
Gardner, R. C.	.....	Gothard, J. T.	Bishop.
Garnett, W. M.	Los Angeles.	Gottenberg, H. W.	Sonoma.
Garrison, D. M.	San Luis Obispo.	Gough, J. F.	San Francisco.
Garrison, D. R.	San Francisco.	Gould, A. D.	Owego, N. Y.
Garrott, A. C.	Los Angeles.	Gove, G. W.	San Francisco.
Garver, W. M.	La Park.	Graham, A. B.	Riverside.
Gaskill, P. D.	San Francisco.	Graham, G. F.	San Francisco.
Gaston, A. A.	San José.	Graham, H. J.	Oroville.
Gaston, W. A.	San José.	Graham, Louis	San Francisco.
Gates, H. E.	San Francisco.	Graham, L. E.	Sacramento.
Gates, Mrs. I. M.	Eureka.	Grant, A. H.	Downieville.
Gates, William G.	Paso Robles.	Grant, F. T.	Healdsburg.
Gautier, L. A.	San Francisco.	Grant, J. T.	Woodland.
Gaylord, H. A.	Pasadena.	Graves, U. L.	.....
Gazarian, H.	Fresno.	Gray, C. F.	Pacific Grove.
Gedge, H. E.	San Francisco.	Gray, D. H.	.....
Geiger, H. H.	Taylor.	Gray, F. A.	Orange.
George, E.	Nome City, Alaska.	Gray, G. W.	.....
Gholson, J. A.	Clarksville, Tenn.	Gray, J. W.	Los Angeles.
Gibson, A. L.	Ukiah.	Gray, John	Tundra, Tex.
Gibson, F. R.	Council City, Alaska.	Gray, W. S.	Marysville.
Gibson, F. W.	Oroville.	Green, M. L.	Oakland.
Gibson, G. W.	.....	Green, W. F.	San Francisco.
Giddings, W. A.	Mountain View.	Greenbaum, L.	San Francisco.
Giffin, R. B.	Sacramento.	Greene, W.	Guatemala, C. A.
Giguette, F. A.	Pasadena.	Greenlaw, H. T.	Superior, Wis.
Gilbert, A. H.	San Diego.	Greenlaw, M. A.	San Francisco.
Gilbert, A. J.	Stockton.	Gresham, J. L.	Coalinga.
Gilbert, C. C.	San Francisco.	Gribbin, J. J.	Philadelphia, Pa.
Gilbert, G. W.	Fresno.	Griesser, A. M. H.	Oakland.
Gilbert, O. C.	Bellingham, Wash.	Griffin, F. M.	Manson, Ia.
Gilbertson, J. C.	Oakland.	Griffith, A. C.	Los Angeles.
Gillespie, D. S.	Los Angeles.	Griffiths, Allen	San Francisco.
Gilman, C. D.	Oakland.	Grimes, A.	Loleta.
Gilman, S. M.	Oakland.	Griner, O. T.	Lakeport.
Gilson, R. E.	Oakland.	Gross, C. F.	Oakland.
Gilstrop, J. M.	Bakersfield.	Grossman, M. E.	Honolulu, H. I.
Ginno, J. W.	San Francisco.	Grotefend, George A.	Redding.
Ginno, L. F.	Berkeley.	Grove, L. H.	Los Angeles.
Girardey, W. O.	Sacramento.	Grove, W. C.	Modesto.
Giusti, J. J.	Berlin, Germany.	Gruss, F. J.	Genesee.
Glasgow, H. J.	Fresno.	Grütner, A. T.	San Francisco.
Glasgow, N. B.	San Bernardino.	Gunsberger, B. M.	San Francisco.
Glasscock, F. A.	Sisson.	Guthrie, John E.	Los Angeles.
Gleason, H. C.	Los Angeles.	Guthrie, T. A.	Woodland.
Glaves, A. D.	Los Angeles.	Guyer, C. N.	Los Angeles.
Glidden, M. D.	Stockton.	Gwin, W. R., Jr.	Los Angeles.
Goe, S. E.	San Francisco.	Gwinn, W. M.	San Francisco.
Gonzales, F. I.	San Francisco.	Haas, M. M.	San Pedro.
Good, C. L.	San Diego.	Hackett, A. E.	San Francisco.
Goode, W. W.	Carson, Nev.	Hackett, C. C.	Napa.
Goodrich, G. A.	Los Angeles.	Hackett, F. M.	San Francisco.
Goodrich, V. A.	San Pedro.	Hackett, S. A.	Oakland.
Goodman, Nye W.	Los Angeles.	Haines, B. W.	San Francisco.
Gore, Arthur	.....	Haines, N. J.	.....
Gorton, C. D.	San Francisco.	Hale, Leon T.	Los Angeles.

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.	Name.	Place of Practice.
Hale, R. L.	San Francisco.	Hauselt, C. P.	San Francisco.
Hall, E. C. ....	.....	Hawley, A. H.	Sacramento.
Hall, R. T.	Fresno.	Hawley, D. E.	Antioch.
Hall, T. W.	Oakland.	Hawver, J. C.	Auburn.
Hall, Walter C.	Petaluma.	Hays, A. P.	Los Angeles.
Hall, W. H.	Denver, Colo.	Hays, H. McD.	Colton.
Hallock, Chas. H.	Los Angeles.	Hays, I. W., Jr.	Grass Valley.
Halsey, N. S.	San Rafael.	Heacock, F. T.	San Francisco.
Halsey, W. H.	Oakland.	Heacock, W. R.	Redlands.
Halsted, E. P.	San Francisco.	Head, A. W.	Vancouver, B. C.
Halsted, J. L.	San Francisco.	Head, T. D.	Redding.
Hambleton, W. D.	Ocean Park.	Head, W. W.	Chico.
Hamilton, Cyrus	Eureka.	Heaney, W. P.	San Francisco.
Hamilton, J. W.	San Francisco.	Hearn, F. G.	Cal.
Hamlin, B. R.	Alameda.	Hedrick, Lyman	San Francisco.
Hammer, H. F.	New York, N. Y.	Heider, W. T.	East Oakland.
Hammond, T. F.	Stockton.	Hein, G. N.	San Francisco.
Hansen, W. A.	San Francisco.	Heino, Julius	Mill Valley.
Hanson, C. T.	San Francisco.	Heinzman, W. H.	Austin, Nev.
Hanson, H. P.	San José.	Heitman, F. W.	Merced.
Harbison, H. R.	San Diego.	Heitman, H. L.	Merced.
Hardcastle, George	San Francisco.	Heller, C. C.	Los Angeles.
Harding, W. C.	San Francisco.	Heller, L. C.	San Francisco.
Hardy, C. S.	San Francisco.	Hempstead, J. E. ....	.....
Hardy, J. R.	San Diego.	Henderson, H. N.	Berkeley.
Hare, D. A.	San Francisco.	Henderson, N.	Alameda.
Hargrave, Walter	Covelo.	Henderson, R. W.	Stockton.
Hargrove, G. H.	Los Angeles.	Henderson, W. D.	Berkeley.
Harms, M. F. E.	Pleasanton.	Henderson, W. R.	Stockton.
Harms, R. G. C.	Oakland.	Hendricks, H. T.	Hanford.
Harnden, F. W.	San Francisco.	Hendricks, Peter	Los Angeles.
Harper, B. W.	Hollywood.	Hennessy, J. C.	Reno, Nev.
Harper, J. A.	Corvallis, Or.	Harvey, Charles Lord	San Francisco.
Harrell, Thomas P.	Los Angeles.	Hebert, C. P.	Riverside.
Harrison, E. L.	San Francisco.	Herbert, E. F.	Santa Barbara.
Harris, G. M.	North San Juan.	Herkner, C. E.	Grass Valley.
Harris, G. N.	Everett, Wash.	Herrick, C. A.	Jackson.
Harris, G. R.	San Francisco.	Herrington, W. M.	San Francisco.
Harris, Isabelle D.	San Francisco.	Hervey, A. R.	Santa Ana.
Harris, M. P.	Grass Valley.	Heseman, C. E.	Riverside.
Harris, S. M.	Grass Valley.	Hesketh, W. R.	Los Angeles.
Harshall, A. K.	San Francisco.	Hewes, R. F.	San Diego.
Harbour, Genette W.	Los Angeles.	Hewitt, H. G.	Healdsburg.
Hart, C. E.	San Francisco.	Hibbard, C. W.	San Francisco.
Hart, O. P.	Needles.	Hickey, Joseph	Portland.
Harth, A. P.	Grant's Pass, Or.	Higby, Nelson G.	Pomona.
Hartman, P. C.	Campbell.	Higgins, C. R.	Fort Bragg.
Harwood, E. M.	Los Angeles.	Higgins, R. M.	San Francisco.
Haselhurst, A. O.	San Francisco.	Higgins, T. S.	San Francisco.
Hasslinger, O. A.	San Francisco.	High, C. B.	Honolulu, H. I.
Hastings, Robert	New York, N. Y.	Hill, A. B.	San Francisco.
Hatch, J. H.	San Francisco.	Hill, A. L. ....	.....
Hatcher, J. H.	Ontario.	Hill, A. S.	San Francisco.
Hathaway, G. E.	Redlands.	Hill, T. L.	San Francisco.
Hathaway, H. W.	Los Angeles.	Hill, W. B. ....	.....
Haughawout, H. C.	Los Angeles.	Hiller, E. D.	Los Angeles.

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.	Name.	Place of Practice.
Hilliker, E. P.	Los Angeles.	Humbelbaugh, A. C.	Los Angeles.
Hinckley, I. L.	Fillmore.	Humphrey, J. G.	San Francisco.
Hines, J. P.	San Francisco.	Hunger, F. J.	Sacramento.
Hines, L. B.	Lodi.	Hunsaker, A. L.	
Hiniker, A. J.	Goldfield, Nev.	Hunsaker, G. W.	Arroyo Grande.
Hinman, A., Jr.	Ashland, Or.	Hurd, E. A.	Hoquiam, Wash.
Hinman, H. T.	Hanford.	Hurd, E. M.	Salem, Or.
Hipkins, Henry	San Francisco.	Hursch, R. L.	San Francisco.
Hirth, C. E.	Vernal, Utah.	Hurt, J. M.	Pomona.
Hirtz, N. F.	Los Angeles.	Hus, F. L.	Oakland.
Hocker, J. M.	San Francisco.	Husted, F. R.	San José.
Hocking, I. C.	San Francisco.	Husted, Guy B.	Modesto.
Hodgen, Jos. D.	San Francisco.	Hutchason, C. B.	
Hodges, George A.	Turlock.	Hutchason, J. E.	Oleta.
Hodghead, W. H.	Mendocino.	Hutchason, W. E.	Los Angeles.
Hoffer, Virgil	Santa Rosa.	Hutchins, J. M.	
Holcombe, John D.	Globe, Ariz.	Hutton, J. A. D.	Berkeley.
Holden, S. R.	Duluth, Minn.	Hyatt, Frank	Los Angeles.
Hofeng, Fred.		Hyde, Edwin C.	Los Angeles.
Holladay, A. C.	Long Beach.	Iglehart, T. N.	San Francisco.
Holladay, W. R.	Los Angeles.	Ingersoll, A. E.	Eureka.
Holland, F. E.	Woodland.	Irgens, L. S.	Oakland.
Hollingsworth, J. W.	Los Angeles.	Ironside, F. A.	Butte, Mont.
Hollingsworth, M. W.	Santa Barbara.	Irving, A. E.	Los Angeles.
Hollingsworth, R. M.	Monterey.	Ivey, J. R.	Nevada City.
Holloway, E. S.	Colusa.	Jackson, J. A.	San Francisco.
Holman, F. D.	Los Angeles.	Jackson, W. N.	San Francisco.
Holmes, C. A.		Jacobs, F. O.	Oakland.
Holmes, L. B.	San Francisco.	Jacobs, Saul R.	San Francisco.
Homan, Wm. W.	Los Angeles.	Jaegeling, J. P.	San Francisco.
Honodel, W. R.	Chico.	James, E. P.	San Francisco.
Hooker, A. O.	San José.	Janes, R. K.	Pasadena.
Hooker, A. H.	San Diego.	Janke, W. E.	San Francisco.
Hooper, Harry	San Francisco.	Jarvis, C. C.	Los Angeles.
Hopkins, E. L.	Fresno.	Jarvis, C. F.	Oakland.
Hopkins, John C.	Los Angeles.	Jeffery, J. A.	Maybert.
Hosmer, Ernest	Los Angeles.	Jenkins, F. M.	San Bernardino.
Houck, F. H.	Anaheim.	Jessup, A. A.	Boise City, Idaho.
Howard, E. G.	Los Angeles.	Jessup, A. H.	Whittier.
Howard, E. J.	San Francisco.	Jessup, J. G.	
Howard, J. L.	Marysville.	Jewell, A. A.	Oakland.
Howard, O. J.	Fresno.	Jewell, W. S.	Oakland.
Howatt, A. B.		Jewett, Stanley	Marysville.
Howatt, G. A.	Scotia.	Johnson, Della M.	Mountain View.
Howe, A. B.	Berkeley.	Johnson, F. D.	San Francisco.
Howe, E. B.	Riverside.	Johnson, J. H.	Wankon, Ia.
Hubbard, Geo. A.		Johnson, J. W.	San Francisco.
Hubbell, A. B.	Santa Rosa.	Johnston, George K.	Santa Maria.
Huddle, W. F.		Johnston, J. H.	San Francisco.
Huddy, Geo. H.	Honolulu, H. I.	Johnston, Robert	Eureka.
Hudgens, A. L.	Tonopah, Nev.	Jones, C. V.	Sonora.
Huebner, O. C.	Healdsburg.	Jones, Ellis	San Francisco.
Huff, W. F.	Riverside.	Jones, E. L.	Jamestown.
Hughes, W. R.	Alameda.	Jones, E. M.	San Francisco.
Hullinger, A. J.	San Francisco.	Jones, H. McK.	Pomona.
Hultberg, F. L.	San Francisco.	Jones, L. D.	San Diego.

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.	Name.	Place of Practice.
Jones, L. G.	San Diego.	Kline, A. E.	Marysville.
Jones, P. C.	Fort Bragg.	Knepper, G.	Los Angeles.
Jones, P. C.	San Francisco.	Knowles, C. W.	San Francisco.
Jones, T. R.	San Francisco.	Knowles, S. E.	San Francisco.
Joost, Anna D.	San Francisco.	Knowles, W. A. L.	San Francisco.
Jordan, Minnie E.	Los Angeles.	Knowlton, J. S.	San Francisco.
Jordan, H. L.		Knox, A. J.	San Francisco.
Josselyn, A. D.		Knox, H. B.	Oakland.
Jurgens, C. H.	San Francisco.	Koehler, Frank.	
Kaschedin, N.	Los Angeles.	Kriechbaum, G. H.	Los Angeles.
Kaufmann, Emil H.	San Francisco.	Kroech, E. C.	Los Angeles.
Kauffung, L. H.	San Francisco.	Kroeck, P. H.	San Francisco.
Keagy, J. M.	San Francisco.	Krueger, O. F.	Healdsburg.
Keene, J. M.	Medford, Or.	Kumle, Lambert.	Dixon.
Keeffe, E. D.	San Francisco.	Kuns, C. A.	Los Angeles.
Keel, C. W.	Sullivan, Ill.	Kuster, C. F.	San Francisco.
Keene, H. H.	Oakland.	Kutch, A. J.	Los Angeles.
Keesing, J. B.	San Francisco.	La Baree, W. H.	San Francisco.
Kelly, A. G.	San Francisco.	Lackey, W. La F.	Porterville.
Kelly, N. D.	Fresno.	Lacoste, H. L.	San Francisco.
Kelley, G. F.	Truckee.	La Force, J. E.	
Kellogg, A. C.	San Francisco.	Lamb, Louis.	Benicia.
Kemp, B. P.	Suisun.	Lamberson, G. E.	Portland, Or.
Kemp, Van Ee F.	San Francisco.	Lancaster, C. E.	Oakland.
Kempe, M. V.	Oakland.	Lane, C. C.	San Francisco.
Kennedy, A. S.		Lane, C. E.	Oregon.
Kennedy, W. F.	Los Angeles.	Lane, C. S.	Santa Barbara.
Kenney, I. B.	Hubbard, Minn.	Lane, F. J.	San Francisco.
Kenworthy, L.		Lane, N. G. McD.	San Francisco.
Keogh, Joseph Benjamin.	San Francisco.	Lane, William R.	San Francisco.
Kertchem, D. J.	Stockton.	Lang, J. E.	Oxnard.
Kerwin, L. J.	San Francisco.	Langdon, F. C.	Los Angeles.
Kestler, F. S.	Sacramento.	Lansdowne, F.	Berkeley.
Ketchum, E. T.	Santa Maria.	Larison, C. A.	Yreka.
Key, J. W.	San Francisco.	Lassen, J. P.	Livermore.
Key, T. B.	Fresno.	Latham, H. E.	Philadelphia, Pa.
Keys, T. R. E.	San Francisco.	Latimer, D. H.	Hanford.
Kimerer, L. L.	Wheatland.	Laughlin, O. A.	
Kincaid, S. W.	Corning.	Laughlin, J. O.	San Francisco.
King, Birdine.	Gridley.	Lawford, C. D. V.	San Jacinto.
King, H. C.	Los Angeles.	Lawrence, W. H.	San Francisco.
King, J. F.	San Francisco.	Lawton, W. J. P.	San Francisco.
King, John J.	Los Gatos.	Leavelle, A. B.	Hollywood.
King, J. S.	Banning.	Ledyard, F. K.	San José.
King, L. A.	Henderson, Ky.	Lee, C. M.	San Francisco.
King, W. Z.	San Francisco.	Leek, G. W.	San Francisco.
Kinley, F. J.	Healdsburg.	Leek, I. G.	San Francisco.
Kirby, A. H.	San Gabriel.	Leek, J. J.	San Francisco.
Kirk, H. M.	Pasadena.	Leighton, C. H.	San José.
Kirkpatrick, H. C.	Santa Cruz.	Lemmon, C. F.	Santa Barbara.
Kirkwood, I. S.	Salt Lake City, Utah.	Lemon, C. H.	Salinas.
Kitchen, C. A.	Los Angeles.	Lemon, G. B.	Salinas.
Kleman, F. C.	San Francisco.	Leonard, C. N.	
Kleiser, G. W.	San Francisco.	Leonard, J. G.	Reno, Nev.
Kleiser, J. A.	San Francisco.	Leonhardi, C. J.	
Klein, N.	Santa Cruz.	Leong, Faith Sai So.	San Francisco.

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.	Name.	Place of Practice.
Leppo, D. H.	Santa Rosa.	MacMullin, D. A.	Orange.
Leslie, E. W.	Pasadena.	MacNevin, G. M.	Vallejo.
Leslie, R. Y.	Pasadena.	McAlpin, Amos C.	San Diego.
Letcher, I. W.	San Francisco.	McArthur, J. F.	Fernando.
Levinger, L. V.	San Francisco.	McAvoy, R. C.	
Leviston, F. E.	San Francisco.	McBain, Jas. A.	Weaverville.
Levkowicz, M. W.	San Francisco.	McCabe, Edward	Watsonville.
Levy, W. H.	San Francisco.	McCan, F. A.	Stockton.
Lewis, J. W. F.	San Francisco.	McCargar, Richard	Red Bluff.
Lewis, M. J.	San Francisco.	McCarthy, C. J.	San Francisco.
Lewis, W. F.	San Francisco.	McCarthy, J. P.	San Luis Obispo.
Lightcap, S. E.	Mobile, Ala.	McCarty, C. H.	Chicago, Ill.
Likens, G. W.	Crockett.	McCarty, W. H.	Chicago, Ill.
Likens, J. W.	San Francisco.	McClish, J. M.	Healdsburg.
Lindsay, J. A.	Sacramento.	McClure, J. F.	Los Angeles.
Lindsey, Charles M.	Santa Monica.	McComb, V. J.	Pine Bluff, Ark.
Linscott, W. R.	Santa Cruz.	McCowan, George	Ukiah.
Litchfield, Oscar J.	Healdsburg.	McCowen, C. S.	Palo Alto.
Little, G. B.	Palo Alto.	McCoy, John C.	Los Angeles.
Littler, S. J. (nee Harris)	Petaluma.	McClinton, Ray	San Francisco.
Litton, C. A.	San Francisco.	McCracken, W. J.	East Auburn.
Lochman, O. G.	Los Angeles.	McCurry, J. M.	San Luis Obispo.
Locke, C. W.	San Francisco.	McDaniel, G. T.	San Francisco.
Locke, F. H.	Oakland.	McDermid, John	
Lockwood, A. T.	Visalia.	McFadyen, A.	San Francisco.
Logan, W. C.	Astoria.	McFarland, G. H.	Pasadena.
Long, G. E.	San Francisco.	McFarlin, R. F.	Oakland.
Lord, Mrs. C. B.		McGaughey, C. W.	Oroville.
Lord, C. C.	San Diego.	McGough, James	San Francisco.
Lord, F. F.	San Francisco.	McGovern, J. C.	San Francisco.
Loring, E. L.	West Berkeley.	McGowan, J. E.	Pomona.
Louissin, W. S.	San Francisco.	McGowan, J. L.	Monterey.
Lovegrove, W. R.	San Francisco.	McGraw, D. F.	San José.
Lovejoy, F. E.	Vallejo.	McIntire, A. A.	
Lovejoy, G. E.	Petaluma.	McIntyre, T. W.	
Lowder, W. D.	Los Angeles.	McKay, W. W.	Philadelphia, Pa.
Lowder, W. L.	Los Angeles.	McKean, N. D.	Alameda.
Lowers, T. H.	Los Angeles.	McKellops, H. L.	St. Louis, Mo.
Lubbock, W. C.		McKenzie, A. W.	San Francisco.
Lucas, G. J.		McKinney, C. W.	Newcastle.
Lucchetti, A. F.	San Francisco.	McLain, A. F.	Santa Rosa.
Luccock, J. P.	Alturas.	McLaren, J. A.	
Luce, George J.	San Francisco.	McLaughlin, G. V.	San Francisco.
Luce, S. T.	Selma.	McLaughlin, W. F.	San Francisco.
Ludlow, William B., Jr.	Berkeley.	McLeod, A. D.	Los Angeles.
Luedke, C. D.	Oxnard.	McLernon, T. J.	Philadelphia, Pa.
Lundborg, J. A. W.	San Francisco.	McMahon, L. J.	San Francisco.
Lundborg, K. M.	Upper Lake.	McMath, J. F. O.	Oakland.
Lundy, E. A.	Adelaide, South Australia.	McMillan, J. E.	Pasadena.
Lyman, E. H.	San Bernardino.	McMurray, M.	San Francisco.
Lynch, T. A.	Downey.	McNeil, H. A.	Virginia City, Nev.
Lynn, T. M.	Los Angeles.	McNutt, R. B.	San Francisco.
Lyons, W. C.	Denver, Colo.	McQueen, J. S.	Bishop.
Macdonald, A. E.	San Francisco.	McQuitty, W. A.	San Francisco.
MacDonald, Flora M.	San Francisco.	McQuilkin, E. R.	Pacific Grove.
MacMillan, H. A.	Ballard, Wash.	McWilliams, W. L.	Mt. Jewett, Pa.

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.	Name.	Place of Practice
Maiden, Wm. R.	Los Angeles.	Meseroll, J. M.	Camptonville.
Maldonado, E.	San Francisco.	Metcalf, F. H.	Sacramento.
Malech, T. G. ....	.....	Metzger, Edwin S.	Calexico.
Mallett, Albert	San Francisco.	Meyer, Albert	San Francisco.
Malone, A. F.	Rio Vista.	Meyer, H. S.	San Francisco.
Malone, G. E.	Dunsmuir.	Meyer, P. J.	San Francisco.
Manchester, M. R. ....	.....	Meyer, W. A.	San Francisco.
Mancilla, M. ....	.....	Meyer, W. P.	San Francisco.
March, H. D.	Chico.	Middleton, J. E.	Nevada City.
Markey, Claude E.	Pasadena.	Miles, A. D. E. ....	.....
Marckres, C. C.	San José.	Miles, H. S.	Los Angeles.
Mariotte, Louis P.	Oakland.	Millar, J. B. F.	San Francisco.
Marizuya, C. J.	San Francisco.	Millar, R. F.	San Francisco.
Marks, L. H.	Oroville.	Millard, G. A.	Los Angeles.
Markwitz, L.	San Francisco.	Miller, G. A.	Los Angeles.
Marsh, C. E.	Santa Clara.	Miller, G. E.	San Francisco.
Marshall, Lewis C.	Vacaville.	Miller, G. G.	Los Angeles.
Martin, F. J.	Oakdale.	Miller, Herman	San Francisco.
Martin, F. P.	Alameda.	Miller, J. A.	San Francisco.
Martin, George	Berlin, Germany.	Miller, O. L.	San Francisco.
Martin, S. D. ....	.....	Miller, W. C.	Los Angeles.
Martin, Todd	Fresno.	Milliken, C. T.	Sacramento.
Martin, Wm.	San Francisco.	Milliken, G. T.	Redwood.
Marx, Monroe L.	San Francisco.	Milliken, H. L.	San Bernardino.
Massie, H. C.	Ætna Springs.	Milliken, J. D.	Iloilo, P. I.
Mathis, R. C.	Monrovia.	Millberry, G. S.	San Francisco.
Matson, A. P.	San Francisco.	Millberry, A. H.	San Francisco.
Matsuda, M.	San Francisco.	Mills, C. W.	Kadiak, Alaska.
Matthews, C. F. ....	.....	Minahen, G. E.	Stockton.
Matthews, E. S.	San Diego.	Minor, H. Everett	Stockton.
Matthews, J. O. B.	Petaluma.	Minor, Isaac Saff	San Francisco.
Mauk, E. H.	San Francisco.	Mitchell, A. B.	San Francisco.
Maunder, P. ....	.....	Mitchell, M. N.	Martinez.
Mayhew, A. B.	Palo Alto.	Moad, Mrs. S. R.	Santa Cruz.
Mayhew, W. H.	San Francisco.	Mobley, W. G.	Oakland.
Maynard, C. C.	San José.	Mogan, C. J.	San Francisco.
Maynard, S. C.	San José.	Molitor, George ....	.....
Mazza, Joseph H.	Petaluma.	Monroe, Geo.	near Yuma, Ariz.
Meek, C. A.	Berkeley.	Montague, James Sears	Los Angeles.
Meek, R. W.	Oakland.	Moody, J. D.	Los Angeles.
Mendes, C. ....	.....	Moody, Kate C.	Los Angeles.
Menendez, H.	Sonora.	Moore, Harry W.	Ocean Park.
Menendez, J. A.	Sonora.	Moore, H. T.	San Francisco.
Menges, M. A.	Santa Ana.	Moore, H. W.	Santa Barbara.
Menken, P. H., Jr.	Sacramento.	Moore, J. C. Y.	Chicago, Ill.
Menton, H. O. F.	Santa Clara.	Moore, J. E.	Watsonville.
Meredith, G. H.	Salinas.	Moore, J. S. Jr.	San Francisco.
Merriman, A. F., Jr.	Oakland.	Moore, L. W.	Antioch.
Merriman, A. F., Sr.	Oakland.	Moore, Roy	San Francisco.
Merriman, W. C.	Oakland.	Moore, T. E.	San Francisco.
Merrill, A. P. ....	.....	Moorhead, T. B.	Whittier.
Merrill, F. B.	Chicago, Ill.	Morey, C. L.	Oakland.
Merritt, C. H.	Oakland.	Morffew, Thos.	San Francisco.
Mertes, J. P.	Los Angeles.	Morgan, A. N.	Nevada City.
Mervy, E. T.	San Francisco.	Morgan, Thos. H.	Los Angeles.
Mervy, Mrs. M. V. (Croall).	San Francisco.	Mories, A. H.	Alameda.

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.	Name.	Place of Practice.
Morris, Amiel	San Francisco.	Ohea, G. H.	San Leandro.
Morris, W. J.	Redlands.	Ohhara, T. H.	Japan.
Morris, C. A.	San Francisco.	Okubo, Ituge	San Francisco.
Morris, R. W.	Los Angeles.	Orella, V. P.	Santa Barbara.
Morris, T. H.	San Francisco.	O'Rourke, William	Oakland.
Morrison, J. W.	Downey.	Osborne, M. Edna	Los Angeles.
Morrison, E. H.	Pomona.	Ostrom, D. A., Jr.	San Francisco.
Morse, W. D.	Pasadena.	Packard, C. W.	Riverside.
Morton, H. R., Jr.	San Francisco.	Packard, Herman R.	Elsinore.
Morton, H. R., Sr.	San Francisco.	Packard, L. M.	Los Angeles.
Morton, R. E.	Dinuba.	Pagne, F. C.	San Francisco.
Mosher, Geo. E.	Pomona.	Painter, E. D. ....	.....
Mosher, G. H.	Los Angeles.	Painter, J. B.	San Francisco.
Moulton, H. G.	Guatemala, C. A.	Palmer, A. H.	Pasadena.
Mueller, A.	Chicago, Ill.	Palmer, Edgar	Los Angeles.
Mueller, F. E.	Los Angeles.	Palmer, F. M.	Los Angeles.
Mulrenin, E. M.	San Francisco.	Pancoast, F.	Benicia.
Mundell, W. A.	San Francisco.	Park, E. E.	San Francisco.
Mungen, W. W.	Los Angeles.	Parker, C. H.	Chicago, Ill.
Munson, V. W.	Quincy, Ill.	Parker, D. S. ....	.....
Murphy, Chester V.	San José.	Parker, E. R.	Brooklyn, N. Y.
Murphy, R. N.	San Francisco.	Parker, Francis M.	Los Angeles.
Musselman, D.	Madison.	Parker, J. A.	San Francisco.
Myers, O. H. P.	San Francisco.	Parker, J. P.	Santa Cruz.
Nash, Dorr E.	San José.	Parker, J. E.	Pasadena.
Neblett, J. W.	Riverside.	Parker, J. Tyler.	Pasadena.
Neel, Ross E.	Los Angeles.	Parker, W. S.	Los Angeles.
Neel, W. E.	Los Angeles.	Parks, E. C.	Modesto.
Nelson, R. W.	San Luis Obispo.	Parks, L. H.	Marysville.
Nelson, W. H.	San Diego.	Parr, E. F.	Visalia.
Nevins, G. F.	San Francisco.	Parr, W. H.	Yreka.
Newbauer, F.	San Francisco.	Parsons, J. G.	San Diego.
Newell, E. W.	Searchlight, Nev.	Parsons, P. M.	Oakland.
Newgarden, Chas.	New York.	Patterson, A. D.	Visalia.
Newkirk, Garrett	Pasadena.	Patton, M. A.	Santa Ana.
Newman, H. C.	Concord.	Payne, C. S.	San Francisco.
Newton, Ernest	Fort Jones.	Payne, R. Eugene	New York, N. Y.
Nicolai, Chas. J.	San Francisco.	Peake, Walter	Biarritz, France.
Noble, C. G.	San Francisco.	Pearce, B. F. ....	.....
Noble, C. S.	Arroyo Grande.	Pearce, C. H.	San Francisco.
Noble, H. D.	San Francisco.	Pearce, C. L. ....	.....
Nordlund, W. J.	Oakland.	Pearce, F. B.	San José.
Novitzky, J. F.	San Francisco.	Pease, J. Loran	Oakland.
Nuckolls, H. H.	San Francisco.	Peel, Jonathan M.	San Francisco.
Numbers, S. Guy	Los Angeles.	Pegot, L. C.	San Francisco.
O'Brien, E. W.	Grass Valley.	Peper, William	San Diego.
O'Brien, J.	San Francisco.	Pepper, C. F.	Los Angeles.
O'Connell, F. E.	Seattle, Wash.	Perkins, E. W.	San Francisco.
O'Connell, George D.	San Francisco.	Perkins, H. F.	Eureka.
O'Connell, Robert E.	San Francisco.	Perkins, P. J.	San Francisco.
O'Connell, T.	San Francisco.	Perrault, J. T.	Los Angeles.
O'Conner, D. L.	Fortuna.	Perren, W. E.	San José.
O'Connor, Delia	Los Angeles.	Perry, E. E.	San Francisco.
O'Connor, J. T.	Healdsburg.	Pershing, R. S.	Riverside.
Ogden, F. R.	Oakland.	Pescia, Attilio F.	San Francisco.
Ogle, William O.	San Francisco.	Peters, A. B.	San Francisco.

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.	Name.	Place of Practice.
Peters, E. K.	Fresno.	Pring, E.	San Francisco.
Peters, Harry C.	Irvington.	Procter, D. A.	Oakland.
Peters, Herman C.	Santa Rosa.	Proctor, M. M. S.	Los Angeles.
Pfister, Joseph	San Francisco.	Proll, R. B.	San Francisco.
Phillips, F. H.	Petaluma.	Prosser, J. L.	Oakland.
Phillips, G. H.	Hanford.	Pruitt, Minnie Fisher	Oakland.
Phillips, H. J.	San Francisco.	Purnell, G. E.	
Philips, R. F.	Los Angeles.	Pyle, Fletcher S.	San Francisco.
Phipps, I. D.	Medford, Or.	Quinne, J. J.	Bella Vista.
Pickett, Burk	San Diego.	Quirk, T. H.	Vancouver, B. C.
Pieper, E. O.	San José.	Rabe, John	Indio.
Piper, S. L.	San Francisco.	Rader, G. O.	San Francisco.
Pirkey, F. Z.	Colusa.	Rainey, T. H.	San Jacinto.
Pirkey, M.	Willows.	Ralls, R. F.	Wichita, Kan.
Pitres, E.	San Francisco.	Ramsey, W. W.	Watsonville.
Pitt, C. S.	San Francisco.	Rankin, J. H.	Santa Rosa.
Place, Lloyd Mills	Palo Alto.	Rantz, W. A.	Placerville.
Platt, F. L.	San Francisco.	Rannells, A. W.	Los Angeles.
Pless, F. G.	San Francisco.	Ransom, Harry E.	Los Angeles.
Pless, H. T.		Ratcliff, A. D.	Dearborn, Mo.
Pletcher, C. B.	Biggs.	Raugh, J. M.	Santa Ana.
Plomteaux, H. J.	Oakland.	Rawlins, G. E.	Orland.
Plunkett, J. A.	Oakland.	Raymond, G. W.	Honolulu, H. I.
Pollok, J. H.		Rea, C. T.	
Pomeroy, G. E.	Oakland.	Rea, F. E.	Ukiah.
Poplin, R. L.	Santa Paula.	Rea, John	
Porter, C. B., Jr.	San Francisco.	Rea, Stanley	
Porter, E. M.	Napa.	Read, Emma T.	San Diego.
Porter, J. P., Jr.	Angels Camp.	Reading, W. W.	San Francisco.
Porter, L. C.	Monterey.	Reamer, H.	Pittsburg, Pa.
Porter, S. P.	Napa.	Redmond, J. M.	Arcata.
Porter, W. S.	Napa.	Redmond, J. J.	San Francisco.
Porterfield, R. H.	San Francisco.	Reed, A. R.	Pomona.
Posner, Milton M.	San Francisco.	Reed, C. W.	Santa Rosa.
Pospisiel, Joseph	Washington, D. C.	Reed, J. H.	
Post, C. E.	San Francisco.	Reed, J. W.	Tahlequah, I. T.
Potter, Fred. W.	Redding.	Reed, U. D.	Los Angeles.
Powel, J. N.		Rees, F. G.	Oakland.
Powell, A. J.	Haywards.	Reese, John S.	Tonopah, Nev.
Powell, Henry, Jr.	Haywards.	Regnart, P. S.	San José.
Powell, J. D.	Sacramento.	Regensburger, A. T.	San Francisco.
Powell, J. N.	San Francisco.	Reich, C. L.	San Francisco.
Power, R. H.	Calistoga.	Reid, H. E.	Reno, Nev.
Prall, J. N.		Reid, T. B.	Sacramento.
Prather, W. J.	Fresno.	Remington, C. L.	
Prather, W. R.	Merced.	Rendall, R. S.	
Pratt, A. C.		Renwick, W. H.	Sacramento.
Pratt, F. E.	Sacramento.	Requa, H. D.	Los Angeles.
Pratt, E. W.	San Francisco.	Reynolds, D. L.	Pasadena.
Preshaw, R. G.	Oakdale.	Reynolds, H. C.	Palo Alto.
Preston, A. P.	Santa Rosa.	Reynolds, P. R.	Santa Ana.
Prey, Otto F.	Salvador, C. A.	Rhoades, R. H.	Manila, P. I.
Price, G. W.	Los Angeles.	Rhoades, S. R.	San José.
Price, J. T.	Los Angeles.	Rhodes, C. E.	Reno, Nev.
Price, W. E.	San Francisco.	Rice, C. E.	Los Angeles.
Prince, A. D.	San Francisco.	Rice, E. V.	Azusa.

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.	Name.	Place of Practice.
Richards, C. W.	San Francisco.	Samuels, L. G.	San Francisco.
Richards, H. G.	San Francisco.	Sand, Joseph E.	San Francisco.
Richards, W. F.	Sacramento.	Sands, D. S.	Los Angeles.
Richards, W. P.	South Pasadena.	Sanderson, A. L.	San Mateo.
Richards, W. H.	Santa Cruz.	Sandford, L. N.	San Francisco.
Richardson, C. C.	Chico.	Sanger, I.	Manila, P. I.
Richardson, E. E.	San Francisco.	Savage, A. H.	Pasadena.
Richardson, E. M.	San Francisco.	Savage, C. W.	Santa Rosa.
Ricks, C. C.	Eureka.	Savage, F. L.	Hollister.
Rietzke, G. C.	San Francisco.	Savage, Henry	
Rinckel, E. J.	Butte, Mont.	Savage, S. L.	Livermore.
Rinebold, J. J.	Etna Mills.	Sawhill, F.	McDonald, Pa.
Ritz, Royal A.	San Francisco.	Sawyer, F. E.	San Rafael.
Roberts, D. E.	Murphys.	Saxby, J. B.	Santa Barbara.
Roberts, H. G.		Saxe, F. J.	Oakland.
Roberts, J. M.	Los Angeles.	Scannavino, John A.	San Francisco.
Roberts, N. J.	Waukegan, Ill.	Schacht, C. W.	Jackson.
Roberts, S. H.	San Francisco.	Schaefer, S. G.	Los Angeles.
Robertson, John	San Francisco.	Scheier, R. B.	San Francisco.
Robinson, F. A.		Scheu, R. E.	San Francisco.
Robinson, F. O.	San José.	Schiffman, A. F.	Los Angeles.
Robinson, R. D.	Los Angeles.	Schiller, Maurice	San Diego.
Robinson, W. H.	Alameda.	Schillig, G. E.	Marysville.
Roche, H. N.	San Francisco.	Schlott, E. F.	San Francisco.
Roche, G. W. W.	San Francisco.	Schmidt, G. L.	Oakland.
Rodden, G. F.	San Francisco.	Schneider, Joe	Mexico.
Rodgers, H. B.	Watsonville.	Schott, W. E.	Berkeley.
Rodolph, C. T.	Oakland.	Schroeder, E. R.	Alameda.
Rodolph, F. E.	San Francisco.	Schroeder, H. C. H.	San Francisco.
Rodolph, G. W.	Oakland.	Schroeder, R. A.	
Rogers, E. J.	Bridgeville.	Schumacher, F.	San José.
Rogers, Guy	San Francisco.	Schumer, A. C.	Oakland.
Rogers, Thos. L.	Berkeley.	Schultheis, C. F.	Oakland.
Rohner, F.	Napa.	Schultze, E. H.	San Francisco.
Rohrer, E. J.	Sigourney, Iowa.	Schwaner, W. F.	Oakland.
Roller, O. P.	Los Angeles.	Schwarz, Charles G.	Oakland.
Romaine, C.	Truckee.	Schwartzschild, F.	
Ronna, Julius	San Bernardino.	Scott, E. W.	San Francisco.
Rood, R. A.	San Diego.	Scott, M. E.	Berkeley.
Root, C. B.	San Francisco.	Scott, C. W.	Fruitvale.
Root, W. A.	Sacramento.	Scott, E. F.	
Roper, R. J.	Prescott, Ariz.	Scott, F. T.	
Rose, F. N.	San Francisco.	Scott, J. M.	Sacramento.
Ross, Donald H.	Los Angeles.	Scott, W. K.	Alameda.
Roth, L. J.	Los Angeles.	Scudder, R. C.	Los Angeles.
Rowand, J. T.		Seager, H. L.	San Francisco.
Rule, R. W.	East Oakland.	Seeley, M. J.	San Francisco.
Rulison, D. W.	Reno, Nev.	Sehorn, W. A.	San Francisco.
Rulison, F. J.	Susanville.	Seibel, P. H.	San Francisco.
Rulison, H. M.	Reno, Nev.	Seiferd, F. J.	San Francisco.
Rulofson, A. C., Jr.	San Francisco.	Semler, Ludwig	
Ruttan, G. M.		Sevier, L. R.	Los Angeles.
Sabichi, J. R.	Los Angeles.	Seydel, F. W.	Willows.
Sabin, C. R.	Calistoga.	Shankey, W. G.	San Francisco.
Salisbury, S. E.	Monrovia.	Sharp, W. F.	San Francisco.
Salmon, William S.	San Francisco.	Sharp, J. G.	San Francisco.

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.	Name.	Place of Practice.
Shartel, W. W.	Lake City.	Smith, Henry Stephen	San Diego.
Shaw, A. A.	Los Angeles.	Smith, J. F.	Los Angeles.
Shaw, F. I.	Seattle, Wash.	Smith, John F.	Forest Hill.
Shaw, H. H.	China.	Smith, Judson G.	Los Angeles.
Shaw, I. G.	Sacramento.	Smith, J. Leroy	Woodland.
Shaw, J. F.	Nevada City.	Smith, J. McC.	Rocklin.
Shellhorn, A. L.	Los Angeles.	Smith, M. E.	San Francisco.
Shepard, E. P.	Los Angeles.	Smith, N. R.	Santa Monica.
Shepard, S. B.	Selma.	Smith, R. E.	Paso Robles.
Shepard, William	Alameda.	Smith, R. E.	Marysville.
Shepherd, G. F.	Anderson.	Smith, R. W.	San Francisco.
Sheppard, H. M.	San Francisco.	Smith, T. M.	San Francisco.
Shepherd, Harris B.	Los Angeles.	Smith, T. Sydney	Palo Alto.
Sherman, C. A.	Los Angeles.	Smith, W. Albert	Los Angeles.
Sheriff, E. W.	San Diego.	Smith, William C.	Pasadena.
Shields, F. M.	Sacramento.	Smith, W. O.	Brooklyn, N. Y.
Shoaff, W. R.	Los Angeles.	Smith, Uriel	Sacramento.
Shoemaker, R. H.	Pasadena.	Smyth, T. U.	Oakland.
Short, E. N.	San Francisco.	Smyth, W. J.	Oakland.
Shuey, G. E.	East Oakland.	Snavelly, A. C.	Los Angeles.
Sibley, R. R.	San Mateo.	Snavelly, M. E.	Los Angeles.
Sibley, W. E.	Los Angeles.	Snell, A. T.	Los Angeles.
Sichel, Henry	San Francisco.	Snook, J. C.	Coquille, Or.
Sichel, Henry, Jr.	San Francisco.	Snow, F. T.	San José.
Sichel, Leo	San Francisco.	Sobey, Arthur L.	Berkeley.
Sichel, Max	San Francisco.	Sobey, A. W.	San Francisco.
Sieberst, W. H.	New York, N. Y.	Soher, H. C.	San Francisco.
Simms, J. B.	Arcata.	Solley, A. A.	San Francisco.
Simms, T. F.	Amador City.	Southworth, S. S., Jr.	Bolinas.
Simmons, B. F.		Southworth, S. S., Sr.	San Rafael.
Simmons, W. A.	Represa.	Sparhawk, E. E.	Oakland.
Simmons, W. H.	Oakland.	Sparks, A. F.	Alameda.
Simons, B. R.	Philadelphia, Pa.	Sparks, E. F. K.	Los Angeles.
Simpson, A. L.	San Francisco.	Sparrevohn, H. R.	Los Angeles.
Simpson, G. W.	Santa Barbara.	Spates, A. P.	Los Angeles.
Simpson, J. H.	Napa.	Spear, T. R.	San Francisco.
Simpson, Jennie M.		Spence, S. J.	Chattanooga, Tenn.
Singleton, W. E.	San Francisco.	Spencer, Roy L.	Rivera.
Sisson, E. K.	San Mateo.	Spiess, G.	San Francisco.
Skillen, R. G.	Pasadena.	Spinks, A. M.	Los Angeles.
Skinner, C. G.	San Diego.	Spinks, M. E.	Los Angeles.
Sloan, J. H.	Santa Paula.	Spinks, W. H.	Los Angeles.
Sloat, C. F.	San Francisco.	Sprague George H.	Ontario.
Small, H. E.	Los Angeles.	Sprake, W. T.	San José.
Small, J. L.	Palo Alto.	Spratt, C. W.	
Smith, A. D.	Los Angeles.	Squier, R. M.	Napa.
Smith, A. L.	Ionia, Mich.	Staire, H. M.	Ventura.
Smith, C. C.	Riverside.	Staire, J. M.	Ventura.
Smith, C. D.	Angels Camp.	Stalder, J. M.	Oakland.
Smith, C. H.	Cloverdale.	Stallman, G. E.	San Francisco.
Smith, C. L.	Tulare.	Stambaugh, C. D.	Los Angeles.
Smith, F. J.	San José.	Stanford, G. G.	San Francisco.
Smith, G. H.	Sausalito.	Stanton, J. C.	Rio Vista.
Smith, Horace A.	Los Angeles.	Stapff, F. W.	San Francisco.
Smith, Harry D.	Alameda.	Stare, Charles B.	Los Angeles.
Smith, H. O.	Nevada City.	Stark, T. A.	Launceston, Tasmania.

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.	Name.	Place of Practice.
Stauter, C. E.	Oakland.	Sylvester, C. W.	Los Angeles.
St. Clair, J. A.	Newman.	Sylvester, H., Jr.	San Francisco.
Stealey, T. S.	San Francisco.	Symington, W. H. L.	Los Angeles.
Steele, Dan L.	Myrtle Point, Or.	Symmons, S. J.	Oakland.
Steinwand, A. R.	Selma.	Taber, M. E.	Riverside.
Stephens, C. J.	San Francisco.	Taft, F. D.	San Francisco.
Stephens, H. H.	San Francisco.	Taggart, John E.	Burlington, Vt.
Stephenson, Harley H.	Sacramento.	Tait, E. R.	Oakland.
Stern, H. S.	San Francisco.	Tait, J. E.	San Francisco.
Stevens, A. J.	Los Angeles.	Takagi, B. S. N.	Los Angeles.
Stevens, C.	Los Angeles.	Talbott, H. I.	San Francisco.
Stevens, F. W. ....	.....	Tate, S. P., Jr.	Oakland.
Stevens, F. E.	Los Angeles.	Tate, A. W., Jr.	Watsonville.
Stevens, H. A.	San José.	Taylor, A. Q.	Los Angeles.
Stewart, J. H.	Downey.	Taylor, A. W.	San Francisco.
Stewart, R.	Chico.	Taylor, C. G.	San Francisco.
Stich, Benjamin M.	San Francisco.	Taylor, F. S.	Los Angeles.
Stickel, J. L.	San Francisco.	Taylor, J. M. ....	.....
Stickney, F. W.	San Francisco.	Taylor, R. L.	San Francisco.
Stile, Henry	San Francisco.	Taylor, W. E.	Alameda.
Stine, F. M.	Spokane, Wash.	Taylor, W. J.	Sacramento.
Stineman, J. H.	Redwood City.	Teague, Fred.	San Francisco.
Stinson, C. G.	Santa Barbara.	Teague, L. A.	San Francisco.
Stirling, M. G. (Fitz.)	San Francisco.	Tennyson, C. B.	Lodi.
Stoakes, F. C.	Oakland.	Tennyson, H. A.	San Francisco.
Stocking, C. H.	Los Angeles.	Thatcher, J. W.	San Francisco.
Stofflet, J. H.	Independence.	Theller, S. S. ....	.....
Stokes, F. R.	San Francisco.	Therkof, Geo. A.	Livermore.
Stokes, T. P.	San Francisco.	Therkof, G. H.	San Francisco.
Stoll, B. F.	San Francisco.	Thomas, A. J.	Sacramento.
Stone, J. T.	Petaluma.	Thomas, C. L.	Escondido.
Stone, W. W.	Placerville.	Thomas, H. B.	Smith's Grove, Ky.
Strickland, S. L.	San Francisco.	Thomas, Jas. Robt.	Ukiah.
Stryker, W. C.	Hanford.	Thomas, Montgomery	Fresno.
Stuart, S. L.	Ventura.	Thomas, W. G.	Grass Valley.
Sturgis, Mrs. A. M. S.	Manila, P. I.	Thompson, R. P. ....	.....
Stuttmeister, W. O.	Redwood City.	Thornburg, F. S.	Pasadena.
Suggett, A. H.	Marysville.	Thrailkell, W. O. ....	.....
Sullivan, A. S.	San Francisco.	Thurston, J. H.	Los Angeles.
Sullivan, H. F.	Oakland.	Tibbetts, A. L.	Petaluma.
Sullivan, J. L.	Marysville.	Tibbitts, A. G.	Los Angeles.
Sullivan, J. P.	San Francisco.	Timerman, E. C.	Oakland.
Sullivan, M. J.	San Francisco.	Timmons, A. J.	Yreka.
Sullivan, T. X.	San Francisco.	Titcomb, C. B. ....	.....
Summers, R. A.	Oakland.	Tizzard, S. B.	Los Angeles.
Sumner, C. M.	Placerville.	Tobriner, Oscar.	San Francisco.
Swain, E. M.	San Francisco.	Todd, Baxter	Los Angeles.
Swain, H. P.	San Francisco.	Todd, C.	Sacramento.
Swain, Homer	Chico.	Todd, P. I.	Los Angeles.
Swanberg, N. A.	Seattle, Wash.	Todd, R. A.	Corona.
Swartwout, L. D.	Los Angeles.	Tolhurst, G. W.	Los Angeles.
Sweetser, L. O.	San Francisco.	Tolhurst, S. H.	Los Angeles.
Swigert, G. O.	Mariposa.	Tolton, Chas. John	San Francisco.
Switzer, Anna ....	.....	Tomkins, G. H.	Oakland.
Sykes, A. E.	San Francisco.	Tomlinson, Chas. McR.	Eureka.
Sylvester, A. J.	San Francisco.	Tope, John H. ....	.....

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.	Name.	Place of Practice.
Toprahanian, A. G.	Colton.	Wagner, A. C. F.	San Francisco.
Toprahanian, H. G.	New York, N. Y.	Wagner, R.	Los Angeles.
Townsend, E. L.	Los Angeles.	Wait, R. L.	Sacramento.
Townsend, J. R.	Pasadena.	Walden, W. A.	Stockton.
Townsend, Wilbur	Los Angeles.	Walk, C. L.	Oakland.
Toye, W. O.	San Francisco.	Walk, Jasper J.	Oakland.
Travers, H. P.	Oakland.	Walker, Lu Ella	Oakland.
Treen, Robt. deG.	Los Angeles.	Walker, C. H.	Los Angeles.
Treen, T. O.	Los Angeles.	Walker, G. H.	
Tremper, R. H.	Ontario.	Walker, J. T.	Hansonville.
Treyer, E. J.	San Francisco.	Wall, A. C.	Honolulu, H. I.
Tristram, G. T.	Chicago, Ill.	Wallace, A. H.	San Francisco.
Trueman, H. G.	San Francisco.	Wallace, L. E.	San Francisco.
Truesdell, E. C.	Los Angeles.	Wallace, W. G.	Stockton.
Trumpour, J. P.	San Francisco.	Walsh, J. W.	Oakland.
Tryon, W. M.	San Francisco.	Walsh, R. L.	San Francisco.
Tucker, A. C.	Los Angeles.	Walsh, W. E.	San Diego.
Tucker, I. L.	Oroville.	Walton, P. J.	Fruitvale.
Tudor, J. P.		Walton, S. L.	San José.
Tufts, J. B.	San Francisco.	Walton, W. McK.	San Francisco.
Tufts, LeRoy	Berkeley.	Waltz, George W.	
Turner, H. C.	San Andreas.	Wanberg, G. E.	Marshalltown, Ia.
Turner, P. T.	Stockton.	Ward, A. W.	San Francisco.
Turner, R. L. H.	Los Angeles.	Ward, H. B.	San Francisco.
Turner, W. A.	Santa Maria.	Ward, J. N.	Auburn.
Twiggs, W. A.	San Francisco.	Wardlaw, H. J.	San Francisco.
Twist, J. F.	San Francisco.	Ware, William H.	Fort Logan, Colo.
Ulsteen, E. A.	Oakland.	Warnekros, W. L.	Santa Barbara.
Upham, F. F.	Dixon.	Warner, A.	San Francisco.
Upton, E. A.	Oakland.	Warner, John	
Urmy, H. N.	Los Angeles.	Washer, W. A.	
Van Amringe, D. R.	Sonoma.	Wasley, D. M.	Chico.
Van Crom, A. Q.	Alameda.	Wasson, J. C.	San José.
Vanderlip, G. G.	San Rafael.	Wassman, Max	San José.
Vanderlip, J. T.	San Francisco.	Waterbury, J. E.	Paso Robles.
Vandever, G. Y.	San Francisco.	Waterman, E. R.	San Francisco.
Van Meter, W. H.		Watkins, Annie Ramburger	
Van Orden, G. N.	San Francisco.	Watkins, F. D.	St. Helena.
Van Orden, L.	San Francisco.	Watkins, W. H.	San Francisco.
Van Vleck, J. D.	Los Angeles.	Watts, Lewis W.	Riverside.
Van Wormer, E. B.	Upland.	Wayne, A. F.	Redlands.
Van Wyck, Crittenden	San Francisco.	Weaver, C. R.	Gilroy.
Veale, A. F.	San Francisco.	Webster, F. E.	Suisun.
Vecki, V. J.	Oakland.	Weisbach, Lewis Charles	San Francisco.
Verrinder, A. E.	Victoria, B. C.	Weldon, C. A.	Vacaville.
Victor, E. R.	Bakersfield.	Weldon, E. J.	Sacramento.
Viney, A. W.	San José.	Weldon, J. A.	Sacramento.
Vogel, Thomas A.	San Francisco.	West, R. C.	Tracy.
Vogelman, D. J.	Vallejo.	Weston, C. S.	Oakland.
Voorhies, G. L.	Vallejo.	Weston, W. H.	Australia.
Vorwald, T. F.	Dubuque, Iowa.	Westphal, E. W.	San Francisco.
Wachs, M.	Chico.	Westphal, O. F.	San Francisco.
Wachhorst, N. B.	San Francisco.	Weyer, G. A.	Modesto.
Wadleigh, W. M.	San Francisco.	Wheeler, T. R.	San Francisco.
Wadsworth, W. H.	Berkeley.	Whelan, W. A.	San Francisco.
Waggoner, Lloyd B.	Sacramento.	Whitcomb, N. T.	San Francisco.

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.	Name.	Place of Practice.
Whitcomb, S. E.	San Francisco.	Wing, George	Ferndale.
White, A. L.	San Francisco.	Wing, William	Eureka.
White, C. M. Jr.	Chico.	Winter, J. W.	San Francisco.
White, G. A.	Santa Barbara.	Wise, Fannie E. (Scott)	Oakland.
White, Herbert C.	Vallejo.	Wisner, P.	San Francisco.
White, J. M.	Los Angeles.	Wolf, F. O.	Yokohama, Japan.
White, J. R.	Los Angeles.	Wolfe, F. DeK.	Fresno.
White, L. L.	Pendleton, Or.	Wood, A. B.	
White, R. W.	Eureka.	Wood, C. C.	Oakdale.
Whitenack, C. A.		Wood, William	Sacramento.
Whitman, E. W.	Oakland.	Woodward, W. S.	
Whitney, E. O.	Seattle, Wash.	Woolley, P. J.	Monterey.
Whittaker, E. E.	Fresno.	Woolsey, E. G.	Ione.
Whitted, Charles	Santa Ana.	Woolsey, R. I.	Berkeley.
Whitted, R. E.	Santa Ana.	Worral, G. H.	Santa Clara.
Whomes, Arthur	Los Angeles.	Worthington, J. I.	Upper Burmah, B.I.
Whomes, George	Los Angeles.	Worthington, M. M.	Bakersfield.
Whomes, R. W.	Los Angeles.	Worthley, A. H.	
Wieder, J. E.	San Francisco.	Wren, J. S.	Loyalton.
Wilbur, P. S.	Bakersfield.	Wright, A. O.	Stockton.
Wilcox, W. C.		Wright, B. E.	Portland, Or.
Wilcox, W. I.	San Francisco.	Wright, Percy B.	Los Angeles.
Wilcoxon, C. R.	Woodland.	Wright, R. B.	Oakland.
Wild, M. C.		Wright, W. S.	San José.
Wilder, D. R.	Los Angeles.	Wuillemin, P. M.	San Francisco.
Wiley, J. N.		Wyatt, M. O.	Winters.
Wilkins, F. E.	Oakland.	Wymore, G. H.	Santa Rosa.
Wilkins, P. J.	Colusa.	Yant, G. A.	San José.
Willard, S. S.	Corona.	Yant, H.	Leadville, Colo.
Williams, Carlos	Lincoln.	Yates, L. G.	Santa Barbara.
Williams, C. C.	Whittier.	Yemen, J. P.	Yuma, Ariz.
Williams, E. G.	Oakland.	Young, H. G.	San Francisco.
Williams, Ernest Guy	Lodi.	Young, J. A.	San Diego.
Williams, J. J.	Pacific Grove.	Young, J. E.	San Francisco.
Willsey, T. F.	Napa.	Young, J. R.	Chico.
Wilson, C. H.	Philadelphia, Pa.	Younger, W. J.	Paris, France.
Wilson, Charles W.	San Francisco.	Younger, E. A.	San Francisco.
Wilson, H. D.	Los Angeles.	Yount, G. B.	San Francisco.
Wilson, J. F.	Jackson.	Zeigler, C. L.	San Francisco.
Wilson, M. W.		Zeller, M. J.	San Francisco.
Wilson, O. T.	Oakland.	Zesch, L. Von M.	San Francisco.
Wilson, W. C.			

DECEASED LICENTIATES.

Adams, Q. L.	Drucker, W. E.	Lawrence, George O.	Russell, E. W.
Austin, H.	Dutch, William	Lee, D. B.	Rubell, W. H.
Arbeely, H. J.	Dyer, J. J.	Lee, E. W.	Quick, E. P.
Barradas, F. C., Jr.	Dorrance, F. C.	Lee, L. A.	Saul, G. M.
Bates, B. F.	Doyle, J. H.	Libby, J. L.	Saul, O. M.
Baynes, H. F.	Emerson, E. W.	Light, W. W.	Sheets, H. Clay.
Beers, Barrett	Esterle, A. M.	Lightbody, H., Jr.	Shrewsbury, N.
Bendix, C. W.	Farnsworth, J. F.	Lilliard, W. F.	Simms, C.
Bernard, George	Fickett, S. H.	Little, F. F.	Smith, F. Z.
Bernard, H. A.	Finigan, L.	Little, J. R.	Smith, J. B. M.
Bertrand, E. H.	Fitzpatrick, W. E.	Livermore, G. W.	Smith, W. B.
Birge, J. J.	Forbes, W. W.	Lucas, D. L.	Stephenson, C. H.
Blake, C. E.	Gates, O. J.	Marshall, Mabel E.	Spaw, C. R.
Blake, R. J.	Gibbon, J. A.	McCargar, P.	Strain, E. L.
Blondin, Arthur	Gildea, B. M.	McGettigan, C. A.	Stealey, E. M.
Blood, J. N.	Goddard, C. L.	Mitchell, H. H.	Stauffer, H. W.
Bolton, Thomas	Gonzales, I. F.	Moad, B. R.	Sublett, W. A.
Bometter, Frank	Goodell, L. E.	Moore, C.	Swift, T. E.
Botsford, George	Gordon, O. L.	Moore, J. S.	Swigert, H. I.
Bowles, J. B.	Gould, H. W.	Moore, W. A.	Stanley, W. H.
Boyd, C. W.	Gray, R. F.	Moterne, C. F.	Taggart, D. R.
Boyd, G. H.	Gray, W. O.	Moulton, C. R.	Thrall, H. H.
Brewer, John L.	Griswold, W. F.	Musselman, S.	Tulles, Morgain
Briggs, C. M.	Hatcher, S. H.	Neumann, L.	Tebbetts, F. F.
Brower, R. C.	Hann, W. D.	Newsom, G. W.	Tyson, Charles.
Bryan, A. C.	Harlan, C. N.	Norman, George H.	Upchurch, N. B.
Burnette, E. F.	Hart, A. C.	Nye, W. E.	Van Ankin, J. R.
Burch, M. A.	Hartman, W. P.	Oviatt, S. M.	Van Bonhorst, C. G.
Burleson, F. D.	Hendricks, J. D.	Parsons, M. W.	Van Winkle, H. M.
Cafferato, A.	Herron, H. H.	Pennington, A. R.	Verrinder, R. T.
Card, William H.	Hitchcock, J. W.	Pendleton, B. F.	Vidaver, N. J.
Case, George A.	Hodgen, I. N.	Petton, L. D.	Wade, Thomas
Case, I. M.	Hoffman, M.	Pierson, H. H.	Walker, A. J.
Caldwell, F. M., Sr.	Holmes, Stephen	Perkins, C. O.	Ward, S. T.
Clark, F. N.	Horner, J Van C.	Porter, J. S.	Webster, L. D.
Clarke, M. E.	Hyde, A. T.	Porter, J. M.	Westover, G. C.
Cogswell, J. L.	Hyde, C. G.	Ray, C. B.	Wells, L. W.
Cole, R. E.	Jacobs, B. R.	Rau, Henry	Whipple, T. S.
Cranz, F. H.	Jennin, E. L.	Read, W. S.	Whitlock, Alma
Croome, William	Jenkins, O. C.	Reith, W. C.	White, F. H.
Davenport, A. C.	Kingsbury, W. B.	Relley, J. W.	Wilbert, J. L.
Dentler, E. F.	Knapp, A. R.	Remington, J. W.	Williams, V. A.
Dempster, James	Knox, H. E.	Ross, C. G.	Winter, W. G.
Dick, W. A.	LaDue, W. K.	Rogers, E. P.	
Doulton, G. H.	Larkin, George W.	Rogers, F. S.	

REPORT
OF THE
STATE VETERINARIAN
OF
CALIFORNIA

For the Two Years Ending June 30, 1906

CHARLES KEANE, State Veterinarian



SACRAMENTO:

W. W. SHANNON, : : : SUPERINTENDENT OF STATE PRINTING.
1907.

REPORT OF THE STATE VETERINARIAN.

*To His Excellency, GEORGE C. PARDEE,
Governor of California.*

DEAR SIR: I respectfully beg leave to submit my report as State Veterinarian for the two years ending June 30, 1906.

During the two years just past our efforts to thoroughly organize the work of this department have been productive of good results. The Legislature of 1905, at my request, enacted an amendment to the County Government Act authorizing Boards of Supervisors, in their discretion, to appoint county inspectors to coöperate with the State Veterinarian in the control and eradication of infectious diseases of live stock. Practically all of the counties situated in the central and southern portions of the State complied with this Act, and they have also adopted uniform county live stock ordinances.

The Legislature of 1905 also provided this department with an assistant. The services of this assistant, Dr. W. E. D. Morrison, who is stationed at Los Angeles, have materially assisted the development of this work. New work has been taken up in counties where practically nothing had been done heretofore, especially in the work of eradicating the cattle tick. As the territory of this State is large, and the calls upon this office must be answered promptly, the appointment of Assistant State Veterinarian has been of material benefit to the live stock interests.

It is easy to underestimate the importance of this branch of the public service. But when a serious disease has obtained a foothold among the live stock of some locality, then the public realizes to what extent it is dependent upon our services.

In addition to the work of control and eradication of diseases of live stock, and making inspections for shipments in conformity with State and county regulations, this department has been instrumental in the organization of stock owners into associations for the purpose of coöperating with us in our line of work. Another association, composed of officials engaged in live stock sanitary work, was organized under the name of the California Live Stock Sanitary Association. These organizations have been productive of much good to the live stock interests of the State.

This department is of comparatively recent origin, the office of State Veterinarian having been created by the Legislature of 1899. While

the law creating the office provides, in a general way, for the duties of the State Veterinarian, his legal status in the work of eradicating certain infectious diseases is not specific enough; and for that reason I would respectfully recommend that the next Legislature grant us the necessary authority to eradicate infections where recalcitrant parties will not follow our instructions. For example, under the present law we have the authority to establish and maintain a quarantine on a ranch infested with cattle ticks (*Boophilus annulatus*), but our right to eradicate these ticks without the owner's coöperation is questionable. These cattle in question may be what we term immune cattle; that is, they may carry the fever ticks and will not contract Texas fever. The owner of the cattle may have no desire to move the cattle from his own ranch which is under quarantine, and consequently the established quarantine does not affect him. At the same time there is always the possibility of some of these cattle breaking through his fences and infecting other clean ranches.

TEXAS FEVER.

The most important work, from an economical standpoint, that this department is pursuing is the control and eradication of the cattle tick (*Boophilus annulatus*), the carrier and transmitter of Texas splenic, or southern cattle fever. During the past two years this work has been vigorously prosecuted in every infested county in the State.

During the present year all of Merced County and a portion of Madera County were placed above the State and Federal quarantine lines.

In that portion of Madera County which was not taken out of quarantine there was only one focus of tick infestation. This infested ranch consists of some 100,000 acres or more, and early in the present year all of the cattle and horses were taken off of the infested fields after the cattle had been dipped in oil in order to destroy the ticks remaining on them. After a sufficient length of time the ticks remaining on the fields would die from starvation. But unfortunately during early summer considerable of this property was flooded and cattle were again brought on to the infested fields, thereby setting our work back in that section for one season.

In Fresno County in the neighborhood of Laton and Riverdale one ranch on which the process of tick reclamation was progressing favorably was also flooded for a time, with the misfortune that the cattle from this infested ranch broke through the fences and infested several other small dairy ranches. However, this is now entirely under control, and reclamation work is being pursued on these as well as several other small foci of infestation in this district. The balance of Fresno County is free from ticks.

Kings County is now entirely free from Texas ticks. It is not advisable to remove this county from the quarantine area until the counties north of Kings are clean.

In Tulare County there are three ticky ranches, on which all necessary work is being done, with the prospects of having them clean this winter.

Kern County has also now only three small foci of infestation, on which we have been working during the past year.

In San Luis Obispo County, in that strip of territory west of the backbone of the Santa Lucia range of mountains, there is considerable tick infestation on the small dairy ranches. During the past two years many dipping plants have been built there, and tick eradication work is being vigorously prosecuted.

In Santa Barbara, Ventura, Los Angeles, San Bernardino, Orange, Riverside, and San Diego counties considerable tick infestation exists. While much improvement has been noted in some of these counties during the past two years, there is considerable work ahead to be done in this line of tick eradication.

Only one infraction of the State quarantine was called to the attention of this department during the two years just past. One of our large cattle outfits moved some cattle from Fresno County into Monterey County (Monterey County is above the State and Federal quarantine line) without first securing permission from this office. Complaint was sworn to by the State Veterinarian in Salinas, and after considerable delay the defendant plead guilty to the charge and was fined \$100 and costs. I have also urged the prosecution by county authorities of several individuals who have infringed county live stock ordinances, and convictions were secured in each case. This is very unpleasant work, but it becomes necessary from the fact that if our quarantines are not maintained the work retrogresses and stock interests suffer.

While maintaining a State quarantine against all cattle in the infested counties, we also establish quarantines on the individual ranches in the quarantined area, thereby not only is territory outside of the quarantined area protected, but the clean ranches in the quarantined area as well. By a strict maintenance of these quarantines losses from Texas fever in the quarantined area have been reduced greatly, and no outbreaks have occurred outside of the quarantined area.

During the last session of Congress the Bureau of Animal Industry, U. S. Department of Agriculture, received an appropriation of approximately \$80,000 for use in the eradication of cattle ticks in those states and territories that have adequate laws on the subject, and whose officials would coöperate with the Federal authorities in this work. I corresponded with the Chief of the Bureau of Animal Industry with

the end in view of obtaining a part of this assistance, and later received the following reply:

DR. CHARLES KEANE, *State Veterinarian,*
Sacramento, Cal.

SIR: This Bureau is in receipt of your letter of the 29th ultimo respecting the eradication of cattle ticks in California, and your purpose to apply to the Department for the release from quarantine of several counties in the San Joaquin Valley next year. It is noted you state that while the State of California has no law compelling the owners of infected ranches to clean same, yet the State authorities place restrictions on the movement of infected cattle, thereby stimulating the efforts of the owners to eradicate infection, and further, that the stockmen of that State are alive to the situation and will render all the assistance required. Under these conditions it appears that profitable work in tick eradication can be accomplished in your State during the present season; yet it is to be hoped that by another year adequate legislation will have been enacted and funds provided for the work in that State. The State laws should give to local officials authority to enter premises, to inspect live stock and enforce quarantine, which may include single farms or districts defined by county or other boundary lines, and to control the movement of live stock. Such officers should be empowered to enforce disinfection of animals and premises by the application of parasiticides or by other practicable means, such as changing animals from one inclosure, field, or premises to another, as may be necessary. The laws should also give authority to State officials to issue rules and regulations to establish and maintain quarantine, as above indicated, and also to confer authority upon Federal representatives to act as officials of the State in such matters. In this connection a general stock law is considered eminently important.

For the purpose of coöperating with your State in eradicating cattle ticks, the Bureau will detail Dr. Wm. M. Mackellar, inspector, to assume immediate charge for the Bureau of tick eradication in the counties which you desire to have released from quarantine the coming year. Dr. Mackellar will be instructed to confer with you at Sacramento regarding different phases of the work it will be practicable to do during the present season. Other inspectors will be assigned to duty in that State under Dr. Mackellar.

Very respectfully,

A. M. FARRINGTON,
Acting Chief of Bureau.

Subsequently nine Federal inspectors were detailed by the Bureau of Animal Industry to this State to coöperate with us in tick eradication work, and in the short period they have been here this year the results have been extremely gratifying. As the Department of Agriculture insists on adequate State laws and thorough coöperation, it will rest with the coming Legislature to give us this assistance in order that this work shall be continued next year. From the manner in which this work is now progressing it is only a matter of a few years when this State will be entirely free from cattle ticks.

ANTHRAX.

Several outbreaks of this disease have occurred during the past two years. This disease is mostly confined to the bottom lands along our large waterways. One severe outbreak took place on a farm close to the City of Napa during the fall of 1905. About one hundred head of

cattle and horses succumbed. When I visited this place I found that a number of the carcasses had been skinned and delivered to a nearby tannery. Other gross infractions of sanitary laws had taken place also. Skinned carcasses were dragged over the county roads and thrown into ditches, from which places there was great danger of the infection being carried to neighboring farms during the winter rains. I removed the hides from the tannery and ordered them cremated; the carcasses were also cremated. As anthrax is communicable to the human family even through the skin of an animal after it has been manufactured into leather, great care must be taken in the cremation of the entire carcass. When the carcasses of animals which have died from anthrax are left lying upon the ground the contagium will remain in the soil for years, and there is great danger of it being carried by animals or birds or by water to neighboring places. The destruction of all carcasses by cremation is the plan adopted by this department.

On several large cattle ranches where anthrax has been an annual visitor for years past, and where the losses have been extensive, it is now the plan to remove the cattle from the infected fields during the late summer and early fall. This disease usually makes its appearance at about the same time each year, and at this time the feed is usually well eaten off, so that the stockman suffers very little loss of forage from this procedure. When the cold weather comes on cattle can again be placed on these fields with comparative safety. Where this change of pasture can not be accomplished preventive vaccination is practiced, with a little success.

BLACK LEG.

Black leg, also termed black quarter and symptomatic anthrax, is a disease that attacks young cattle, and in former years was the cause of severe losses in this State. Veterinary science has developed a system of preventive vaccination against this disease, which, if properly and systematically performed, reduces fatalities to a minimum. The losses in this State are very light, as vaccination is universally performed by stock owners.

CONTAGIOUS ABORTION IN COWS.

During the summer of 1905 a severe outbreak of contagious abortion occurred among the dairy cows at the Napa State Hospital for the Insane. This disease had gained considerable headway when I visited the hospital, and before the trouble was checked the majority of the milch cows had aborted. While it is seldom that a fatality occurs from this disease, it has a decided economic importance from the fact that after abortion many of the cows dry up in their milk supply for an entire season. There is always a tendency left in these cows to abort again the next season. The disease is very pernicious in character, and

being infectious must be combated by scrupulous cleanliness of the dairy barn and surroundings, and liberal use of disinfectants.

HOG CHOLERA.

The losses from hog cholera have been greatly lessened during the past two years, few outbreaks having been reported. This is entirely due to the fact that hog-raisers recognize the infectious character of this disease, and consequently adopt the usual sanitary precautions to prevent the introduction of the infection into their herds.

SHEEP SCABIES.

The sheep industry in this State has experienced considerable prosperity during the past few years. Feeding conditions have almost universally been good, with a brisk demand and good prices for both mutton and wool. Still, the presence of scabies or mange in many of our flocks has reduced the profits that otherwise would have occurred if the sheep were clean. This affection is a serious menace to the sheep industry of this as well as other Western states. Sheep do not fatten so readily when affected with scab, and if the disease is advanced to any great extent it is sometimes the occasion of fatalities. It also affects the wool clip in both quantity and quality. The disease is easily eradicated from a flock by thorough and systematic dipping. A thorough State inspection and supervision of sheep shipments is an absolute necessity in order to completely eradicate this disease.

The sheep inspection law enacted by the Legislature of 1903 for the control and eradication of scabies of sheep has, in some localities, proved to be ineffective. Representative California sheepmen recognize the financial benefits that will accrue from the complete eradication of scab, but it is only by the enactment and enforcement of a good law that beneficial results will ensue.

Under the present system of inspection the deputy State sheep inspectors are appointed and removed by the various Boards of Supervisors. While the State Veterinarian is the State sheep inspector, he is given no supervision over his deputies. Some of the deputy inspectors have proven incompetent, while other inspectors have been known to have issued clean bills of health for sheep which were badly infected with scab. This has happened not only once, but many times. Acting under the present law on the subject the State sheep inspector (State Veterinarian) is powerless to rectify this.

As an example, the following are a number of shipments of sheep received at the Los Angeles and San Francisco markets, the majority of which shipments were certified to by deputy inspectors as clean sheep, when as a matter of fact they were infected with scabies to a

greater or less extent. The balance of the shipments were unaccompanied by certificates of any kind. The names of the consignees, consignors, and deputy sheep inspectors who certified the shipments are omitted in this report:

Date of Shipment.	Number of Sheep.	Station Loaded.	Destination.
Sept. 24, 1904	650	Santa Barbara Co.	Los Angeles
Nov. 5, 1904	475	Saticoy	Los Angeles
Nov. 17, 1904	378	Saticoy	Los Angeles
Dec. 19, 1904	503	Florence	Los Angeles
Jan. 31, 1905	290	Florence	Los Angeles
Apr. 25, 1905	150	Burbank	Los Angeles
May 10, 1905	505	San Diego	Los Angeles
May 16, 1905	492	Santa Monica	Los Angeles
May 17, 1905	800	San Bernardino	Los Angeles
May 17, 1905	600	San Diego	Los Angeles
May 18, 1905	392	San Diego	Los Angeles
May 25, 1905	693	Santa Barbara Co.	Los Angeles
June 2, 1905	345	Santa Barbara Co.	Los Angeles
June 6, 1905	448	Ventura	Los Angeles
June 10, 1905	1,012	San Bernardino Co.	Los Angeles
July 21, 1905	334	Santa Barbara Co.	Los Angeles
Aug. 15, 1905	120	Gilroy	San Francisco
Aug. 16, 1905	155	Corcoran	San Francisco
Aug. 21, 1905	160	Puente	Los Angeles
Aug. 21, 1905	1,137	Bay City	Los Angeles
Aug. 22, 1905	190	Ventura	Los Angeles
Sept. 6, 1905	310	Bethany	San Francisco
Sept. 13, 1905	480	Buttonwillow	San Francisco
Sept. 20, 1905	284	Bethany	San Francisco
Oct. 31, 1905	1,159	Saticoy	Los Angeles
Nov. 6, 1905	1,059	Bethany	San Francisco
Feb. 9, 1906	827	San Pedro	Los Angeles
Mar. 7, 1906	240	Connor	San Francisco
Mar. 26, 1906	264	Alhambra	Los Angeles
Apr. 10, 1906	1,280	Bakersfield	Los Angeles
Apr. 17, 1906	825	Bakersfield	Los Angeles
May 7, 1906	983	Mojave	Los Angeles
May 23, 1906	723	Dinuba	San Francisco

GLANDERS.

There is hardly a county in the State that has been entirely free from this disease for a number of years past. The State Veterinarian and his assistant have destroyed a large number of horses and mules affected with this malignant disease during the past two years. Many head of stock have also been destroyed by order of the various live stock inspectors and officials in charge of sanitary work in the larger cities. It is an unfortunate circumstance that upon information we will occasionally discover a glandered animal in the possession of a citizen who will endeavor to hide its presence from sanitary officials, understanding at the same time that this disease is communicable to man. During 1905 it became necessary to establish a temporary quarantine against the portion of Arizona in the neighborhood of Needles, San Bernardino County. A serious outbreak of glanders occurred in

Arizona Territory around this section, but it was quickly stamped out by the Territorial Veterinarian. Later our quarantine was raised.

Early during the present year it became necessary for me to prosecute an individual in Stockton. This party had in his possession an animal affected with glanders and would not submit to its destruction. The animal was later destroyed.

TUBERCULOSIS.

While this disease is prevalent on many of the dairy farms of this State, this department has made no systematic effort to combat it. The present laws in force and our lack of help and financial assistance preclude the taking up of a work of this magnitude. The scientific investigations in relation to this disease are receiving the attention of the most eminent scientists. Several European and American investigators have announced within the past few years that they have been successful in manufacturing a material which when injected into cattle would confer immunity against tuberculosis. The announcement of Von Behring, the discoverer of diphtheria antitoxin, that he had also discovered a material which would grant immunity to cattle against tuberculosis, received the widespread attention of scientists and sanitarians. If this proved to be true the eradication of tuberculosis in cattle would be a comparatively easy task in time. The reports of several European commissions appointed for the purpose of investigating Von Behring's bovine vaccine were very favorable. I received the permission from the Superintendent of the Napa State Hospital to test this bovine vaccine on some of the calves at the hospital dairy. Twenty calves were placed at my disposal early in 1905, into ten of which the material was injected according to the instructions of Von Behring; the balance of the calves were used as control animals. At the present time all of the injected calves are in excellent condition, but it is yet too soon to give definite results. This same procedure is being carried out by me at a dairy farm in the vicinity of Sacramento. It is to be hoped that these experiments will prove to be as successful as some of those reported by several European commissions.

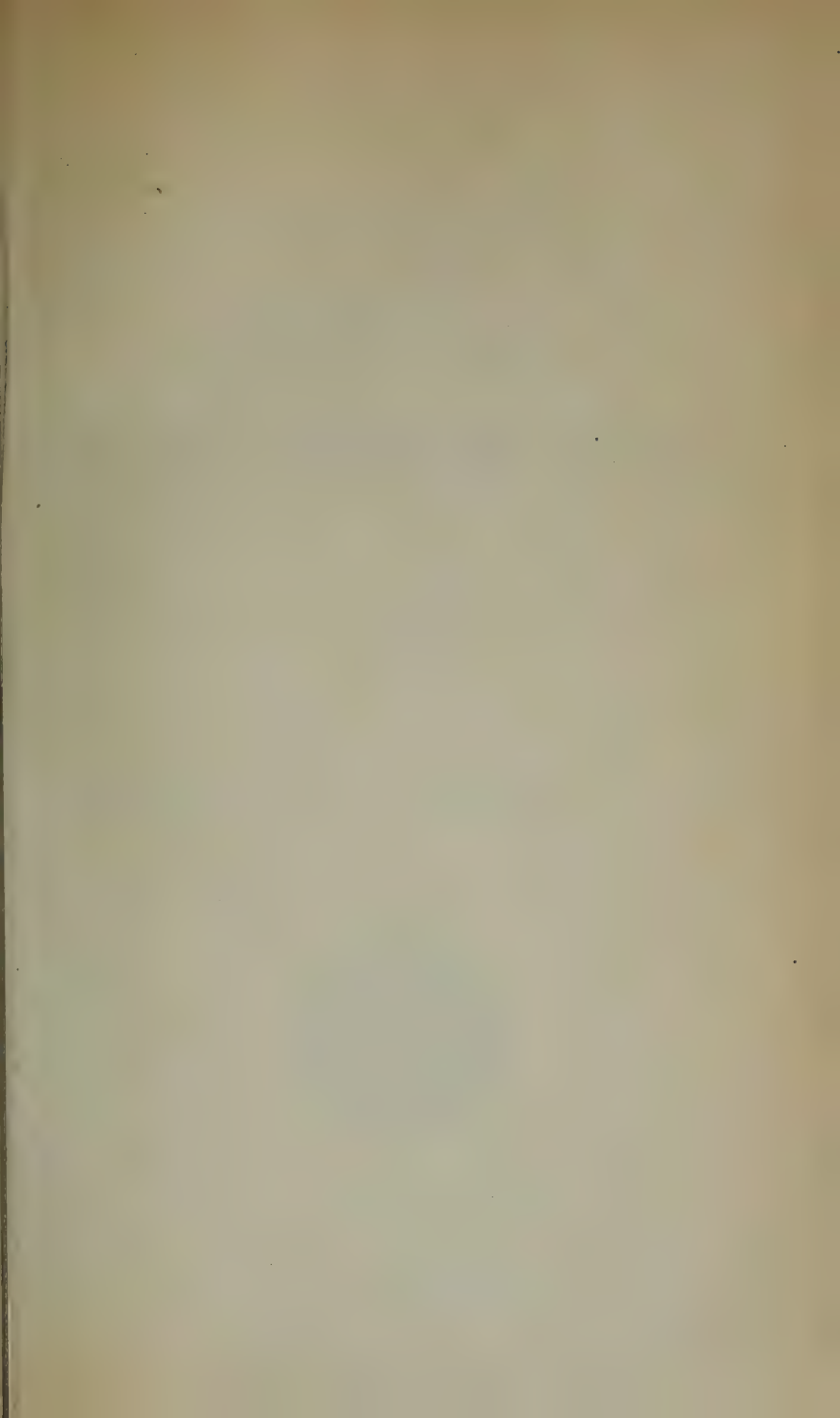
INSPECTIONS.

Since January 5, 1905, 508 horses and mules, comprising sixty separate inspections, were made for shipments to other States and Territories in compliance with the regulations at points of destination.

Since January 5, 1905, 7,695 cattle, comprising sixty-eight separate inspections, were made from points in the modified quarantined area, and during the open season, to points outside of the quarantined area in this State.

Respectfully submitted.

CHARLES KEANE,
State Veterinarian.



REPORT

OF THE

DEBRIS COMMISSIONER

FROM

November 1, 1904, to December 31, 1906.



SACRAMENTO:

W. W. SHANNON, : : : : SUPERINTENDENT STATE PRINTING.
1907.

REPORT OF THE DEBRIS COMMISSIONER.

To His Excellency, GEORGE C. PARDEE,
Governor of the State of California.

SIR: I have the honor to report the operations of my office from November 1, 1904, to December 31, 1906. In each case the State of California pays one half of the amount.

DAGUERRE POINT.

At the date of my last report, operations were being conducted to make a cut through this point. The work of excavation was being done by Edward Malley, under contract, and was finished January 27, 1906, at the following cost:

628,400 cubic yards of earth, at 23.5 cents	\$147,674 00
5,807 cubic yards of rock, at \$90.....	5,226 30
	<hr/>
	\$152,900 30
Deduct expenses for inspection.....	88 80
	<hr/>
	\$152,811 50

INLET WALL TO THE DAGUERRE POINT CUT.

To further complete the cut, an inlet wall was made at the entrance to the cut, to prevent possible undermining. The work consisted of excavating the material at the entrance to the cut, left under the contract with Edward Malley, and placing therein a concrete wall and apron 40 feet wide, 700 feet long, and 18 inches thick, with abutments at each end. Contracts were let for furnishing cement at Marysville, hauling the same to the site, and for doing the work.

On July 27, 1905, bids were received for cement, and the contract was awarded to the Western Fuel Company for furnishing and delivering "Standard" Portland cement at Marysville.

The contract was completed in October, 1905, there being supplied 10,200 sacks at 56½ cents, amounting to \$5,737.50.

At the same date bids were received for hauling the cement to Daguerre Point, the lowest bidder being George S. Risher. Under this contract he hauled 10,228 sacks at 10½ cents per sack, amounting to \$1,048.37.

On August 18, 1905, bids were received for building the inlet wall, the United States and the State of California furnishing the cement.

The lowest bidder was the firm of Palmer & McBryde, to whom the contract was awarded, at \$28,108.18, as follows:

1,189 cubic yards of earth excavation, at \$1	\$1,189 00
27,669 cubic yards of earth excavation, at 45 cents	12,451 05
690 cubic yards of rock excavation, at 45 cents	310 50
275 cubic yards of rock excavation, at \$1.50	412 50
232 cubic yards of back filling, at \$1.00	232 00
11 cubic yards of placing embankment, at 75 cents	8 25
2,224 cubic yards of concrete, at \$5	11,120 00
30,786 pounds of plain steel, at 6 cents	1,847 16
4,250 pounds twisted steel, at 7 cents	297 50
Extra labor	494 24
Supplies	132 57
	<hr/>
	\$28,394 77
Deduct for cement lost by contractor	\$10 64
Less expense, incurred by not completing contract at timeset	275 95
	<hr/>
	286 59
Total cost	<hr/>
	\$28,108 18

Thus the aggregate cost of the Daguerre Point cut was—

Excavation	\$152,811 50
Cement	5,737 50
Hauling cement	1,048 37
Placing inlet wall	28,108 18
Shed for storing cement, built by hired labor	338 37
Extra work	58 80
	<hr/>
	\$188,102 72

RAISING EMBANKMENT AT BARRIER No. 1.

At the time of my last report, Lewis Moreing was under contract to raise the embankment at the north end of the barrier. The embankment was to be 20 feet high, 30 feet wide on top, with an upstream slope of $2\frac{1}{2}$ to 1 and a downstream slope of $1\frac{1}{2}$ to 1, with a turn 10 feet wide. The contract was completed in January, 1905.

The following quantities were furnished:

12,172 cubic yards of earth at \$1	\$12,172 00
445 square yards of riprap at \$1	445 00
	<hr/>
	\$12,617 00

In addition, Mr. Moreing, under emergency work, placed 1,860 cubic yards of earth, at a cost of \$2,734.26, in order to turn the Yuba to close the gap, to finish raising the barrier.

The winter of 1904-05 was not severe, yet the floods scoured the gravel away from below the barrier to a depth of 6 feet; for a distance of 380 feet the lower 6 feet of the apron had been undermined and broken down, together with the entire face being worn, in places, through the whole 18 inches of concrete.

During 1905 contracts were made to repair the barrier and raise the same 8 feet, and known as the "second step."

The general type was the same as shown in the illustration in my last report.

There were two rows of piles placed 16 feet above the barrier as built and 10 feet apart. A rock fill was made to a subgrade, over which a layer of 18 inches of concrete was placed, with a crest 10 feet wide and sloping down stream to the old work and up stream to the level of the old work. The concrete was divided into sections, which were fastened to the piles by cables passing through the cement. Large rock was also to be placed below the barrier where the gravel had been washed away.

To do this work, bids were received for erecting the pile-driver, furnishing piles, driving piles, furnishing cement, hauling cement, and raising the barrier.

On February 3, 1905, after due advertising, a contract was made with Hugh McGuire, of Marysville, the lowest bidder, to erect the pile-driver and furnish piles.

Under this contract there was paid:

Erecting pile-driver.....	\$630 00
399 forty-foot piles, at \$3.15 per foot	5,027 40
	<hr/>
	\$5,657 40

On March 22, 1905, after due advertising, a contract was made with Palmer & McBryde, the lowest bidder, to drive the piles, and they were paid as follows:

Driving 345 piles, at \$7.60	\$2,546 00
Deduct for use of pile-driver.....	1,016 65
	<hr/>
	\$1,529 35

On March 25, 1905, after due advertising, a contract was let to the Western Fuel Company for furnishing cement to be delivered at Marysville.

Under this contract there was furnished and paid:

16,736 sacks, at \$2.24 for 4 sacks	\$9,357 75
Deduct for 15,647 empty sacks	782 35
	<hr/>
	\$8,575 40

On March 29, 1905, a contract was made with George S. Risher, of Browns Valley, for hauling cement from Marysville to the barrier.

The amount earned by this contractor at the named price was:

Hauling 16,637 sacks, at 73.5 cents for 4 sacks	\$3,056 85
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On May 8, 1905, after due advertising, a contract was entered into with Palmer & McBryde, the lowest bidder, to furnish materials, excepting piles and cement, and to perform the necessary work of raising the barrier.

They were paid as follows :

11,330 cubic yards of embankment, at 30 cents	\$3,456 00
2,985 cubic yards of excavation, at 75 cents	2,238 75
60,870 feet (B. M.) of lumber, at \$25 per M	1,521 75
13,222.97 tons of rock fill, at 87.5 cents	11,570 12
5,408.73 tons of large rock, at \$2	10,817 46
560 square yards of brush mattress, at 70 cents	392 00
1,600 sand bags, filled with sand, at 7 cents	112 00
4,156 cubic yards of concrete, at \$4.25	17,663 00
14,000 linear feet of cable, at 15 cents	2,190 00
Extra labor and supplies for repairing barrier	8,411 72
	<hr/>
	\$58,522 80
Deduct for materials and use of plant	624 88
	<hr/>
	\$57,897 92

On August 4, 1905, after due advertising, a contract was made with J. B. Barrie, of Marysville, for furnishing 350 piles for the third step of the barrier. Under this there was furnished :

14,000 linear feet of piles, at 26¼ cents	\$3,675 00
Deduct for inspector	2 50
	<hr/>
	\$3,672 50

The season of 1905-06 was not severe, and the raising of the barrier increased the storage capacity for débris so that it was late in the season before it so filled that much sand and gravel flowed over its crest. However, the concrete showed considerable wear, and the cobble and gravel were washed away from the barrier to a total depth of 11 feet, and made a deep channel in the river below and washed away much of the large rock placed below the barrier.

It was, therefore, decided by the California Débris Commission not to raise the barrier during 1906, but instead to cut a spillway around the south end of the barrier, and raise and extend the abutment at that end. The spillway has a general width of 65 feet, widening to 150 feet at the entrance, cut into the side hill composed of rock of a varying degree of hardness, a concrete side wall 320 feet long and 12 feet high. The work also contemplated placing 5,000 tons of large rock below the barrier to make up for that washed away, together with laying a track to the rock quarry, to be the joint property of the State and the United States.

To carry out this work a contract was made with the Western Fuel Company on March 14, 1906, for 12,000 sacks of cement, 1,301 sack to be delivered at the gates to the settling basin, to be mentioned later

The company delivered at Marysville—

12,000 sacks; at \$2.50 for 4 sacks	\$7,500 00
Less 10 per cent deducted until sacks are returned	750 00
	<hr/>
	\$6,750 00

On March 22, 1906, after due advertising, a contract was made with George S. Risher, the lowest bidder, to haul the cement to the works.

He was paid as follows:

Hauling 1,301 sacks to settling basin, at 15 cents	\$195 15
Hauling 10,725 sacks to barrier, at 68.9 cents for 4 sacks	1,847 38
	<hr/> \$2,042 53

CONSTRUCTING SPILLWAY.

On April 11, 1906, after due advertising, a contract was entered into with Edward Malley of San Francisco for constructing spillway and furnishing materials other than cement. This contract was completed in December, 1906. The following amounts have been paid, pending final settlement at contract prices:

11,164 cubic yards of earth excavation from spillway, at 80 cents	\$8,931 20
2,161 cubic yards of rock excavation from spillway, at \$1	2,161 00
560 cubic yards of earth excavation from foundation, at \$1.20	712 50
477 cubic yards of rock excavation from foundation, at \$2	954 00
2,291.2 cubic yards of concrete, at \$5	11,456 00
3,418.71 tons of large rock, at \$2.50	8,546 76
33 tons of steel rails, at \$46	1,518 00
Extra labor repairing barrier	2,442 26
Board of Inspectors	63 50
	<hr/> \$36,785 22
Deduct for use of plant	\$61 63
Deduct for supplies	54 00
	<hr/> 115 63
	<hr/> \$36,669 59
Less 10 per cent until contract is completed	3,666 95
	<hr/> \$33,002 64
Add for supplies on repairing barrier	\$393 89
300.79 tons of small rock, repairing barrier	300 86
	<hr/> 694 75
	<hr/> \$33,697 39
Deduct for use of plant	4 15
	<hr/> \$33,693 24

TRAINING WALL.

One feature of the existing plans is to confine the flood waters of the Yuba from Daguerre Point to Marysville in a single channel, instead of allowing them to spread over the great waste nearly three miles wide between the levees. To do this, it was planned to build training walls about one-half mile apart, and force the floods to enlarge one of the several channels to the full capacity; the material so scoured out to be discharged into the Feather River. To carry this into effect, plans were prepared for a part of the north training wall, the work to be an embankment about 12,000 feet long, generally 13 feet above the bed of the river; the embankment to be 10 feet wide on top, with a slope 2 horizontal to 1 vertical on the land side and 3 horizontal to 1 vertical on the water side, and estimated to contain 200,000 cubic yards of earth.

Upon March 29, 1905, after due advertising, a contract was let to Anson B. Munson of Stockton, the lowest bidder. Under this contract work has progressed. To December 1, 1906, 163,100 cubic yards have been placed in the embankment, at 12.4 cents per cubic yard, or \$20,224.40; ten per cent being retained until the completion of the contract. The State has paid so far, \$9,100.98.

FINANCIAL STATEMENT.

Salary of Débris Commissioner.....	\$1,200 00
Traveling and incidental expenses.....	600 00
Salary of Secretary.....	600 00
Printing.....	165 25
Total appropriations.....	\$2,565 25

Expenditures.

(December 1, 1904, to December 1, 1906.)

Salary of Débris Commissioner.....	\$1,200 00
Salary of Secretary.....	600 00
Traveling and incidental expenses.....	472 30
Total expenditures.....	\$2,272 30

APPROPRIATIONS FOR DEBRIS WORK.

Appropriation, March 7, 1897.....	\$250,000 00
Appropriation, February 14, 1901.....	150,000 00
Total appropriations.....	\$400,000 00

Expenditures.

(December 1, 1902, to December 11, 1906.)

Land.....	\$9,699 50
Advertising and printing.....	378 69
Incidental expenses.....	1,654 11
Salaries of inspectors.....	7,182 23
Samuel Montgomery, Barrier No. 2.....	6,072 88
Daguerre Point Cut—	
Edward Malley, excavation.....	76,405 76
Western Fuel Company, cement.....	2,868 75
George S. Risher, hauling cement.....	524 18
Palmer & McBryde, inlet wall.....	14,054 08
Palmer & McBryde, extra work.....	29 40
Shed for storing cement.....	194 19
Barrier No. 1—	
Labor, teams and supplies.....	13,127 22
Atlantic, Gulf and Pacific Company.....	3,887 61
Lewis Moreing, fill.....	1,587 66
Lewis Moreing, first step.....	28,602 28
Lewis Moreing, embankment.....	6,308 50
Lewis Moreing, fill.....	1,367 13
Hugh McGuire, pile-driver and piles.....	2,828 70
Palmer & McBryde.....	764 68
Western Fuel Company, cement.....	4,287 71
George S. Risher, hauling cement.....	1,528 44
Carried forward.....	183,351 70
	\$400,000 00

Expenditures—Continued.

(December 1, 1902, to December 11, 1906.)

Brought forward	\$183,351 70	\$400,000 00
Barrier No. 1—		
Palmer & McBryde	28,948 97	
J. B. Barrie, piles	1,836 25	
Western Fuel Company, cement	3,375 00	
George S. Risher, hauling cement	1,021 27	
Edward Malley	16,845 62	
Cement shed	199 64	
Lewis Moreing, closing sloughs	2,089 63	
Marysville Levee Commissioners, brush work	236 66	
Anson B. Munson, training wall	9,100 98	
Concrete culvert under training wall	213 52	
		247,219 24
Remaining on hand		\$152,780 76

THE DEBRIS PROBLEM.

Another two years have passed, and but little has been done toward the general solution of the débris problem. During that time none of the great hydraulic mines have been in operation, and only here and there a small mine has been operating under the California Débris Commission. The State has been blessed in that there have been no great floods to cause havoc, such as the one three years ago.

During the past two years I have made several trips over a portion of the flooded region of the Upper Sacramento and Feather rivers, to observe conditions and to be able to make comparisons with mountain conditions.

I found much to be deplored. In one section the land is assessed for its full cash value, and sometimes more, something that does not obtain all over the State. Upon this assessment they were paying the average State and county taxes, and in addition a levee tax, sometimes as high as seven and one-half per cent; then they had to maintain their own back levees, while the seepage water was each year encroaching upon their fertile fields, thereby destroying their productivity. Yet these people were bearing their cross with stoical fortitude, fearful lest the world learn of their troubles and they be injured thereby. At another place, during the past five years, the high-water mark has raised 3 feet 8 inches, and there is no reason why it should not go higher. Yet during this time the hydraulic mines that have been blamed for all of this have declined to a practically total cessation. That these conditions do exist is due to the fact that an exact statement has not been brought out, together with the general indifference of one section for another. This indifference should not exist; there is plenty of room in the State for each one to follow his chosen pursuit without injury to others.

How often is it noticeable in the jealousy of one part of the State against another, and especially so with respect to the relations of the

mountain sections to those of the valley? In reality, if the conditions in each section were carefully studied it would be found that the very works that are required for the much-needed relief of the property holders of the valley would at the same time assure the long-cherished hope of the gravel miner to carry on his operations without hindrance. At the same time the construction of such works would only be complying with the intent of the mandates of the courts.

Before this much-desired state can be secured there must be an absolute change in the policy which has obtained during the past twenty-five years.

It is to be regretted that the miner is principally interested in only where he can run his mine, caring but little for the interests of others. This has been largely due to the fact of the non-intercourse of the two sections, although they occupy the relation to each other of producer and consumer. Another cause has been that the leaders have not taken the trouble to study thoroughly both sides of the case, deferring to others, who have no interests at stake, what they should do themselves.

This is illustrated in the proposed litigation to test the constitutionality of the Caminetti Act, under which the California Débris Commission is acting, and to determine whether a miner to whom a permit had been issued would be subject to injunction issued by a State court, where the plea was that such miner was committing a nuisance. Such proceedings are but a waste of time, stir up sectional distrust where none should exist, and postpone the construction of such works as would bring relief to both sections. In the valley the same spirit is manifested, as in the case of certain citizens who were discussing a plan for river improvement, and objected to it on the ground that it would start up the hydraulic mines and at the same time do away with levee commissioners.

If the full intent and the provisions of the Caminetti Act had been executed, both sections would have had relief long before this.

Another cause in the delay of the construction of the much-needed works lies in the fallacies that are the foundation of the science of river improvement, supplemented in this case by gross errors in the physical data that emanated during the débris litigation suits over twenty-five years ago, and discussed in a former report, and which unfortunately crept into the plans for river relief and have stayed there ever since.

Before considering the subject of river improvement, it would be well to consider the cause of the floods and the deteriorating forces that affect them.

THE CAUSE OF THE FLOODS.

The primary source of the floods and the water of the rivers is the great cyclones that come from the Pacific Ocean and sweep across the continent, dropping the principal part of their moisture upon the mountain sides. These cyclones occur generally during the winter months.

In the northern part of California, the rainfall varies from 30 inches upon the Coast Range and 18-20 inches in the Sacramento Valley to 75 inches upon the high Sierras, and here the fall has been as high as 143 inches. In the high altitudes much of the precipitation falls as snow that melts and discharges during the summer months. During the winter there are often heavy, warm rains that carry off a large part of the accumulated snow. It is at such times that the great floods occur.

The Sacramento Valley is peculiarly situated; bounded on the west, north and east sides by mountain ranges. While the valley proper contains 4,196 square miles, with only 38 square miles covering the perennial streams, it is surrounded by 21,971 square miles of mountains and rolling lands. This mountain area is drained by numerous streams, whose grades are often as high as 150 feet per mile, while the mountain slopes may be compared to the steep roofs of houses.

Hence it is that the passing storm is quickly debouched upon the valley below. In the valley the Sacramento and Feather rivers have light grades, varying from 5 inches to 1 and 2 feet per mile. Nature has so constructed them that they are able to carry the ordinary summer flow and the medium stage of the winter flow; but when the times of flood occur the water must find escape, which it does by spreading over the low lands that act as great reservoirs.

NATURAL EROSIONS.

One of the results of the heavy precipitation of rain and snow upon the mountains is that the rocks are decomposed, varying from small fragments to sand and soil. This decomposition often extends several hundred feet into the ground.

The effect of the heavy downpours is to erode the decomposed surface of the mountain sides, which are swept by the mountain torrents to the valley below.

This material is dropped upon the river beds when the force of the current is slackened by the lighter grades of the valley rivers, with the attendant decrease of transporting power.

After the passing storm and the rivers and mountain streams become clear, there is a gradual wearing away of these deposits, carrying them onward to the sea. Hence it is that before the settlement of a country the rivers are generally deep and suitable for navigation. But, with the settlement in the mountains, the matted surface of the slopes is broken by the various avocations of man, and what was a very low rate of erosion becomes very great.

We have but to read the reports of the Forest Service concerning its investigations upon the subject of cutting away the timber, clearing and cultivating the soil and the effects of pasturage, at the same time realizing that the high and mountainous areas will ever in the future be inhab-

ited, and necessarily the flow of sand and silt continually increased with the increase of the population in those regions. It is no wonder that the régime of the rivers of the United States draining extensive mountain areas is deteriorating.

This process of natural erosion is nature's way of leveling mountains, making valleys, and finally building new continents by depositing the products upon the ocean's bed.

In the journey of the material to the sea many interesting features are observed in conjunction with the action of the floods. First, the material is dropped at the edge of the valley where the transporting power has decreased, the water still carrying all it can, and when the rivers overflow their banks the heavier particles are deposited on the shores, forming as it were natural levees, and thereby forming swamps some distance back from the rivers. The natural, uneven deposit on the rivers' beds, together with at times an unequal resistance of the banks, causes the rivers to cut the banks first on one side and then on the other, until the winding action so common with rivers is seen.

Where the rivers have a steep grade, as upon the Upper Sacramento above Colusa, where this action is taking place, often great areas of rich bottom lands are carried away, the material finding a place of rest at some bar lower down, and part working its way to the sea. Upon the Upper Sacramento great gravel bars may be seen, rivaling those from the mines upon the Feather River.

Another interesting feature of the depositing near the edge of a valley where it debouches from the mountains is that the stream will leave its old bed and form a new channel, like Cortina Creek, near Colusa, that has shifted its mouth eight miles in the last fifty years, while the Yellow River, in China, taking its name from the mud it carries, has been cited on an extensive scale of the same process, having shifted its mouth nine times during the last 2,500 years, affecting an area 300 miles wide.

MINING DÉBRIS.

The Sacramento River, and particularly the Feather River, are affected from another source of débris—that is, from the mines.

California dates its present settlement from the discovery of gold in 1849, that brought its great influx of goldseekers to the State. They swarmed all over the Sierras, seeking the glittering gold along the streams and ravines, and finally attacking the great gravel deposits. The most extensive deposits were found to be upon the drainage area of the Yuba River, where it is estimated that there were 30,000 miners at work during the early days. It is safe to say that one fourth of the gold which California produced came from this region, and with it, upon

the Yuba River, is found the greatest deposit of debris in any river to-day.

The methods of the early placer miners were very primitive, but in a few years ditches were dug and they were able to work the shallow deposits of light material and were afterwards able to send down more material than even the mountain torrents could carry. Their operations continued until large areas of light surface gravel were washed that cover the great banks of heavy boulders, cobbles and sand that are often cemented and form the principal part of the great unworked deposits to-day.

This material went direct to the rivers, deeply filling the mountain streams. The floods of each winter carried all they could to the valleys below; the coarser gravel was deposited in the foothills upon the bed of the Yuba River, the finer material worked lower down to Marysville, and much went into the navigable rivers.

The portion resting upon the bed of the Yuba deeply filled that stream, being, it is claimed, 100 feet deep near Smartsville and 31 feet at Marysville. The deposit varies from 600 feet wide near Smartsville to nearly three miles wide upon the plains, where except in the main watercourses it consists, principally, of fine silt and sand; but in the foothills it consists of boulders, cobble, gravel, and sand. In 1879 the State Engineer estimated this deposit at 41,876,200 cubic yards. Col. W. H. Heuer had surveys made in 1894, upon which the deposit was estimated at 408,000,000 cubic yards. Later, in 1899, the California Débris Commission made surveys, connecting the same with those of the State Engineer's department in 1879, and estimated the fill from the Narrows to the old State dam, a distance of 10 miles, during the twenty years, at 33,637,000 cubic yards. I further find from these surveys that there has been a mean fill of 4 feet from the old State dam to Marysville, or 66,918,000 cubic yards, and believe the total deposit to be nearly 600,000,000 cubic yards.

In 1880 and before, when the hydraulic mines were at their highest activity and the floods were cleaning the cañons of the debris of the early miners the watercourses of the Yuba upon the plains were practically obliterated, so that much of the sand due to natural causes was deposited with that of the mines upon the plains.

Upon no other hypothesis can the great quantity of sand near Marysville be accounted for, in that the material of this great deposit bears no resemblance to the gravel deposits within the mountains.

Since the stopping of the mines the floods have been cutting channels through the deposit, carrying the material into the Feather River.

In 1880 the deposit near Marysville consisted of the fine material that was called "slickens," and may be likened to the "silt age." Since then, with the general scouring process, there has been a general

replacement in the size of the particles, the silt giving away to sand, that may be called the "sand age." Now in the watercourses fine gravel is found all the way to the Feather River, and we may say that the "gravel age" is at hand. How long it will be before the "cobble age" will appear no one can say.

The favorite way of treating this deposit, including the plan now being carried out by the State and General Government, is that of channel building—that is, confining the floods in a single waterway and forcing them to so scour a channel that they will not overflow their banks, the materials so scoured being dumped into the navigable rivers. Inasmuch as this is only accelerating what nature is doing, no immediate relief is to be expected from this débris flow. In addition, the material due to natural causes that did stop upon the deposit in years past is now being carried direct into the navigable rivers.

REMEDIAL MEASURES.

There have been many plans proposed to overcome the difficulties that have affected the rivers during the past twenty-five years.

The miners have proposed dams within the mountain cañons, for the storing of the débris, but they have been principally for their own benefit.

Others have proposed storing the flood waters in great reservoirs, to be discharged later in the season and utilized as far as possible for irrigation. Unfortunately for this scheme—in the Sierras, where the greatest precipitation occurs, there are few storage sites below an elevation of 4,000 feet. Above this elevation a suitable valley of 400 to 500 acres is a rare occurrence. It completely fails when it is considered how great an area is flooded in the Sacramento Valley each winter, with no valley in the mountains whose aggregate area compares with it.

In river improvement, there have been several projects outlined by various commissions. They either contemplate providing additional waterways for the floods besides rectifying the main rivers, or plan the enlargement of the navigable rivers until they will carry the entire flood flow, together with the building of levees. The latest was by a Board of Engineers in 1904, and commonly known as the "Dabney Commission."

Inasmuch as it is now before the public and is a model of its kind, representing the present ideas of river improvement, it alone will be discussed.

The plan in brief, when fully completed, contemplates the building of levees on both sides of the Sacramento and its tributaries, and widening and deepening the waterway until it would carry the entire flood flow, which was estimated at 250,000 cubic feet per second, together with all the débris coming down from the mountains direct to Suisun Bay.

It is the purpose of the writer to discuss this plan only so far as to bring out phases of the debris flow and the science of river improvement, that the conclusion may be more clearly seen.

RIVER IMPROVEMENT.

The science of river improvement, as it is conducted to-day, practically consists of three things: leveeing, channel building, and dredging. Although millions of dollars have been expended within the United States upon such work, it can not be said to be a pronounced success. Levees are to confine the passing floods to keep them from overflowing the adjoining lands, but they have to be continually raised and strengthened; there is an old saying that every levee had been or would be overtopped. Channel building is resorted to to remove sand bars and shoal places, forcing the material farther down stream; at the most it is a local and temporary relief. Dredging contemplates the removal of deposits that can not effectively or speedily be cared for by channel building.

Referring again to the project of the Dabney Commission, the first question is, Was a flood discharge provided for large enough so that the land would not be flooded?

Upon referring to Water Supply and Irrigation Paper No. 147, by the United States Geological Survey, upon the "Destructive Floods in the United States in 1904," it will be found that the Sacramento flood of that year is discussed. During that year the Survey had five gauging stations upon the Sacramento and its principal tributaries, and prepared tables of the respective discharges, and also estimated the total discharge into the valley of the flood waters from the mountain areas.

The total estimated discharge during the storm period was as follows, in cubic feet per second:

Feb. 11.....	22,408	Feb. 28.....	169,296	Mar. 16.....	183,153
12.....	95,554	29.....	152,750	17.....	308,023
13.....	68,231	Mar. 1.....	138,296	18.....	380,434
14.....	51,587	2.....	152,558	19.....	349,319
15.....	180,369	3.....	149,724	20.....	323,675
16.....	570,014	4.....	174,889	21.....	228,171
17.....	298,266	5.....	162,746	22.....	177,349
18.....	147,436	6.....	139,448	23.....	148,569
19.....	110,214	7.....	168,548	24.....	134,910
20.....	94,682	8.....	295,970	25.....	119,151
21.....	118,077	9.....	217,998	26.....	104,825
22.....	442,141	10.....	345,474	27.....	128,408
23.....	279,554	11.....	218,318	28.....	260,514
24.....	542,216	12.....	165,973	29.....	287,075
25.....	328,167	13.....	143,209	30.....	206,309
26.....	277,421	14.....	174,829	31.....	158,823
27.....	251,436	15.....	182,462		

From the foregoing it will be seen that on sixteen different days the discharge was greater than 250,000 second feet, and that there were two

periods, one of four and one of six days, when a greater amount flowed and when the discharge was at times more than twice the capacity contemplated.

Therefore, if the works proposed had been built at the estimated cost (\$24,000,000), the levees would have been overtopped and great damage done.

To form this waterway, high ground along the banks of the river would have to be taken that has been made by the waters overflowing their banks during the ages past, and which are none too wide now, leaving only a remnant of land subject to cultivation along the overflowed ground.

As shown above, to make an adequate channel a greater amount of land would have to be taken, say one-half mile wide all told.

But, assuming that the plans were adequate, the project calls for the enlarging of the existing channel and requires the removal of 315,752,000 cubic yards of material, of which 197,015,000 cubic yards were to be removed by the scouring action and which it was recognized would find lodgment in Suisun Bay.

Again, the filling of Suisun Bay would cause the debris annually coming down from the mountains to back up and deeply fill in the river at Sacramento and at all points above. The material that comes down must find lodgment somewhere, and under the project the bed of the streams is the only place left. This, again, will require a further expenditure to keep pace with the filling. Vernon Harcourt, the great authority on river improvement, says that "the rise of the beds of some rivers in Japan, from the deposit of silt, has been followed up by the gradual raising of the embankments; and this system has been carried out to such a degree, and the accumulated deposit is so great, that some of these embanked rivers have their beds as much as forty feet above the level of the plains over which they flow."

A few years ago the Missouri River Commission was legislated out of existence, and from their own report it was apparent that they had not kept pace with the deteriorating forces. Nor should one be surprised when he considers the Platte and the various streams heading in the Rocky Mountains, sending there countless millions of cubic yards of sand and silt into the Missouri each year.

But this very filling of the navigable rivers and the Suisun Bay was one of the causes that led to the injunctions and the stopping of the hydraulic mines. It would be the irony of fate for the owners of those mines to be taxed to raise money to do the very thing which they were enjoined from doing.

The 197,015,000 cubic yards of sand and silt probably represent more fine material than there is in all the workable and payable deposits of gravel in the mountains. If it is right that it should be done, the stopping of the hydraulic mines was the greatest outrage of the age.

If dredging is resorted to to keep down the filling process, the job will never end. The General Government expends \$100,000 each year to keep the mouth of the Mississippi open. When one recalls that each recurring flood brings breaks in the levees of nearly every river in the land; with all the attendant losses, one is forced to the conclusion that there is something missing in the science of river improvement as it is now practiced.

PROBLEM STATED.

To meet the wants of the people of Northern California, the following conditions must be brought about:

1. Improved carrying capacity of the navigable rivers both for flood water and navigation.
2. Relief from the seepage evil and the drainage of the land.
3. The resumption of hydraulic mining.

In the light of the flood flow as shown above it is evident that it is not practicable to construct a channelway large enough to carry the entire discharge, but that the water must overflow the land as heretofore.

Therefore, it is now proposed that the levees remain generally as they are at present; that drainage canals be constructed to return to the rivers the overflow water, and that the *débris* now discharging into the navigable rivers be kept where it is or carried upon the low lands for reclamation purposes.

In order that the effect of these proposals may be seen, let us introduce into the river problem, as previously discussed, the keeping of the *débris* out of the rivers. As has been stated, it is a well-known law in the flow of *débris*, that if a deposit is made in a channel owing to the water being surcharged with *débris*, as soon as this overload ceases and the water becomes clear, as it were, then a scouring action takes place, restoring the channel to the condition existing before the deposit was made. If, then, the *débris* is stopped from flowing into the navigable rivers, those rivers will begin to scour their beds until a base level is obtained such as existed before the present settlement of the valley.

As stated before, borings show that the deposit in the Feather River at Marysville is 31 feet deep—20 feet at its mouth and thinning out down the Sacramento. It has also been estimated that the fill in the Sacramento and Feather rivers amounts to 120,000,000 cubic yards, or a uniform fill of 9 feet.

Now, if this fill was removed the waterways would have a greater capacity than that existing fifty years ago, owing to the increasing of the channel capacity due to the levees, or practically double the flow of that of 1880; therefore, the water would not overflow the land as it does now.

With the rivers thus restored, the water table would be lowered to

that of fifty years ago; or, in other words, the entire seepage evil would be overcome.

It would then be possible to construct drainage canals that would drain off any flood water early in the season when the high stage in the rivers was receding.

The lowering of the river bed of the upper Sacramento streams 20 feet, in the light of the published maps, ought to give grade sufficient to drain all of the overflowed land, and in time for the early cropping of the land.

With the rivers thus restored, navigation would be all that could be expected, and the existing congestion relieved.

RESTRAINING DÉBRIS.

The *débris*, whether from the mines or by natural erosion, may be divided into two classes: the sand, gravel and boulders, and the fine material in the nature of silt or alluvium. The former is not suitable for soil making, while the latter is decidedly so, and should be utilized for land building to its fullest extent.

Storage sites for this *débris* may be stated as first in the mountain cañons, and second in the low lands now subject to overflow. These overflowed lands are for the most part situated on the west side of the Sacramento, and between that river and the Feather. Experience has shown that it is not practicable to carry the heavy matter to these overflowed lands, nor is it desirable to do so. The solution naturally suggests itself that by building great dams within the mountain cañons the heavy material will be impounded, most of the heavy sand being locked in the interstices of the gravel; then by diverting the course of the creeks the fine material and silt can be carried to the low lands without destroying the channel through which it is carried. Such treatment is particularly adapted to such streams as Cache and other creeks draining into the Sacramento from the Coast Range, the tule swamps being close at hand, into which the floods should be turned and settled before being discharged into the navigable rivers. By building embankments and dividing the land into compartments much after the method in use in Egypt for flood irrigation upon the Nile, each compartment can be filled, the mud allowed to settle, and the water then drained into the Sacramento by means of floodgates and drainage canals. Such treatment should begin at the margin of the foothills at the high ground, and advance toward the river. By so doing, in time, the land would be raised above all high water. The water would naturally be discharged with the receding high stage in the rivers, leaving its sediment to be plowed under, thereby either maintaining the strength or giving new life to a depleted soil. This would be reclamation par excellence, and would pay for itself by the advance in the price of the land so benefited.

The building of dams for the storage of *débris* in the mountains, particularly in the Sierras, has now a value greater than at the time when they were first proposed by the miners for the storing of their *débris*.

Since that time the transmission of power by electricity has become a reality. In former times it was customary to take the factory to the waterfall. Now, it is possible to transmit that energy hundreds of miles to the factory; therefore, by building such dams, they not only serve their purpose for *débris* storage, but likewise form the headworks for electrical plants; and, again, afford a further application in irrigation, and are worth all they would cost for either of the three uses.

HYDRAULIC MINING.

The owners of hydraulic mining property have, ever since the time of their suspension, desired to operate their mines, and should be recognized as a potentiality in consideration of the river problem.

It must be recognized that if the mines are to resume, they must impound their own *débris* as a part of their operating expenses. The *débris* for the most part will be on heavy bottom ground. The finer material, being similar to that of natural erosion, can be cared for on the bottom lands near the rivers. The heavy material should be impounded in the mountain cañons far away from the navigable rivers. This should be done at suitable locations by structures composed of stone. They should be of great size and of large capacity, adequate for storage for a long term of years—and in this they will be proportionately cheaper per cubic yard of storage. To illustrate: It takes a mile of fence to go around forty acres of land, but it only takes four miles of fence to go around a section of land having sixteen times the acreage.

In building such structures the miners will have to impound much *débris* that was deposited during the many years past and for which the present owners are not responsible, and also the heavier part of that from natural erosion, and thereby aid in river improvement. In this the miners can justly claim assistance from State or national sources.

Had structures been built in the mountain streams twenty-five years ago much of the material that has injured the rivers, or is a menace to them to-day, would be permanently impounded far away from their present beds.

Under the present condition of feeling between the valley and the mountain people, capital is not justified in making the expenditure. It is recognized that they would be subject to espionage so long as the present conditions exist along the rivers. Hence it will be seen that a "community of interests" actually exists for those things that would be best for both sections.

The resumption of hydraulic mining would also cause further building of storage reservoirs, further impounding of water that would later be valuable for irrigation, and increasing the low-water depth of the navigable rivers.

The building of dams with great storage capacity would probably be the best way to treat the Bear and American rivers, at whose mouths there are no such deposits of *débris* as has been previously described upon the Yuba.

For the Yuba River, not only must storage works be constructed in the mountains, but the great deposit upon the plains described under the head of "Mining *Débris*" must be kept out of the navigable rivers. In my last report I demonstrated that the only sure method of treating this deposit was by diverting the present course of the Yuba into an old channelway, and is popularly known as "Losing the Yuba."

As outlined, the project proposes to utilize the great boulder and cobble embankment built by the Yuba Consolidated Gold Fields, extending from Hallet Point on the south bank of the Yuba to Daguerre Point on the north bank, to divert the water into the new channel by means of a spillway cut through to Hallet Point large enough to carry any possible flood, at an elevation of say 40 feet above the present bed of the river. By this means a storage reservoir would be formed for impounding *débris* that would have a capacity of probably 200,000,000 cubic yards.

The course taken for the new channel would be down what is now known as Dry or Reed Creek, emptying into the Feather about four miles north of the mouth of the Bear. Here is located a large area of low lands that have been subject to overflow during the years past, not only from the Feather, but also from the Yuba, breaking its levees and working to the southward. Of late years it has been well into the summer before this water could drain into the Feather, on account of the increasing fill upon the bed of that stream. It is proposed to train the flood of the Yuba over this low ground, allowing the sediment to deposit for reclamation purposes before discharging it into the Feather. The discharge to be expedited by drainage canals.

It is believed this project can be carried out at a cost of \$3,000,000.

By this means, the greatest single menace to the improvement of the rivers would be removed. It would then be possible for the resumption of hydraulic mining. It would make available for cultivation some 15,000 acres of land within the present levees of the Yuba, together with dredging of the then available auriferous portions. It would thus be possible to dredge the Feather and lower the present plane, thereby reducing the flood heights at Marysville. While the reclaiming of these low lands would be worth the whole expenditure, the final condition of the Yuba would be the same as when it flowed by Marysville, before the present bed was destroyed by *débris*, fifty years ago.

DREDGING OF THE RIVERS.

Under the existing conditions, if the work of dredging of the rivers were undertaken, each recurring flood would wash into the navigable rivers enough débris from outside sources to fill the space from which material had been removed. But if the débris flow is stopped, then such work becomes a constant improvement, while the natural scouring action of the rivers tends to the same end at the same time. It is customary to begin dredging at the lower end of a deposit or bar, but under these conditions it should also begin at the upper end of the deposit, in the case at Marysville, so as to minimize the amount that would naturally work downstream and thereby hasten channel development.

The works outlined are not expected to be carried out as a single project, but are intended to develop in time and show how the various industries of a section can be made to improve the carrying capacity of the navigable rivers that drain them, instead of deteriorating from them. The writer regrets that owing to the meager salary he has not been able to make the examinations and surveys necessary to make the proper estimates of costs and other details, nor was such work contemplated when the compensation was fixed—the duties being rather those of disbursing officer on the part of the State for the works upon the Yuba River.

In his private capacity he has had opportunities for experience along mountain and débris lines that have fallen to the lot of but few inquirers.

This contribution to the open discussion of this most vexed problem is made, hoping to see two blades of grass flourish where one has died and the other withers to-day.

Respectfully submitted.

W. W. WAGGONER,
Débris Commissioner.



BIENNIAL REPORT

OF THE

BOARD OF STATE HARBOR COMMISSIONERS

FOR THE

BAY OF SAN DIEGO

OCTOBER 1, 1906.



SACRAMENTO

W. W. SHANNON, : : : : SUPERINTENDENT STATE PRINTING

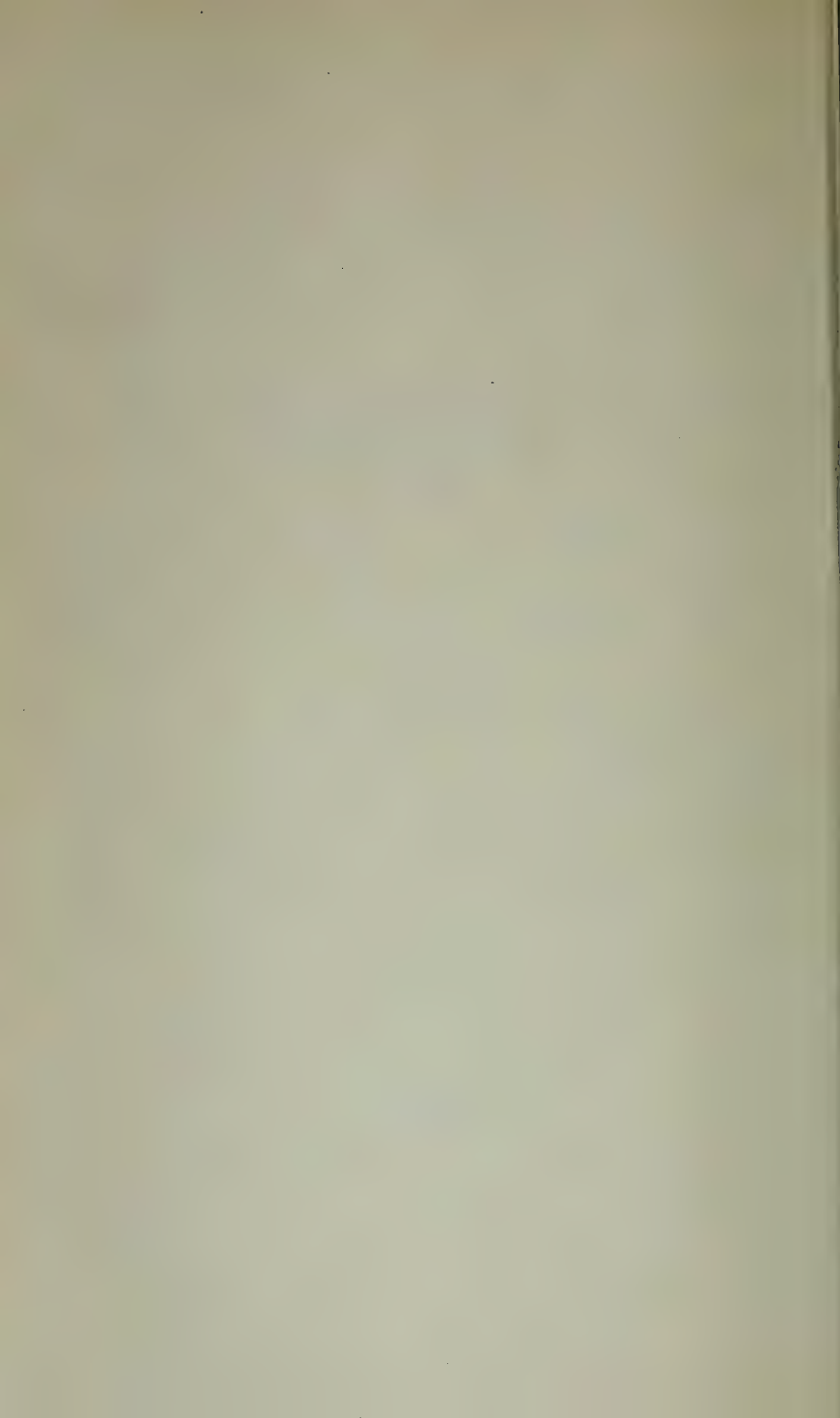
1906

BOARD OF STATE HARBOR COMMISSIONERS FOR THE BAY OF SAN DIEGO.

CHAS. W. OESTING.....San Diego.
EUGENE DE BURN.....San Diego.
CAPT. W. H. PRINGLE.....San Diego.

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EUGENE DE BURN.....Secretary.
CAPT. W. H. PRINGLE.....Chief Wharfinger.
EUGENE DANAY.....Attorney.
G. A. D'HEMECOURT.....Engineer.



REPORT

OF THE

BOARD OF STATE HARBOR COMMISSIONERS FOR THE BAY OF SAN DIEGO.

SAN DIEGO, CAL., October 1, 1906.

To HON. GEORGE C. PARDEE,

Governor of the State of California.

YOUR EXCELLENCY: In accordance with the provisions of Section 2592 of the Political Code, the Board of State Harbor Commissioners for the Bay of San Diego respectfully submits the following report for the two years beginning October 1, 1904, and ending September 30, 1906.

FINANCIAL STATEMENT.

Senate Bill No. 774, amending Section 2584 of the Political Code, approved by the Governor, March 20, 1905, went into effect April 1, 1905. The provisions of this law authorize the Board of State Harbor Commissioners for the Bay of San Diego to designate a bank in which shall be deposited all moneys received for the use of the bay and its tide lands, and to draw from the bank and pay the salaries of the members of the Board and all necessary expenses of the Board.

On the 20th day of June, 1905, the American National Bank of San Diego was designated by the Board as the bank of deposit.

No money was collected for the use of the bay until June, 1905, since which time the provisions of the law have been observed.

RECEIPTS.		DISBURSEMENTS.	
1905—June.....	\$61 00	1905—June.....	.....
July.....	21 50	July.....	\$71 25
August.....	296 00	August.....	42 35
September.....	325 25	September.....	261 55
October.....	300 30	October.....	350 25
November.....	297 00	November.....	286 75
December.....	309 70	December.....	289 65
1906—January.....	322 50	1906—January.....	275 25
February.....	286 50	February.....	350 50
March.....	338 60	March.....	276 00
April.....	290 50	April.....	350 00
May.....	290 50	May.....	278 45
June.....	299 35	June.....	310 00
July.....	303 50	July.....	291 30
August.....	278 50	August.....	325 00
September.....	322 50	September.....	225 00
Total.....	\$4,343 20	Total.....	\$3,983 30
		Balance.....	359 90

The salaries of the Commissioners have been computed, beginning with April 1, 1905, and ending with September 30, 1906; being for eighteen months:

Chas. W. Oesting—By salary, 18 months, at \$25.....	\$450 00
Chas. W. Oesting—To cash.....	125 00
Balance.....	<u>\$325 00</u>
W. H. Pringle—By salary, 18 months, at \$25.....	\$450 00
W. H. Pringle—To cash.....	450 00
Eugene DeBurn—By salary as Commissioner, 18 months, at \$25.....	\$450 00
Eugene DeBurn—By salary as Secretary, 18 months, at \$100.....	1,800 00
	<u>\$2,250 00</u>
Eugene DeBurn—To cash.....	1,418 00
Balance.....	<u>\$832 00</u>

OTHER EXPENSES.

Office rent.....	\$375 00
Attorney's salary.....	646 50
Chief Wharfinger's salary.....	818 00
Court expenses, Commissioners vs. Wright.....	10 00
Court expenses, Commissioners vs. Engelbretsen.....	23 50
Office furniture.....	8 00
Express charges.....	3 65
Typewriting, stationery, postage, incidentals.....	105 65
Total.....	<u>\$1,990 30</u>

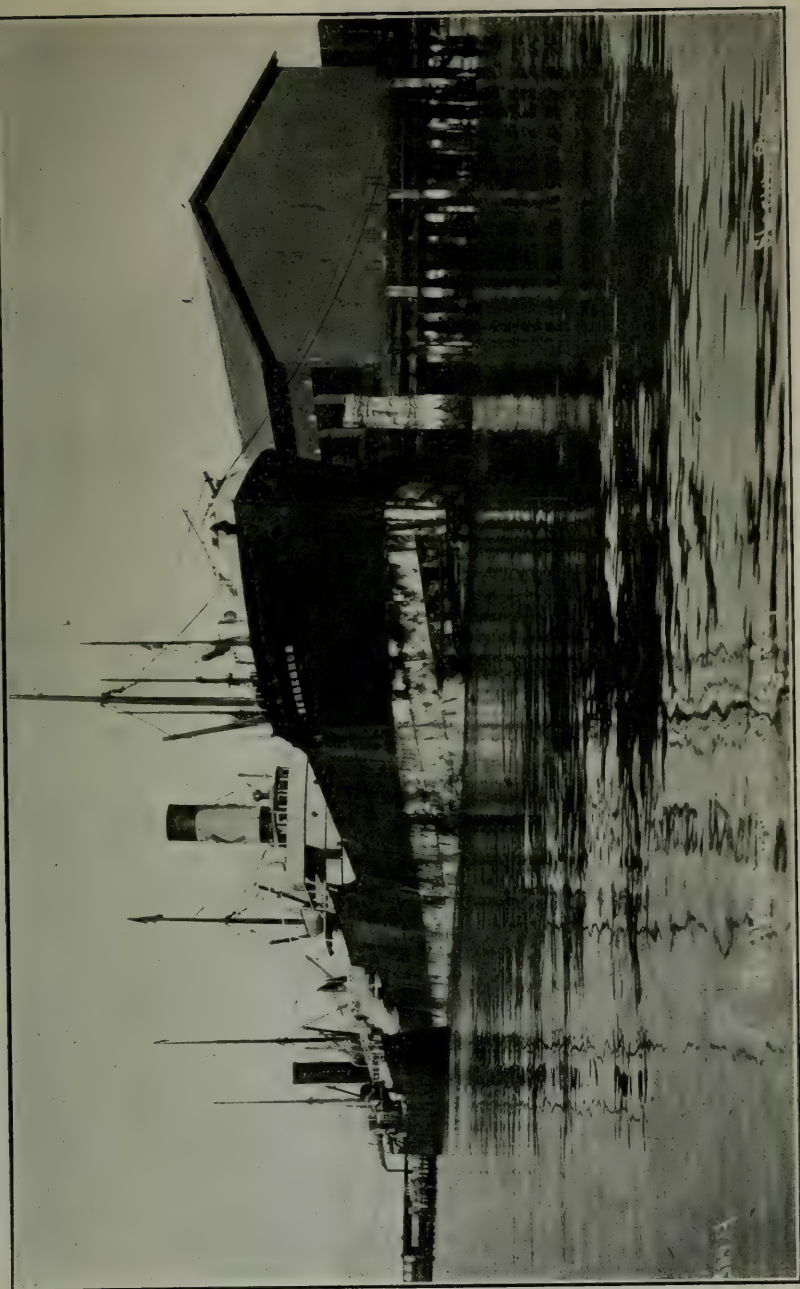
RECAPITULATION.

Receipts.....	\$4,343 20
Disbursements:	
Chas. W. Oesting.....	\$125 00
W. H. Pringle.....	450 00
Eugene DeBurn.....	1,418 00
Other expenses.....	1,990 30
	<u>3,983 30</u>
Balance.....	<u>\$359 90</u>

THE BAY OF SAN DIEGO.

In the great State of California, with a seacoast 800 miles in length, the nearness of the Coast Range to the sea leaves room for the formation of but few natural harbors. Of the two large deep-water harbors, the Bay of San Diego lies in the far south. Being well to the southward and being the first port in the United States reached by vessels passing from the Atlantic to the Pacific, it is the initial point in the nearest and most direct route from the California coast, through Hawaii, to China, Japan, and other points in the far East.

In the form of a crescent, about 13 miles in length, varying from a half mile to two miles in width, the bay has an area of about 22 square miles.



LARGE SHIPS IN SAN DIEGO HARBOR.

The entrance is straight and easy of access. The sea does not break on the bar; there is, in fact, very little swell. There are no hidden reefs, no sunken rocks, no treacherous currents to guard against.

Loma Peninsula, or Headland, towering 400 feet above the water, its huge bulk looming against the sky, forms the northern shore of the bay, warding off the strong northwesterly winds, perfectly shielding the harbor from their force.

ANCHORAGE.

A holding ground of deep, heavy, tough mud, depth of water sufficient to float the largest vessels that traverse the seas, and immunity from the force of winds afford secure anchorage. No vessel has ever dragged her anchor, no marine disaster has ever occurred on account of storm, in San Diego Harbor.

Latitudinally below the region of the polar, westerly winds, which cause the fierce storms of the tempestuous northern seas, the path of commerce lies across a "Pacific" ocean.

SHIPPING.

NUMBER OF VESSELS ARRIVED IN THE PORT OF SAN DIEGO, CALIFORNIA, FROM OCTOBER 1, 1904. TO OCTOBER 1, 1906.

Month.	STEAM.				SAIL.			
	From Ports in the United States	From Foreign Ports	Total	Tonnage	From Ports in the United States	From Foreign Ports	Total	Tonnage
1904—October	17	7	24	18,956	7	1	8	4,815
November	23	5	28	16,796	10	—	10	2,444
December	14	8	22	24,079	9	—	9	3,386
1905—January	16	6	22	26,632	5	1	6	2,456
February	21	5	26	31,198	9	—	9	3,777
March	17	10	27	27,174	4	—	4	276
April	19	7	26	24,389	7	—	7	3,058
May	18	4	22	16,789	4	—	4	1,688
June	14	7	21	20,469	6	—	6	2,051
July	22	4	26	23,973	7	1	8	3,578
August	16	6	22	20,870	12	—	12	5,026
September	19	5	24	21,308	9	1	10	4,680
October	18	3	21	17,803	5	1	6	3,971
November	16	6	22	18,690	7	2	9	4,011
December	24	8	32	29,821	7	1	8	5,176
1906—January	21	7	28	27,486	4	—	4	1,731
February	21	5	26	23,868	6	—	6	2,024
March	23	6	29	26,099	9	1	10	6,099
April	29	5	34	28,259	5	1	6	3,644
May	18	6	24	21,116	9	1	10	5,330
June	6	6	12	9,797	4	—	4	1,043
July	19	6	25	22,728	7	—	7	3,751
August	16	9	25	22,456	8	—	8	2,738
September	24	9	33	31,069	4	—	4	2,308
Totals	451	150	601	552,825	164	11	175	79,061

DREDGING.

The depth of water at the entrance to the bay was originally about 23 feet at low tide. In July, 1903, Capt. A. A. Polhemus began the work of deepening the water over the bar for the Government. By February, 1904, he had dredged out a channel across the bar 1,300 feet long and 270 feet wide, with a depth of 28 feet at low water. The middle ground between the entrance and the anchorage has also been dredged to the same depth, permitting vessels to steam directly up the harbor instead of making the old circuitous detour.

The Government has constructed a jetty at the mouth of the harbor which causes the outflowing tide to strike the bar directly, without diffusion, the effect being the scouring of the bottom. There is still \$10,000 in the fund appropriated by the Government for dredging, and the work of widening and deepening the channel will be continued immediately.

At the wharves and in the stream the water is from 30 to 50 feet deep, and there is abundance of room for sea-going vessels of the deepest draft.

LARGE SHIPS.

In evidence of the depth of water in the harbor, the ships of the American-Hawaiian Line regularly call at this port. Instances:

On December 31, 1905, the steamship "Texan" came into port; 471 feet long, 57 feet 2 inches breadth, 31 feet 8 inches depth; gross tonnage, 8,615; net tonnage, 5,636; drawing 27 feet 7 inches of water at the time.

On January 25, 1906, the steamship "Arizonan" came into port; same size as the "Texan."

On February 24, 1906, the steamship "Hawaiian" came into port; gross tonnage, 5,597; net tonnage, 3,650.

On March 20, 1906, the steamship "Oregonian" came into port; same size as the "Hawaiian."

On April 15, 1906, the steamship "American" came into port; same size as the "Hawaiian."

On May 8, 1906, the steamship "Massachusetts" came into port; 490 feet long, 58 feet 5 inches breadth, 24 feet depth; gross tonnage, 7,913; net tonnage, 5,131; drawing 27 feet 1 inch of water at the time.

On June 6, 1906, the steamship "Californian" came into port; same size as the "Hawaiian."

In July, 1906, the steamship "Alaskan" came into port; same size as the "Texan."

On July 29, 1906, the steamship "Texan" again came into port.

RAFT.

On the 7th day of September, 1906, a huge raft of saw-logs, the property of the Benson Lumber Company, was towed into the harbor. The raft was 600 feet long, 50 feet wide, 35 feet deep, and drew 22 feet of water. It was built in the Columbia River and was towed down the coast to San Diego. The logs will be sawed into lumber at the Benson mill, now being erected on the shore of the bay. The raft will cut about 3,500,000 feet of lumber.

GOVERNMENT WORKS.

The Government is well aware of the strategic importance of the bay. Modern forts for its defense have been built. The military post has remarkably well-appointed quarters for the officers and men.

The quarantine station has a fine equipment of the most modern fumigating and disinfecting apparatus. The detention quarters are ample and well arranged. Next year, the station will be removed farther up the bay, and a Government coaling station will be built where the quarantine station now stands.

WORK OF THE BOARD.

The Board has held one regular meeting every month; besides, twenty-five special or adjourned meetings have been held in the past two years. Every duty has been diligently performed, and the Board has been alert in protecting the interests of the State in the bay. The recognition of the right of the State to a large amount of the tide lands of the bay, occupied and held by persons and claimed by them under squatter's rights, has been secured by inducing these people to pay a small monthly rental for the premises they occupy.

Within the past two years, encroachment upon the tide lands of the bay by unauthorized persons has been entirely stopped. But a large portion of the tide lands is yet in the possession of private individuals and of corporations, some of whom have made large investments thereon in buildings and in other valuable improvements and have filled in the land, and they deny the right of the State to the possession or control of the premises they occupy.

FRANCHISES.

It has been the policy of the Board to foster the commercial use of the bay, and to that end industries in boat and ship building and in the manufacture and repairing of machinery used in vessels have been encouraged.



WARSHIPS IN THE BAY OF SAN DIEGO.

Permits have been granted giving authority for the construction of small wharves and for making minor improvements.

The franchises of the companies owning the large commercial wharves have all been renewed for terms of twenty years; to terminate on August 1, 1925. These franchises are as follows: To the

Atchison, Topeka, and Santa Fé Railway Company.....	Wharf.
Pacific Coast Steamship Company.....	Wharf.
Spreckels Bros. Commercial Company.....	Wharf.
{ Coronado Beach Company.....	Ferry Slip.
{ Coronado Beach Company.....	Wharf No. 3.
Standard Oil Company.....	Wharf and Pipeline.
Jorres & Son.....	Wharf.
San Diego Lumber Company.....	Wharf.
Russ Lumber and Mill Company.....	Wharf.

Other franchises and permits were granted as follows:

October 4, 1904, to C. Telson, a foot wharf, boat shop, and small marine ways; during the pleasure of the Board.

December 22, 1904, to Olympia Rowing Club, foot wharf and boat house; during the pleasure of the Board.

April 17, 1905, to Home Telephone and Telegraph Company of San Diego, cables of telephone and telegraph wires across the bay; twenty years.

July 24, 1905, to San Diego Fish Company, wharf and fish house; during the pleasure of the Board.

July 24, 1905, to Hensley-Howard Company, small boat wharf; during the pleasure of the Board.

September 5, 1905, to San Diego Consolidated Gas and Electric Company, foot wharf in connection with pipeline now existing; twenty years.

November 21, 1905, to R. M. Cresswell, small boat wharf for ferry at at Roseville; twenty years.

April 4, 1906, to San Diego Consolidated Gas and Electric Company, pipeline to high-tide line; during the pleasure of the Board.

April 4, 1906, to Russ Lumber and Mill Company, boatways and tool house; during the pleasure of the Board.

June 5, 1906, to S. Benson, piling and wharf and platform for saw-mill; nineteen years.

June 5, 1906, to National Fish Company, wharf and fish house; during the pleasure of the Board.

July 28, 1906, to Coffee Club Association of San Diego, house for Coffee Club; during the pleasure of the Board.

The franchise of A. C. Johnson, granted January 7, 1904, for small boatways, was revoked, for the reason that the franchise had never been used and the location was needed for other purposes.

The franchise of Santana Romero, granted January 7, 1904, for

small boatways, was revoked, for the reason that the franchise had never been used and the location was needed for other purposes.

September 28, 1906, the franchise of Manuel S. Goularte, granted June 7, 1904, for small marine ways, dry dock, and wharf and pier, was revoked, for the reason that the location was needed for other and larger purposes.

The franchise of C. Telson, granted October 4, 1904, for a foot wharf, boat shop, and small marine ways, was revoked September 28, 1906, for the reason that the location was needed for other and larger purposes.

RECOMMENDATION.

The tide lands of the Bay of San Diego are a large and valuable property, worth several hundred thousand dollars. To preserve and protect the interests of the State in these tide lands, the shore line or line of mean high tide should be established and permanently fixed by survey and by placing conspicuous marks or monuments at salient points along the shore.

There having been much change in the shore line in the past, and much of the tide lands having been filled in, now appearing to be high land, it will require living witnesses in many cases to establish the facts. While witnesses are yet to be found, they are advancing in years and soon will have passed away. These facts make it necessary that reclamation be undertaken soon, if it shall be done at all.

This work will necessitate the employment of engineers. And to secure possession of the tide lands now held by individuals and corporations probably will require some litigation. The receipts from the bay at present will not be sufficient to defray these expenses. This Board therefore recommends that the State shall appropriate sufficient funds to carry out this work.

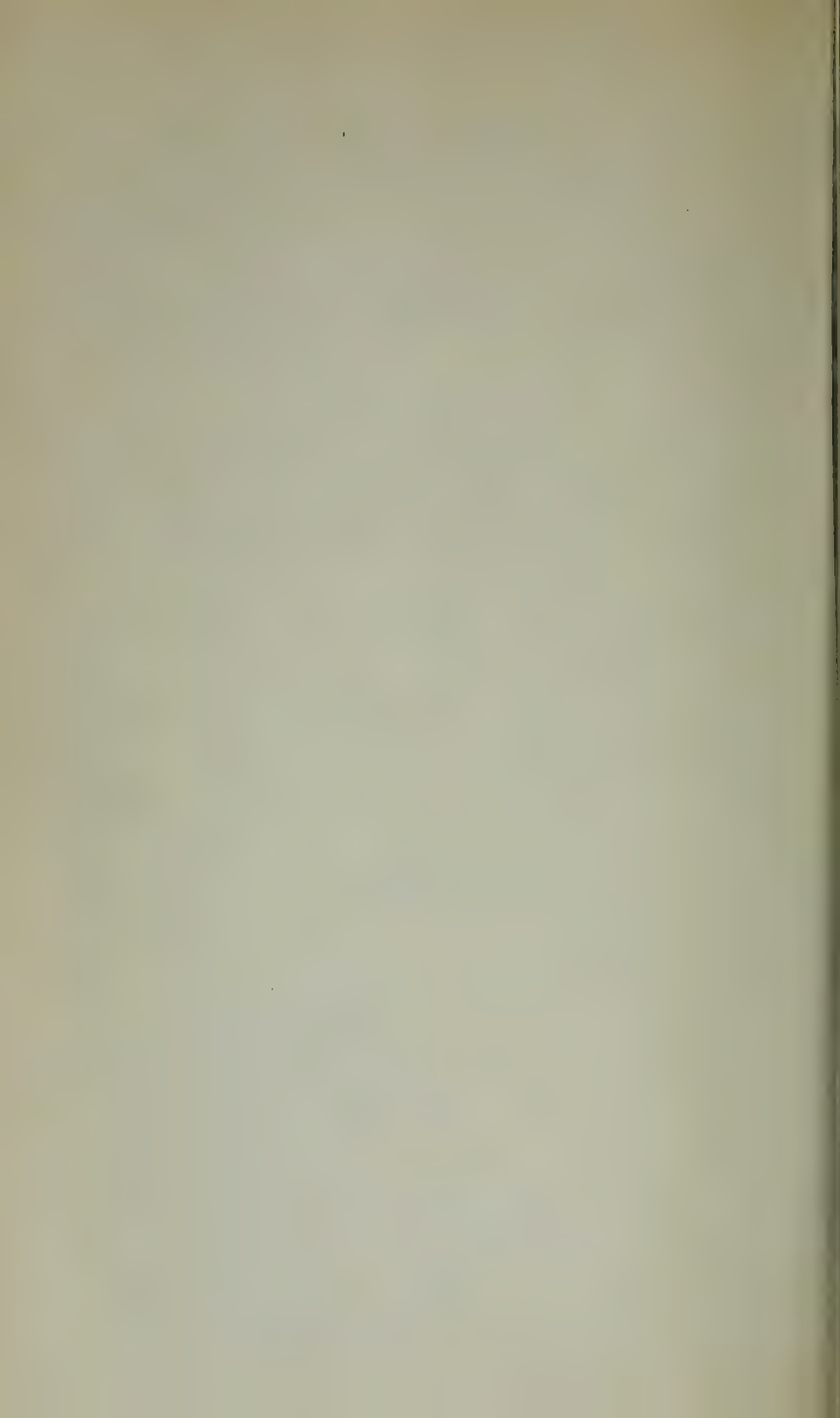
Respectfully submitted.

CHAS W. OESTING,

EUGENE DE BURN,

CAPT. W. H. PRINGLE,

Board of State Harbor Commissioners
for the Bay of San Diego.



REPORT
OF THE
COMMISSIONER OF PUBLIC WORKS

TO THE
GOVERNOR OF CALIFORNIA

FRANK D. RYAN, Commissioner

1904-1906



SACRAMENTO

W. W. SHANNON, : : : : SUPERINTENDENT STATE PRINTING

1906

M. A. NURSE, - - - - - *Engineer.*

W. H. HEUER, - - *Consulting Engineer.*

MEMBERS OF THE AUDITING BOARD.

ALEX. GORDON, - - - - *Chairman.*

THOS. B. HALL, - - - - *Secretary.*

M. J. BRIGGS, H. WEINSTOCK,

G. W. TATTERSON.

REPORT OF THE COMMISSIONER OF PUBLIC WORKS.

SACRAMENTO, CAL., November 30, 1906.

To HON. GEORGE C. PARDEE,
Governor of California.

DEAR SIR: Under date of December 20, 1904, there was submitted to you, together with the report of the Commissioner of Public Works, a general plan and estimate of cost for rectification of the Sacramento and San Joaquin rivers, their principal tributaries, and the reclamation of the overflowed lands adjacent thereto, prepared by a Commission of Engineers, who were appointed by the Commissioner of Public Works upon the recommendations of many of the ablest engineers of America, given in response to a request made by the California River Improvement and Drainage Association for engineers of ability and experience in dealing with problems of river improvement and reclamation on other waterways of the Nation where difficulties to navigation have been largely remedied and reclamation interests successfully promoted.

The plan as presented provides for channel rectification and enlargement by the joint action of natural and mechanical agencies and the ultimate concentration and confinement of these rivers and the tributary streams between lines of levees so located as to provide ample channel area for transporting all the flood volume harmlessly to an outfall in Suisun Bay. Until such channel rectification and enlargement shall have been secured through the associated agencies of increasing current energy and mechanical excavation, relief will be afforded to substantially built levees by the introduction of escapement weirs to temporary bypass channels for conducting the surplus flood waters through the basins to an outfall below.

The engineering problems involved in the proper improvement of these rivers and the reclamation of the vast areas of low lands adjacent thereto have been solved by the Commission of Engineers, and their solution of the vexed problem should be accepted as final, except in so far as minor modifications may be found advisable through experimentation as the vast work of channel rectification and reclamation progresses.

After this report had been submitted, printed, and given wide distribution, Congress, in the River and Harbor Act of March 3, 1905, authorized and directed the appointment of three engineer officers of the United

States Army for the purpose of making a general examination of the Sacramento, San Joaquin, and Feather rivers and their tributaries, and of consulting with any engineers, commissioners, or officers who have been appointed by the State of California to determine a method of controlling the overflow of said rivers and their tributaries, with a view to considering what, if anything, the United States can, or should do, in conjunction with said State, to improve the navigation of said rivers and their tributaries, and the probable cost to the United States of such improvement.

This Board was appointed, made the required investigations, and submitted its report under date of September 25, 1905. It is known as Printed House Document No. 262, Fifty-ninth Congress, First Session.

The report is a compendium of valuable descriptive information as to extent, character, and topography of California's interior valleys and overflow areas, and contains much statistical data on rainfall, drainage areas, and river commerce, with comparative depths of the Sacramento River through periods beginning with the survey of 1841 up to recent date, clearly showing that the Sacramento River's minimum depth has not been materially reduced in these many years, though the low-water plane at Sacramento has been raised about 7.5 feet since 1850 as a result of hydraulic mining. Page 12 of this report, "Benefit to navigation from efforts at reclamation":

"The full effect of this injury, however, has not been allowed to take place on the Sacramento River, more especially in its lower reaches. The efforts of the landowners to keep back the ever-rising high water from their farms by levees, which had to be added to in height every few years to keep pace with the ever-rising flood plane, has had the effect of keeping the river within its banks, at all but very high stages, for many miles of its length. We thus find that, although there was only an available least depth of 7 or 8 feet in the Sacramento River from Sacramento to Suisun Bay in 1841, from profiles or surveys made at that date, there is now an available depth of 7 feet over the same distance, and in the mean time the bed has filled so that at Sacramento the low-water level is now 7.5 feet higher than in 1841. This maintenance of depth has been mainly accomplished incidentally by the reclamation work done by individuals and the State, and is a benefit to navigation which has enabled the United States to maintain the favorable channel depths with comparatively small expense. In consequence of this incidental assistance to the United States in maintaining navigable depths it would appear that in equity some financial assistance might be given by the United States toward the problems of reclamation and the prevention of overflow now being studied under the State's supervision.

"Reclamation by the Federal Government.—If all the swamp and overflowed land transferred to the State under the Act of 1850 had been

retained by the United States as 'public land' up to the present time, it is certain that the entire problem of reclamation in the Sacramento and San Joaquin valleys could be approached with reasonable promise of easy solution, the land paying for the cost of the work, as in other reclamation projects now under construction. Any Federal appropriation for such reclamation now, however, would go primarily to increase the value of the holdings of private individuals and be of great benefit to the State by increased valuation of property and increased taxation, without there being any return to the General Government, except an indirect one resulting from the increase of general wealth."

NATIONAL ASSISTANCE.

During a recent visit to our State of Hon. Joseph E. Ransdell, a member of the Rivers and Harbors Committee of the United States Congress, a review of the San Joaquin and Sacramento rivers was made in company with the Commissioner of Public Works, the President of the Sacramento Valley Development Association, and members of other public bodies of our cities and valleys.

He expressed a deep surprise that such important cities as Sacramento and Stockton, situated on magnificent rivers within valleys of inestimable potentialities, should complacently submit to navigable depths of less than 15 feet at low-water stages for growing commercial needs.

He urged organization and concerted efforts on the part of all interested bodies, in seeking favorable congressional recognition and assistance for such improvement in navigation, and asserted that Eastern cities of like importance on tidal streams are clamoring for, and in many cases receiving, the desired Government aid for channel deepening to even a greater depth than 15 feet. No project for the improvement of our waterways will receive congressional favor without a report on its practicability, cost and advantages, from local Army officers having charge of the district where the waterways are located.

Nothing can be initiated by the local Army engineers. Congress must authorize them to act.

Let us rouse the great project of river improvement and reclamation from the lethargy that over forty years of disconnected and systemless efforts for its accomplishment have failed to do and with new energy begin the task of its execution upon lines that promise ultimate success.

Let Congress of the United States be requested, through legislative or other effective agencies, to authorize a survey and report upon the practicability and cost of providing 15 feet of water to Stockton, a like depth to Sacramento, with 9 feet from Sacramento to the mouth of Feather River, and 7 feet from there to Marysville, and the bearing such river improvement will have toward flood control, reclamation and commercial development.

Such a report from local Army officers can then be made the basis of appeal for national aid in promoting our commercial and associated river interests.

RECLAMATION DIFFICULTIES.

Under existing statutes of California pertaining to reclamation, the almost invariable rule has been to apportion the cost of necessary protection and improvement works according to the benefits to be received by the lands embraced in the district.

In favored localities, embracing the higher lands along the river bank and including the islands in the lower river deltas, where the cost of levee construction has not been so great as it will be in the lower lands of the basins, this system of distributing assessments has been productive of good results in accomplishing an effective reclamation of possibly twenty per cent of the lowland area of our State.

But the immense tracts of low land in Butte, Sutter, Colusa, Yolo, and American basins, still open to overflow, can only be reclaimed by methods of procedure that border on the intrepid in character, too costly in the magnitude of the expenditures involved in their perfection to be borne by the tracts alone.

Levees, at best, are not an absolute barrier to overflow. There is the ever-prevalent danger of rupture and overflow, sufficiently pronounced to render the lands inclosed by such monster dikes as these basins will require in their reclamation, of doubtful security for the cost of protection against flood disaster; and if the higher lands, already reclaimed, have no obligation to bear burdens of reclamation beyond their own extent, it must be evident that the great cost of reclaiming the basin areas will be more than these tracts alone will justify.

The problem of ways and means for the execution of a comprehensive and complete plan of river improvement and reclamation of California's lowlands will require statesmanship of the highest type in its legislative solution, for these fertile areas, corresponding in measure to states, or empires even, must bear the cost of improvement and protection in other than their diversified relation to accruing benefits. Otherwise the project of reclaiming the still open basins by the land-owners must be long delayed, if not hopelessly abandoned, for want of funds.

IMPORTANCE OF RIVER IMPROVEMENT.

California's development and prosperity are particularly dependent upon the systematic improvement of her navigable waterways, not alone as a protection against excessive transportation charges, for products and supplies by improved commercial facilities, but as the essential factor in the reclamation of over 1,000,000 acres of extremely fertile land and placing it in a position of assured safety from overflow.

The Great Central Valley of California consists of a depression

between the Sierra Nevada and Coast Range mountains nearly 400 miles in length and about 35 miles in width.

The plains land of smooth surface within this depression aggregates fully 14,000 square miles, about fifteen per cent of which was subject to overflow before operations for reclamation and drainage were begun.

The marvelous fertility of the irrigated and reclaimed portions of these lands, built up from "an agricultural cream washed from the bordering mountains," has been demonstrated in long-continued and astounding productiveness.

Nature has liberally blest California in providing waterways for the interchange of commodities and the cheap transportation of her products from this vast area.

The Sacramento and San Joaquin rivers, the drainage ways of this great interior valley, have navigable lengths of about 260 miles for the Sacramento from the north, and about 200 miles for the San Joaquin from the south, to a common outfall in Suisun, San Pablo, and San Francisco bays.

Skirting these great bays are navigable estuaries and rivers, as Alviso and Suisun sloughs, and Napa, San Rafael, and Petaluma rivers, upon which the important commerce of rich interior valleys is conducted through the various craft adapted to their navigation.

Bordering these inland waterways lies the highly productive land of California.

No freight monopoly can be long sustained if these valuable water facilities be improved and maintained free from obstruction.

Notwithstanding the vast importance of our many natural water-courses, nearly all of which need improvement in the interest of navigation and drainage, the State of California has spent less than half a million dollars in their rectification and improvement, and the National Government less than one million dollars for the multifarious needs of commerce on the Sacramento and Feather rivers.

These sums are small in comparison to the last decade of river and harbor appropriations and expenditures by European countries in the development of less important waterways and their associated interests.

No State in the Union is more deeply concerned in the improvement of her waterways than is California.

The national grant of over a million and a half acres of overflowed land to our State, carrying with it a legal obligation for its reclamation, was made in 1850.

The State, in turn, shifted the responsibility for reclamation to individuals by a gift of these lands—a sort of bid or bribe for release from its assumed obligations.

The Government and State have, since shifting this responsibility to individuals, permitted and encouraged hydraulic mining to wash down mountains of material to find lodgment in the channels below, thus

interrupting (in instances almost destroying) their navigability and reducing the flood-carrying capacity of many of our rivers to such an extent that restoration and improvement must be accomplished to make further reclamation practicable.

It is true that landowners have in certain piecemeal tracts succeeded in protecting the higher and less frequently submerged portions from overflow by continually adding to levee heights to keep pace with the ever-rising flood plane that followed channel filling. But by far the larger area of our lowlands, embracing the great basin inside the rim of higher lands skirting the rivers, is yet open to overflow, and unless material aid be extended by the Government and State in restoring, rectifying, and deepening our damaged rivers, the project of reclaiming and adding fully 1,000,000 acres of these fertile overflowed lands to the agricultural and industrial wealth of our country is certainly a doubtful, if not an impossible, task.

BENEFICIAL RESULTS OF RECENT IMPROVEMENT.

A material deepening of the Sacramento below the mouth of Feather River has resulted through the influences of recent work done by the State and Nation in channel maintenance and improvement. Navigation has been improved and tidal action (the essential element for channel preservation) has been enlarged and extended fully 15 miles up the river. A few years ago tidal oscillation did not reach within 10 miles of Sacramento City, because of channel filling and bar formations between Rio Vista and the mouth of Feather River. Prior to recent river improvement navigation was hampered by shoals, and river steamers were so delayed thereby that schedule time was impossible between Sacramento City and points below. Transportation is now uninterrupted by shallow water, or bar formation, notwithstanding the low water has been lowered fully two feet at Sacramento City.

Thus the river slope, through the influences of recent improvements, has been so reduced that tidal action has been extended above Sacramento City in the last few years. The importance of tidal action in preserving river channels, particularly in rivers whose waters are, at times, taxed beyond their power to maintain the sediment in suspension, is readily apparent from constant assistance of such tidal agency in the transportation of silt.

Equally as important to river interests has been the river improvement on the San Joaquin.

CHANNEL MAINTENANCE.

Vast sums of money, possibly aggregating \$20,000,000, have been expended by organized districts and individual landowners along the Sacramento and San Joaquin rivers in levee construction to protect the islands in the river deltas and adjacent lowlands from overflow. Where

naturally favorable conditions and constant work have been combined a reasonable success has been attained, and thus many thousands of acres of these fertile lands have been reclaimed and added to the agricultural area and wealth of our State. The problem of protection by effective levees would be much simplified and cheapened with the removal of the necessity for frequently moving these levees farther back from the rivers before advancing caving banks. This difficulty grows continually more serious, for the new levees must be built on lower ground, as a rule, besides requiring the sacrifice of much valuable property in rebuilding the new levee farther back to prevent disaster by caving and overflow. Bank protection by such methods of revetment as will insure it against erosion or caving, becomes a basic feature of river control and reclamation; for stability of the banks against the current impingement and the action of the waves will be attended with fixedness of channel and safety of levees when once completed. Added to the particular merits of petitions for bank protection in the interests of reclamation, the further consideration of navigation makes appeal for recognition, inasmuch as such protection marks an additional step in the great problem of river improvement and channel maintenance against the flood's destructive vagaries.

An eminent authority (T. G. Dabney of Mississippi) on river protection and improvement has recently said: "In general, to give fixation to a caving bank would put an end to a situation full of future uncertainties, large with potency for destructiveness, both proximate and remote, and both as to time and locality, for it must not be lost sight of that changes of great magnitude in channel conditions in one place must extend their influence in a very direct manner to the alteration of channel conditions in other localities farther down stream, giving added energy to destructive agencies and setting up unending complications of indefinite extension, which have bearing both upon the general problem of levee protection and that of maintaining channels for navigation."

REVTMENT ON GRAND, BRANNAN, AND SHERMAN ISLANDS.

Methods of security against bank erosion and channel deterioration by consequent changes are an outgrowth of experience and consist of either jetty work or revetment. The relative value of these two methods is largely a question of cost and durability. From the nature of the two classes of work, revetment is the more permanent. Jetty work, being largely of wood, partly beneath water and partly above, must inevitably fall by natural decay in a short time. Revetment work has no perishable material above water, and is therefore exempt from decay. Jetty work is exposed to the direct onslaught of river current with its drift, etc. Revetment rarely, if ever, receives the attack directly. Jetty work is avowedly for the purpose of changing the direction of the river;

their influence is far reaching; the current may be thrown against other banks, causing new destruction and giving rise to just complaint. Revetment never has this effect, but, on the other hand, tends to hold the river in its existing channel. The plan of revetment adopted for bank protection and improvement consists of paving all that portion above low water with rock and protecting that portion under water from erosion, or undermining, by means of mattress work weighted with rock. The mattress is extended from the foot of the bank, or low water's edge, far enough out into the river to prevent all scouring action, and being elastic, it readily adjusts itself to all irregularities of the bottom. The bank must be first graded to proper slope; second, the mattress must be woven, ballasted, and sunk; third, the upper bank must then be paved and spawled.

The plan, specifications and description are taken from "Technical features concerning improvement of the Missouri River," prepared by Major H. M. Chittenden, Corps of Engineers, U. S. A., who kindly furnished the same to our department.

The following testimonial as to the necessity for and efficiency of the revetment introduced for channel maintenance and river improvement has been furnished by the Trustees of Grand, Brannan, and Sherman islands. It should be borne in mind that the landowners here represent approximately 40,000 acres of land, as fertile as any in the world, upon which they have expended over \$2,000,000 of individual funds in reclamation levees alone:

GRAND ISLAND, SACRAMENTO COUNTY, CAL.,
October 1, 1906.

TO HON. GEORGE C. PARDEE, *Governor*,
HON. F. D. RYAN, *Commissioner of Public Works*, and
AUDITING BOARD TO COMMISSIONER.

DEAR SIRS: The very crooked channel of the Sacramento River past the town of Ryde, on Grand Island, in Sacramento County, has for many years hampered transportation interests and, through frequent bank caving, endangered the reclamation of the island.

Like situations existed along the banks of Brannan and Sherman islands. We have held that it is the duty of the State and nation to maintain the integrity of navigable channels against impairment, and thus restrict the burden of landowners to reclamation costs alone. The coöperative plan you have lately pursued in river treatment, based upon the theory that interests of navigation and reclamation are interdependent, and providing for equal payments by the State and landowners, for executing proper works for promoting and protecting these interests, has certainly accomplished much good in channel maintenance and improvement.

The sum of \$44,000, equally contributed by the State and landowners, for introducing modern and effective methods for channel preservation and improvement past Grand, Brannan, and Sherman islands, has been wisely and economically expended under the direction of the Commissioner of Public Works and the Auditing Board.

Safeguards of vast river interests have been cheaply introduced where former expensive efforts at protection and improvement have been costly and ineffectual in comparison.

Channel alignment has been protected, transportation interests promoted, and thou-

sands of acres of the fertile delta lands of the lower Sacramento River have been given greater security against devastation by floods.

W. J. SMITH,
DENNIS LEARY,
A. T. J. REYNOLDS,
Trustees of Grand Island.
J. H. DESROSIER,
HART SMITH,
Trustees of Brannan Island.
J. M. UPHAM,
ISADOR SHAD,
Trustees of Sherman Island.

MOKELUMNE RIVER IMPROVEMENT.

AUGUST 24, 1906.

To HON. GEORGE C. PARDEE, *Governor of the State of California*,
HON. FRANK D. RYAN, *Commissioner of Public Works*,
AUDITING BOARD TO THE COMMISSIONER OF PUBLIC WORKS,
HON. M. A. NURSE, *Engineer*.

GENTLEMEN: At a meeting of the citizens, landowners, and shippers, in conjunction with the Board of Trustees of Reclamation District No. 348, held on the above entitled date, the following resolution, expressing the appreciation of the navigation, drainage and reclamation interests, was unanimously adopted:

WHEREAS, Under the policy of the Governor of this State, and the officers of the Board of Public Works, a system of public works has been undertaken and completed upon the Mokelumne River in the interest of navigation, drainage and reclamation; and,

WHEREAS, Through State aid about thirteen thousand (\$13,000) dollars have been expended in said work; and,

WHEREAS, The navigation, reclamation, and drainage interests in the Mokelumne River basin have added to the State aid the sum of upwards of thirty thousand (\$30,000) dollars, making in all a sum of about forty-five thousand (\$45,000) dollars expended; and,

WHEREAS, By the said coöperation of the State and said local interests, the Mokelumne River has been improved, and its tidal range has been enlarged and extended, and transportation facilities provided throughout about 10 miles of the said Mokelumne River channel that had long been destroyed by bar formations and the accumulation of snags; and,

WHEREAS, These conditions have happily and successfully been remedied by the combined efforts of the State and local landowners in perfecting the plans of river improvement, prepared and submitted by the Commissioner of Public Works, whereby river improvement has been largely promoted, and a broad and fertile area of agricultural lands has been made not only productive but safe from overflow; and,

WHEREAS, Lasting and inestimable benefits of water transportation upon the Mokelumne River from the Galt-New Hope bridge to New Hope landing have been permanently established; and,

WHEREAS, All of the crops of that section, heretofore carried overland, may now be carried by water through said improvements at a reduced rate; and,

WHEREAS, In short, 10 miles of said river heretofore impassable with a rowboat have been made serviceable for river steamers by said coöperative efforts; and,

WHEREAS, The aid received from the State had a marked stimulus in arousing local interest to action; therefore, be it

Resolved, That the citizens, landowners, navigation interests and reclamation interests hereby express their deep appreciation of the said State officers for the liberal and broad support given to said improvements of said Mokelumne River, thus restoring to the use of the people of the State, for all time, a highly serviceable waterway, which now stands as evidence of the far-sighted and wise policy of said honorable public servants; be it further

Resolved, That copies of this resolution be spread upon the minutes of Reclamation District No. 348, and that copies of the same be severally sent to the Hon. George C.

Pardee, Governor of the State of California; Hon. Frank D. Ryan, Commissioner of Public Works; the Honorable Auditing Committee to the Commissioner of Public Works, and Hon. M. A. Nurse, Engineer to the said Board.

ARTHUR THORNTON,
J. P. SARGENT,
E. H. BARBER,
Committee and Trustees.

Attest: GEO. F. McNOBLE, Secretary.

I take pleasure in sending you this expression of appreciation of the people of the Mokelumne River Basin District for your able and useful assistance.

Thanking you for past favors, we remain, very sincerely yours.

By order of the Board of Trustees of Reclamation District No. 348.

GEO. F. McNOBLE, Secretary of Reclamation District No. 348.

EDWARDS BREAK.

On the 26th day of January, 1904, a rupture, locally known as the "Edwards Break," located on the left bank of the Sacramento River, about $2\frac{1}{2}$ miles below the City of Sacramento, occurred in the levee of Reclamation District No. 535. The crevasse soon attained immense proportions and the rush of Sacramento flood waters southeasterly across the valuable lands of intervening reclamation districts eventually overtopped and swept away the vast protection works along the Mokelumne and San Joaquin rivers and found outlet through Staten and Bouldin islands to the great channels below. In this mad rush of flood waters probably 40,000 acres of fertile lowlands, long considered comparatively safe from overflow, were submerged, while residences, outbuildings, and fencing were wrecked in the general devastation. Probably \$2,000,000 would be a low estimate of property and crop loss by this one great flood disaster. Efforts to repair the break in time to minimize impending disaster proved unavailing, for a closure of the crevasse was not effected until the river subsided and the fullest flood damage had been wrought. The closure of the Edwards Break cost the landowners fully \$112,000. The burden fell largely upon 4,000 acres embraced in District No. 535. Means for closing the break were raised through assessments distributed throughout the district, according to the benefits to be received from its closure. In some instances the enormous levy of \$63 per acre was imposed.

The long-continued rush of water through the rim of higher bank land cut it away. The new levee was placed farther inland for foundation. This involved the sacrifice of valuable river-front land to levee purposes. It was built of sand excavated from the river channel by clamshell dredges. Its dimensions were ample to withstand extreme flood pressure. But the great rush of the river flood waters in February, 1905, impinged with damaging force against the new levee. Under the direct onslaught of the flood current the erosion and caving were rapidly invading the new levee. A recurrence of the Edwards Break disaster seemed inevitable unless some plan of diverting the current's onslaught could be hurriedly introduced. The attention of the Gov-

error, the Commissioner, and Auditing Board was drawn to the dangerous situation and the enormous and irretrievable property loss that would befall landowners already nearly impoverished by the late overflow and immense cost of the break's closure.

Upon the recommendation of the Commissioner, approval of the Governor and authorization of the Auditing Board, plans consisting of wingdams and mattress work for deflecting the current away from the rapidly caving levee were prepared by the engineers of the department and introduced without delay. They were effective for the purpose designed and will long remain a safeguard against a repetition of the widespread disaster occasioned through the Edwards Break. It is highly probable that the State's expenditure of \$18,000 in protection here averted an overflow that would have entailed great loss to all within the submerged area and absolute ruin to many.

SUMMARY OF SPECIAL IMPROVEMENTS MADE UNDER COMMISSIONER AND AUDITING BOARD.

Many of the public institutions of the State have referred their engineering matters to the Commissioner and Auditing Board for solution, and under plans and specifications prepared by the engineers of the department important and substantial improvements have been made under our direction and engineer's superintendence.

We mention among these investigations that for water supply and sewage disposal at the Home for the Care and Training of Feeble-Minded Children for the State of California.

Folsom Sewage Plant.—A survey, plan, and specifications for a pumping plant for disposal of the prison sewage through utilization on a prison farm, located on the hill above, were made from this office and submitted to the Prison Directors and the State Board of Examiners for approval. The plant conforming to plan was installed at a cost of about \$12,000, and is in every way satisfactory.

Southern California State Hospital Pumping Plant.—A contour survey of the lands of the Southern California State Hospital, with an estimate of cost and recommendations for installing a supplemental pumping plant for the better irrigation of the hospital lands, was made and installed upon plans prepared by this office; also, an electric plant of the power and capacity recommended.

Ione Industrial School.—A survey, plan and specifications for supplemental reservoir and new pipeline for perfecting a system of water supply for the school were made and submitted to the Board of Trustees. The work was executed in conformity with our plans.

Napa State Hospital Reservoir.—An inadequate water supply for Napa State Hospital led to an investigation for purposes of providing

better storage facilities and the development of a system ample for domestic and fire purposes. A reservoir site was selected in the hills about $2\frac{1}{2}$ miles east of the hospital, embracing a little valley known as "Wicks Flat." The site is an ideal one, with an elevation of 550 feet above the hospital. The reservoir capacity, with dam 45 feet high, will be about 120,000,000 gallons. This hydraulic development may be used as a source of power for lighting, etc., at the institution, besides providing ample water for domestic uses. The reservoir dam of earth will have, when completed, a middle concrete core-wall over 90 feet in height. Its crest length is over 400 feet. The base width of the core-wall is 4 feet, tapering to 2 feet width at the crest. The trench down the mountain slopes on each side and across the lower end of the flat, at places being 58 feet in depth, was excavated to secure a perfect bed-rock contact for the concrete core-wall to thus prevent all seepage and percolation. The tributary drainage is ample to compensate for evaporation. The entire storage may be utilized for power. The low water occurs during summer when the lighting needs of the hospital are comparatively few hours in duration. The total cost of the site, reservoir dam, flush drain, and adjustable intake pipe will approximate \$60,000. The dam is now being constructed.

Veterans' Home, Napa County.—Survey, plans, and specifications for enlargement and improvement of dam and storage reservoir at the Home, together with sewer system and septic tanks, have been prepared and submitted. The estimated cost is \$25,000 for reservoir enlargement and \$5,000 for proposed sewer system.

Many other surveys of a public nature have been made for various interests of the State.

CONCLUSION.

California's interests in navigation and reclamation are interdependent and so interwoven that the proper promotion of either affords material advantage to the other. But vast sums may be and have been spent in systemless reclamation without any benefit to navigation. Hence, the importance of State and National control of river problems and supervision of all work for promoting and preserving these important interests.

All the navigable waters of the State are under National control, and permission to introduce improvements is guarded by such statutory provisions pertaining to channel alterations, liability for damage to private interests, and regulations for supervision of the work to be done, that individuals, or district organizations, are delayed in, or perhaps prevented from, executing plans essential to protection and improvement because of the difficulty in complying with these National requirements.

Detail plans in triplicate, showing character, extent, and locality of proposed works for improvement must be submitted for affirmative approval of the Chief of Engineers of the United States Army. Permission of the Secretary of War must then be had before the proposed improvement in river conditions may be introduced.

It would seem that the office of Commissioner of Public Works, specially created by the State of California to promote interests of navigation, reclamation, and drainage, would be the proper channel through which to secure National permission for introducing such river improvement and channel alterations as may be deemed essential to promote and protect the interests of navigation, reclamation, and drainage.

Upon many of the navigable waterways of the State, besides the Sacramento, San Joaquin, and Feather rivers, a trifling expenditure of money for improvement would promote commerce and drainage to such an extent as to justify the outlay. The development of these waterways is essentially of State interest and benefit.

The hampered commerce along the Mokelumne, Napa, Petaluma, and San Rafael rivers is petitioning for public recognition and relief. The interests affected are generally willing to pay one half the cost of improvement. Thus, the combined efforts of the State, Federal Government and people along the Mokelumne River, in channel rectification, snag removal, and river deepening last year, have added fully 10 miles of fine navigable river to the waterways of our State; drainage has been improved and reclamation of a vast area facilitated by providing better channelway for flood disposal. As a general proposition the United States Congress is more liberal with its appropriations when the State, or local authorities, municipalities or parties benefited show a disposition to aid the Government in its efforts toward internal improvements.

The vast reclamation interests of our State are dependent upon the maintenance of effective levee lines for protection.

The problems of levee magnitude and cost are susceptible of analysis and solution by review of the physical difficulties to be combated. But vagaries of flood that wash and cave the banks away are impossible to foresee and provide against, except as the dangerous caving agencies may indicate the locality and extent and necessity for bank protection. Proper methods of revetment will insure stability of the banks and maintenance of channel, the basic features in flood control, reclamation, and river preservation.

In our judgment the State should lend assistance in fostering and protecting the great reclamation and associated river interests of California. Our great wealth and prosperity are dependent on the eventual development of our river interests.

The advantages of river work, so far done, are so pronounced as to

justify a fixed policy of the State in liberal appropriations for continuation of protection and river improvement upon lines we have recently pursued.

FRANK D. RYAN,
Commissioner of Public Works.

M. A. NURSE,
Engineer.

ALEX. GORDON, Chairman;

THOS. B. HALL, Secretary;

M. J. BOGGS,

H. WEINSTOCK,

G. W. TATTERSON,

Auditing Board to the Commissioner of Public Works.

FINANCIAL STATEMENT.

Act of 1897 (Statutes of 1897). Balance in appropriation December 19, 1904.	\$214 52
Act of 1903 (Statutes of 1903). Balance in appropriation December 19, 1904.	138,106 47
Cash contribution to fund by landowners.....	21,911 36
	<hr/>
	\$160,232 35
Expenses of Auditing Board.....	\$704 20
Engineers' salaries, December, 1904, to September 30, 1906	12,140 00
Office expenses.....	2,749 29
Weir at Butte Slough, Sutter County	27,795 27
Survey, plan of improvement San Rafael Inlet.....	1,000 00
Jetty and revetment, Byers' Bend, Colusa County.....	4,752 50
Revetment, Knight's Landing, Sacramento River.....	1,998 24
Revetment, Chicory Ranch, Sacramento River.....	154 05
River gauges.....	4,380 08
Jetties, Sacramento River, Edwards Break	18,950 88
Jetties, Sacramento River, Washington, Yolo County	3,091 72
Revetment, Grand Island	14,152 49
Revetment, Brannan Island	12,864 80
Revetment, Sherman Island	13,660 58
Channel deepening on Mokelumne River.....	6,850 14
Closures, Finnegan, Minor, and Walden Sloughs, San Joaquin River.....	5,787 45
River and levee survey below Sacramento City.....	208 00
Expenses, Engineers Dabney, Richardson, Chittenden, and Nurse	5,021 86
Special survey, Suisun Bay, and Straits of Carquinez, with report	4,500 00
Survey, Sacramento Drainage District.....	3,231 45
Contour survey between Feather and Yuba rivers.....	2,500 00
	<hr/>
	146,493 00
Balance in appropriation, November 1, 1906	\$13,739 35

TWELFTH BIENNIAL REPORT

OF THE

BUREAU OF LABOR STATISTICS

OF THE

STATE OF CALIFORNIA.

1905-1906.

W. V. STAFFORD, Commissioner.

J. M. ESHLEMAN, Deputy Commissioner.

San Francisco.



SACRAMENTO:

W. W. SHANNON, : : : SUPERINTENDENT OF STATE PRINTING.

1906.

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OFFICE OF THE STATE BUREAU OF LABOR STATISTICS,
FERRY BUILDING,
SAN FRANCISCO, CAL., November 8, 1906.

To His Excellency, GEORGE C. PARDEE,
Governor of California.

SIR: I have the honor to submit herewith the Twelfth Biennial Report
of this Bureau.

Respectfully yours,

W. V. STAFFORD,
Commissioner.

INTRODUCTION.

In presenting the Twelfth Biennial Report of this Bureau, which is composed almost entirely of material gathered since the disastrous fire of April last, there is full realization of the fact that much is lacking in elaboration and deduction. Believing it best to obtain as much definite data as possible in this year of extraordinary industrial activity, the work of collecting was carried too near the time limit allowed by law to permit of exhaustive tabulation.

The article on farm labor is limited as to the number of farms investigated, but is very thorough and comprehensive so far as it goes, and is valuable in that it shows tendencies that are toward better conditions.

The wage statistics are grouped in classes. While a greater segregation is desirable, the form in which the tables are presented is the best possible under the conditions.

Previous to the destruction of the office of the Bureau, much information had been gathered regarding the cost of living and the conditions of the homes of the poor. It is regrettable that this matter was destroyed. The Bureau had very thorough and detailed evidence of the fact that not only were many of the older dwellings unfit for human habitation, but, especially in San Francisco, new buildings were in course of erection that were veritable fire-traps, lacking in light and ventilation, and offensive to all ideas of common decency. In the building following the disaster of last April, there is evidence of a disposition on the part of some investors to erect structures for renting purposes, regardless of all modern ideas regarding sanitary tenements. If we are to avoid all the horrors and dangers of the slums, it is imperative that the coming Legislature shall enact a suitable tenement-house construction law.

The cheerful manner in which county officials throughout the State duplicated returns of all the material required for the report on social statistics, the aid rendered by the Federal Labor Commissioner and other departments at Washington, the willingness of employers to furnish again copies of payrolls, etc., regardless of the pressure of their own affairs, all combined to make this report possible.

LAW CREATING THE BUREAU.

The statute creating this Bureau, providing for its maintenance, fixing its responsibility, and delegating its powers, is as follows:

Stats. of Cal., 1883, p. 27.

An Act to establish and support a Bureau of Labor Statistics.

[Approved March 3, 1883.]

The People of the State of California, represented in Senate and Assembly, do enact as follows.

SECTION 1. As soon as possible after the passage of this Act, and every four years thereafter, the Governor of the State shall appoint a suitable person to act as Commissioner of a Bureau of Labor Statistics. The headquarters of said Bureau shall be located in the City and County of San Francisco; said Commissioner to serve for four (4) years, and until his successor is appointed and qualified.

SEC. 2. The Commissioner of the Bureau, before entering upon the duties of his office, must execute an official bond in the sum of five thousand (5,000) dollars, and take the oath of office, all as prescribed by the Political Code for State officers in general.

SEC. 3. The duties of the Commissioner shall be to collect, assort, systematize, and present, in biennial reports to the Legislature, statistical details, relating to all departments of labor in the State, such as the hours and wages of labor, cost of living, amount of labor required, estimated number of persons depending on daily labor for their support, the probable chances of all being employed, the operation of labor-saving machinery in its relation to hand labor, etc. Said statistics may be classified as follows:

First—In agriculture.

Second—In mechanical and manufacturing industries.

Third—In mining.

Fourth—In transportation on land and water.

Fifth—In clerical and all other skilled and unskilled labor not above enumerated.

Sixth—The amount of cash capital invested in lands, buildings, machinery, material, and means of production and distribution generally.

Seventh—The number, age, sex, and condition of persons employed; the nature of their employment: the extent to which the apprenticeship system prevails in the various skilled industries; the number of hours of labor per day; the average length of time employed per annum, and the net wages received in each of the industries and employments enumerated.

Eighth—The number and condition of the unemployed, their age, sex, and nationality, together with the cause of their idleness.

Ninth—The sanitary condition of lands, workshops, dwellings, the number and size of rooms occupied by the poor, etc.; the cost of rent, fuel, food, clothing, and water in each locality of the State; also the extent to which labor-saving processes are employed to the displacement of hand labor.

Tenth—The number and condition of the Chinese in the State; their social and sanitary habits; number of married and of single; the number employed, and the nature of their employment; the average wages per day at each employment, and the gross amount yearly; the amounts expended by them in rent, food, and clothing, and in what proportion such amounts are expended for foreign and home productions, respectively; to what extent their employment comes in competition with the white industrial classes of the State.

Eleventh—The number, condition, and nature of the employment of the inmates of the State Prisons, county jails, and reformatory institutions, and to what extent their employment comes in competition with the labor of mechanics, artisans and laborers outside of these institutions.

Twelfth—All such other information in relation to labor as the Commissioner may deem essential to further the object sought to be obtained by this statute, together with such strictures on the condition of labor and the probable future of the same as he may deem good and salutary to insert in his biennial reports.

SEC. 4. It shall be the duty of all officers of State departments, and the Assessors of the various counties of the State, to furnish, upon the written request of the Commissioner, all the information in their power necessary to assist in carrying out the objects of this Act; and all printing required by the Bureau in the discharge of its duty shall be performed by the State Printing Department, and at least three thousand (3,000) copies of the printed report shall be furnished the Commissioner for free distribution to the public.

SEC. 5. Any person who willfully impedes or prevents the Commissioner, or his deputy, in the full and free performance of his or their duty, shall be guilty of a misdemeanor, and upon conviction of the same shall be fined not less than ten (10) nor more than fifty (50) dollars, or imprisoned not less than seven (7) nor more than thirty (30) days in the county jail, or both.

SEC. 6. The office of the Bureau shall be open for business from nine (9) o'clock A. M. until five (5) o'clock P. M. every day except non-judicial days, and the officers thereof shall give to all persons requesting it all needed information which they may possess.

SEC. 7. (As amended, Stats. of Cal., 1889, p. 6.) The Commissioner shall have power to send for persons and papers whenever in his opinion it is necessary, and he may examine witnesses under oath, being hereby qualified to administer the same in the performance of his duty, and the testimony so taken must be filed and preserved in the office of said Commissioner. He shall have free access to all places and works of labor, and any principal, owner, operator, manager, or lessee of any mine, factory, workshop, warehouse, manufacturing or mercantile establishment, or any agent or employé of such principal, owner, operator, manager, or lessee who shall refuse to said Commissioner, or his duly authorized representative, admission therein, or who shall, when requested by him, willfully neglect or refuse to furnish to him any statistics or information, pertaining to his lawful duties, which may be in the possession or under the control of said principal, owner, operator, lessee, manager or agent thereof, shall be punished by a fine of not less than fifty nor more than two hundred dollars.

SEC. 8. (As amended, Stats. of Cal., 1889, p. 7.) No use shall be made in the reports of the Bureau of the names of individuals, firms, or corporations supplying the information called for by this Act, such information being deemed confidential, and not for the purpose of disclosing any person's affairs; and any agent or employé of said Bureau violating this provision shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine not to exceed five hundred dollars or by imprisonment in the county jail not to exceed six months.

SEC. 9. (As amended, Stats. of Cal., 1889, p. 7.) The Commissioner shall appoint a deputy, who shall have the same powers as the said Commissioner, and such agents or assistants, not exceeding three, as he may from time to time require, at such a rate of wages as he may prescribe, but said rate must not exceed four dollars per day and actual traveling expenses for each person while employed; he shall procure rooms necessary for offices, at a rent not to exceed fifty dollars per month.

SEC. 10. (As amended, Stats. of Cal., 1889, p. 7.) The salary of the Commissioner shall be three thousand dollars per annum, and the salary of the Deputy Commissioner shall be eighteen hundred dollars per annum, to be audited by the Controller and paid by the State Treasurer, in the same manner as other State officers; there shall also be allowed a sum not to exceed forty-five hundred dollars per annum for the salaries of agents or assistants, for traveling expenses, and for other contingent expenses of the Bureau.

SEC. 12. (As amended, Stats. of Cal., 1901, p. 12.) Whenever complaint is made to the Commissioner that the scaffolding, or the slings, hangers, blocks, pulleys, stays, braces, ladders, irons, or ropes of any swinging or stationary scaffolding used in the construction, alteration, repairing, painting, cleaning, or painting of a building are unsafe or liable to prove dangerous to the life or limb of any person, such Commissioner shall immediately cause an inspection to be made of such scaffolding, or the slings, hangers, blocks, pulleys, stays, braces, ladders, iron, or other parts connected therewith.

If after examination such scaffolding or any such parts is found dangerous to life or limb, the Commissioner shall prohibit the use thereof, and require the same to be altered and reconstructed so as to avoid such danger. The Commissioner, Deputy Commissioner, or agent or assistant making the examination shall attach a certificate to the scaffolding, or the slings, hangers, irons, ropes, or other parts thereof, examined by him, stating that he has made such examination and that he found it safe or unsafe as the case may be. If he declared it unsafe, he shall at once, in writing, notify the person responsible for its erection of the fact and warn him against the use thereof. Such notice may be served personally upon the person responsible for its erection or by conspicuously affixing to the scaffolding or the part thereof declared to be unsafe. After such notice has been so served or affixed the person responsible therefor shall immediately remove such scaffolding or part thereof and alter or strengthen it in such a manner as to render it safe, in the discretion of the officer who has examined it or of his superiors. The Commissioner, his deputy, and any duly authorized representative whose duty it is to examine or test any scaffolding or part thereof as required by this section, shall have free access, at all reasonable hours, to any building or premises containing them or where they may be in use. All swinging and stationary scaffolding shall be so constructed as to bear four times the maximum weight required to be dependent therefrom and placed thereon, when in use, and not more than four men shall be allowed on any swinging scaffolding at one time.

This Act shall take effect immediately.

SOCIAL STATISTICS.

At the last session of the Legislature a law was passed instructing the Commissioner of the Bureau of Labor Statistics to collect statistics on "marriage, divorce and crime." Inasmuch as the Bureau of Vital Statistics was also instructed to collect statistics on "marriage," that part of the investigation was taken up jointly with that department and the tables compiled by its officials have been used for the report on marriages herein presented. For the collection of the material on "divorce and crime" special blanks were prepared by this office and sent out to the county officers whose duty it is, under the law, to furnish the information on these subjects, *i. e.* County Clerks and Sheriffs. Many of these officials responded promptly, but others required much urging. By persistent work and many visits and letters, we were able finally to extract the information from all the County Clerks and from the majority of the Sheriffs. Then came the fire of April 18, when this office lost all its records, and it was necessary to go after the same information again, from the Sheriffs for the entire year, and from the County Clerks for the months of 1906 preceding April. The divorces for the last six months of 1905 had been compiled and sent out in a preliminary report prior to the fire, and it was possible to get a copy of this report. Notwithstanding the extra work required, the information covering divorces has been sent in from every County Clerk in the State, except for the first six months of the present year for the City and County of San Francisco, which records were destroyed. Every Sheriff in the State has reported with the exception of six: those from the counties of Alpine, Butte, Plumas, San Benito, San Luis Obispo, and Trinity. The convictions for felonies in these counties failing to report to this Bureau were obtained from the penitentiaries, thus making a complete story on felonies. The data on misdemeanors are lacking for these counties and for San Francisco and Sonoma counties, where records were destroyed, and the City of Los Angeles. The figures in the table are for Los Angeles County outside the City of Los Angeles. In cities having a city prison distinct from the county jail, it is necessary to call on the chiefs of police for the data covering the convictions for misdemeanors. The Chief of Police of Los Angeles furnished the data in a different form than that taken by the investigation, but this information being a comparison of arrests and convictions, is given in a separate table. The records of convictions in San Francisco were all destroyed. The convictions for felonies in San Francisco and Sonoma counties were obtained from the State penal

institutions. It being impossible to get the convictions for misdemeanors in San Francisco, a copy was made of the arrests for a part of the time under consideration, for the County of San Francisco, for the purpose of showing tendencies. These will be shown separately. Sonoma County records were so mutilated that it was impossible to get the record of convictions for misdemeanors.

MISDEMEANORS.

On account of the six delinquent counties, the destruction of the records in San Francisco and Sonoma counties, and the failure of the Chief of Police of Los Angeles to send in complete data, it will be understood that the figures given here do not include those counties or the city named.

It is considered that the problem of punishment presents two aspects. On the one hand we must look toward the criminal, and on the other hand toward the community. Plainly, an investigation having in view the first aspect would take into consideration the condition of the person punished. The second aspect would lead to an inquiry concerning the crime and the punishment. We have here considered the age and occupation of those convicted as throwing light on the first aspect. It is hoped that in the future we may get more detail along this line, such as marital state, family, education, etc., at least for the felonies. We have also submitted data concerning the nature of offense and the sentence of each individual convicted.

Ages of Persons Convicted of Misdemeanors in This State, for the Fiscal Year ending June 30, 1906. (Tabulated by Counties.)

County.	Total Number of Misdemeanors	Under 15 Years	15 to 19 Years	20 to 29 Years	30 to 39 Years	40 to 49 Years	50 Years and Over	Ages Unknown
Alameda	1999	5	65	574	577	447	331	
Alpine	No report		sent in on	misde me a nors.				
Amador	30	2	7	5	6	10		
Butte	No report		sent in on	misde me a nors.				
Calaveras	10		1	3	3	3		
Colusa	16		3	2	1	1	9	
Contra Costa	177	1	10	50	55	37	24	
Del Norte	1			1				
El Dorado	20			5	8	6	1	
Fresno	683	3	24	228	200	176	52	
Glenn	11		1	6	4			
Humboldt	39							39
Inyo	22		1	9	5	4	3	
Kern	334		5	110	150	49	20	
Kings	79		11	15	19	16	17	1
Lake	5			2	2		1	
Lassen	4				1	1	2	
Los Angeles*	1372	4	214	551	277	180	146	
Madera	27			17	9	1		
Marin	109		1		2	2	2	102
Mariposa	9			3	1		2	3
Mendocino	49		3	15	13	11	7	
Merced	190	1	15	70	49	34	21	
Modoc	7				2	2	3	
Mono	11							11
Monterey	474		22	19	5	6	1	421
Napa	72		2	7	15	18	30	
Nevada	40			9	7	16	8	
Orange	181		1		5	3	3	169
Placer	235		29	92	43	44	17	
Plumas	No report		sent in on	misde me a nors.				
Riverside	100	1	22	37	25	12	3	
Sacramento	276	1	8	89	54	20	4	100
San Benito	No report		sent in on	misde me a nors.				
San Bernardino	646	3	117	333	117	45	25	6
San Diego	217		1	5	15	7	1	188
San Francisco	No report		on convictions.	Recordsdest'yd.				
San Joaquin	510	1	20	105	118	84	92	90
San Luis Obispo	No report		sent in on	misde me a nors.				
San Mateo	90			29	30	13	18	
Santa Barbara	217	1	3	13	11	4	8	177
Santa Clara	323		39	130	73	36	41	4
Santa Cruz	107		2	32	36	22	11	4
Shasta	45			11	20	14		
Sierra	2					1	1	
Siskiyou	25		1	9	7	6	2	
Solano	296							296
Sonoma	No report		on convictions.	Recordsdest'yd.				
Stanislaus	68							68
Sutter	No convictions			formisde me a nors.				
Tehama	42							42
Trinity	No report		sent in on	misde me a nors.				
Tulare	87	1		27	23	23	13	
Tuolumne	21			6	7	4	4	
Ventura	161		15	74	29	28	15	
Yolo	93		2	22	11	10	8	40
Yuba	110		9	35	34	18	14	
Totals	9632	22	645	2750	2070	1410	965	1770

* Exclusive of the City of Los Angeles.

Of a total of 9,632 convicted, 22, or a little more than 0.2 per cent, are under 15 years of age; 645, or a little over 6.5 per cent, are over 15 and under 20 years of age; 2,750, or 28.5 per cent, are between 20 and 30 years of age; 2,070, or 21.5 per cent, are between 30 and 40 years of age;

1,410, or 14.6 per cent, are between 40 and 50 years of age; and 965, or a trifle over 10 per cent, have passed the 50-year mark. Just 60 per cent of the misdemeanors committed in California during the past year, for which convictions were obtained, were committed by persons from 20 to 40 years of age.

Occupations of Persons Convicted of Misdemeanors in California for the Year ending June 30, 1906. (Tabulated by Counties.)

County.	Total	Actor	Architect	Artist	Attorney	Awning-maker	Baker	Barber	Barkeeper	Beckeeper	Blacksmith	Boilermaker	Bookkeeper	Bootblack	Brakeman
Alameda	1999	4				1	6	8	17		6	23	8	4	2
Alpine	No	report	on	conviction	s.										
Amador	30														
Butte	No	report	on	conviction	s.										
Calaveras	10														
Colusa	16														
Contra Costa	177							2			2	3	1		
Del Norte	1														
El Dorado	20										1				
Fresno	683										1			1	2
Glenn	11														
Humboldt	39														
Inyo	22														
Kern	334														
Kings	79														
Lake	5														
Lassen	4														
Los Angeles*	1372	3		2			17	5	8		11	14	4	3	4
Madera	27														
Marin	109														
Mariposa	9														
Mendocino	49							1	2		1				
Merced	190							2	3	2	5				1
Modoc	7														
Mono	11														
Monterey	474										2				
Napa	72							1							
Nevada	40				1						1				
Orange	181														
Placer	225	1						2	1						
Plumas	No	report	on	conviction	s.										
Riverside	100														
Sacramento	296								2			1			
San Benito	No	report	on	conviction	s.										
San Bernardino	646	2					5	5	2		7	4			7
San Diego	217											1			
San Francisco	No	report	on	conviction	s.										
San Joaquin	510	3	3	1	1		4	3	3		14	3	1		1
San Luis Obispo	No	report	on	conviction	s.										
San Mateo	90										1				1
Santa Barbara	217														
Santa Clara	323	1			1		2	3	1		1	1	4	1	1
Santa Cruz	107							1				1			1
Shasta	45													1	2
Sierra	2														
Siskiyou	25										2				
Solano	296							1							
Sonoma	No	report	on	conviction	s.										
Stanislaus	68							1	1		3				
Sutter	No	convictions	for	misdemeanors											
Tehama	42														
Trinity	No	report	on	conviction	s.										
Tulare	87							1							
Tuolumne	21										1				
Ventura	161										4				
Yolo	93														
Yuba	110							3			3				
Totals	9632	12	5	5	3	1	34	39	40	2	66	51	18	10	22

* Exclusive of the City of Los Angeles.

Occupations of Persons Convicted of Misdemeanors in California for the Year ending
June 30, 1906. (Tabulated by Counties)—Continued.

County.	Brass-finisher.....	Brewer.....	Bricklayer.....	Broker.....	Brushmaker.....	Buggy-washer.....	Butcher.....	Candy-maker.....	Cannemaker.....	Capitalist.....	Cardwriter.....	Carpenter.....	Carpet-layer.....	Car-repairer.....
Alameda	6		25	1	1	9	1	1	1	3	1	51		
Alpine	No	report	on	con	viction	s.								
Amador														
Butte	No	report	on	con	viction	s.								
Calaveras														
Colusa														
Contra Costa						2						5		
Del Norte														
El Dorado										1				
Fresno											1	5		
Glenn														
Humboldt														
Inyo														
Kern														
Kings														
Lake														
Lassen														
Los Angeles*	3	2	4			6	4					37		1
Madera														
Marin														
Mariposa														
Mendocino														
Merced				3		1	1	2				1		
Modoc														
Mono														
Monterey												2	1	
Napa							1					2		
Nevada							1							
Orange			1											
Placer							1	1						
Plumas	No	report	on	con	viction	s.								
Riverside														
Sacramento												1		
San Benito	No	report	on	con	viction	s.								
San Bernardino			4			2	1					10		
San Diego														
San Francisco	No	report	on	con	viction	s.								
San Joaquin			2			5						8		
San Luis Obispo	No	report	on	con	viction	s.								
San Mateo												8		
Santa Barbara														
Santa Clara			1			2						2		1
Santa Cruz												2		
Shasta			1											
Sierra														
Siskiyou						1								
Solano												1		
Sonoma	No	report	on	con	viction	s.								
Stanislaus						1								
Sutter	No	con	viction	s	for	misdemeanors.								
Tehama														
Trinity	No	report	on	con	viction	s.								
Tulare														
Tuolumne														
Ventura		1	1											
Yolo														
Yuba			1											
Totals	9	3	40	1	3	1	32	8	3	4	2	135	1	3

* Exclusive of the City of Los Angeles.

Occupations of Persons Convicted of Misdemeanors in California for the Year ending
June 30, 1906. (Tabulated by Counties)—*Continued.*

County.	Cement-worker.....	Chauffeur.....	Cigar-maker.....	Clerk.....	Collector.....	Conductor.....	Contractor.....	Cook.....	Cooper.....	Coppersmith.....	Cowboy.....	Deckhand.....	Defective.....	Dishwasher.....
Alameda.....	2	3		49		2	6	51	2			1	2	5
Alpine.....	No	report	on	conviction	s.									
Amador.....	No	report	on	conviction	s.									
Butte.....	No	report	on	conviction	s.									
Calaveras.....								1						
Colusa.....								1				2		
Contra Costa.....				1				7			1			
Del Norte.....														
El Dorado.....														
Fresno.....								6						
Glenn.....														
Humboldt.....														
Inyo.....														
Kern.....														
Kings.....														
Lake.....														
Lassen.....														
Los Angeles*.....	6		6	26		1		51	3					4
Madera.....														
Marin.....														
Mariposa.....														
Mendocino.....					2			2						
Merced.....			2	3				9						1
Modoc.....														
Mono.....														
Monterey.....									1		1			
Napa.....														
Nevada.....								1						
Orange.....														
Placer.....				1				8	1	1				
Plumas.....	No	report	on	conviction	s.									
Riverside.....														
Sacramento.....				5				3						
San Benito.....	No	report	on	conviction	s.									
San Bernardino.....	3	1		5				12	3		2			2
San Diego.....														
San Francisco.....	No	report	on	conviction	s.									
San Joaquin.....	1			5				20						1
San Luis Obispo.....	No	report	on	conviction	s.									
San Mateo.....								5						
Santa Barbara.....				1				2						
Santa Clara.....				2				20						2
Santa Cruz.....				2				7						
Shasta.....														
Sierra.....														
Siskiyou.....									1					
Solano.....														
Sonoma.....	No	report	on	conviction	s.									
Stanislaus.....				1				2						
Sutter.....	No	conviction	s	for	misdemeanors.									
Tehama.....														
Trinity.....	No	report	on	conviction	s.									
Tulare.....														
Tuolumne.....														
Ventura.....								5						
Yolo.....								2						
Yuba.....														
Totals.....	12	4	8	101	2	3	6	215	11	1	4	3	2	15

* Exclusive of the City of Los Angeles.

**Occupations of Persons Convicted of Misdemeanors in California for the Year ending
June 30, 1906. (Tabulated by Counties)—Continued.**

County.	Druggist	Domestic	Electrician	Elevatorboy	Engineer	Expressman	Farmer	Fireman	Fisherman	Flagman	Foreman	Furniture-handler	Gambler
Alameda	31	2	8		14	3	4	32	10	1	4	2	
Alpine	No report		on convictions.										
Amador	No report		on convictions.										
Butte	No report		on convictions.										
Calaveras													
Colusa													
Contra Costa			1		2		3	1					
Del Norte													
El Dorado													
Fresno					2		4						
Glenn													
Humboldt													
Inyo													
Kern													
Kings							1						
Lake													
Lassen													
Los Angeles*	1	2	2	14	14	1	24	14	3				
Madera													
Marin													
Mariposa													
Mendocino							1	1					
Merced			5										
Modoc							1						
Mono													
Monterey			1										
Napa													
Nevada					1		2						
Orange													
Placer					1		1	5					
Plumas	No report		on convictions.										
Riverside							2						
Sacramento	1												
San Benito	No report		on convictions.										
San Bernardino			6	2	6	4		1					
San Diego								1					
San Francisco	No report		on convictions.										
San Joaquin		2	1	1	2	3	3						
San Luis Obispo	No report		on convictions.										
San Mateo						3	1						
Santa Barbara			3										
Santa Clara	1		2		2	4	2						
Santa Cruz						1	1						
Shasta						1							
Sierra													
Siskiyou													
Solano							2	1					
Sonoma	No report		on convictions.										
Stanislaus							2						
Sutter	No convictions		for misdemeanors.				1						
Tehama													
Trinity	No report		on convictions.										
Tulare							3						
Tuolumne													
Ventura							1	1	2				
Yolo													
Yuba							1						
Totals	1	35	6	41	1	40	4	71	16	2	4	2	1

* Exclusive of the City of Los Angeles.

Occupations of Persons Convicted of Misdemeanors in California for the Year ending June 30, 1906. (Tabulated by Counties)—Continued.

County.	Gardener.....	Garment-worker.....	Glass-worker.....	Glazier.....	Gloves-maker.....	Harness-maker.....	Hat-worker.....	Hodcarrier.....	Horse-clipper.....	Horseman.....	Horse-shoer.....	Hostler.....	Hotel-keeper.....	Housewife.....
Alameda.....	18	2			1	7	1	5	1	11	4	9		24
Alpine.....	No	report	on	conviction	s.									
Amador.....	No	report	on	conviction	s.									
Butte.....	No	report	on	conviction	s.									
Calaveras.....														
Colusa.....														
Contra Costa.....		1						1			1			
Del Norte.....														
El Dorado.....														
Fresno.....	3													
Glenh.....														
Humboldt.....														
Inyo.....														
Kern.....	1													
Kings.....														
Lake.....														
Lassen.....														
Los Angeles*.....	2	3			2	1	5					20		
Madera.....														
Marin.....											2	1		
Mariposa.....														
Mendocino.....													1	
Merced.....							1					2		
Modoc.....														
Mono.....														
Monterey.....		1												
Napa.....														1
Nevada.....														
Orange.....														
Placer.....	2			1				1						
Plumas.....	No	report	on	conviction	s.									
Riverside.....														
Sacramento.....								2						
San Benito.....	No	report	on	conviction	s.									
San Bernardino.....		2								6		4		
San Diego.....														
San Francisco.....	No	report	on	conviction	s.									
San Joaquin.....	1	2			1	1				4	4	7		
San Luis Obispo.....	No	report	on	conviction	s.									
San Mateo.....	3													
Santa Barbara.....														3
Santa Clara.....	2					1				2		6		3
Santa Cruz.....	1											2		1
Shasta.....														
Sierra.....														
Siskiyou.....														
Solano.....	1													
Sonoma.....	No	report	on	conviction	s.									
Stanislaus.....	2													
Sutter.....	No	conviction	s.	for	misdemeanors.									
Tehama.....														
Trinity.....	No	report	on	conviction	s.									
Tulare.....						3								
Tuolumne.....														
Ventura.....												1		
Yolo.....														
Yuba.....	1			1								1		
Totals.....	37	1	10	2	2	14	3	14	1	23	11	53	1	32

*Exclusive of the City of Los Angeles.

Occupations of Persons Convicted of Misdemeanors in California for the Year ending
June 30, 1906. (Tabulated by Counties)—*Continued.*

County.	Hunter	Ink-maker	Ironworker	Janitor	Jeweler	Jockey	Junk-dealer	Knife-grinder	Laborer	Lather	Laundry-worker	Letter-carrier	Lineman	Lithographer
Alameda		1	15	4	1	3	1	2	632	1	9	2	4	3
Alpine	No	report	on	convictions.					24					
Amador														
Butte	No	report	on	convictions.										
Calaveras									5					
Colusa									12					
Contra Costa			1						90	1			1	
Del Norte									1					
El Dorado									14					
Fresno									621		1			
Glenn					1				10					
Humboldt														
Inyo									20					
Kern									333					
Kings									74					
Lake									5					
Lassen														
Los Angeles*			14						519	6	8		5	
Madera									25					
Marin									14					
Mariposa									5					
Mendocino									30		3			
Merced	1								100					
Modoc									5					
Mono									11					
Monterey									17					
Napa									42					
Nevada									15					
Orange									10					
Placer			1						120				1	
Plumas	No	report	on	convictions.										
Riverside							1		97					
Sacramento									141					
San Benito	No	report	on	convictions.										
San Bernardino			2						331		4			
San Diego									23					
San Francisco	No	report	on	convictions.										
San Joaquin			1			1		1	183	4	2		1	
San Luis Obispo	No	report	on	convictions.										
San Mateo									53					
Santa Barbara									22					
Santa Clara			5	2					147	1	5		2	
Santa Cruz						1	1		49	2				
Shasta					1				34					
Sierra														
Siskiyou									14					
Solano									25					
Sonoma	No	report	on	convictions.										
Stanislaus									53					
Sutter	No	convictions	formisde	meanors.										
Tehama									15					
Trinity	No	report	on	convictions.										
Tulare									70					
Tuolumne									9					
Ventura									138					
Yolo									71					
Yuba									80					
Totals	1	1	39	6	3	5	3	3	4309	15	32	2	14	3

* Exclusive of the City of Los Angeles.

Occupations of Persons Convicted of Misdemeanors in California for the Year ending
June 30, 1906. (Tabulated by Counties)—*Continued.*

County.	Longshoreman	Lumberman	Machinist	Manager	Marble-worker	Merchant	Messenger-boy	Metal-worker	Milkman	Millhand	Miner	Molder	Motorman	Musician
Alameda	28	28	1	2	19	1	7			8	13	8	1	
Alpine	No report		on convictions.											
Amador	No report		on convictions.							2	2			
Butte	No report		on convictions.											
Calaveras											2			
Colusa														
Contra Costa			7								5	2		
Del Norte														
El Dorado											2			
Fresno	1	2									4			
Glenn														
Humboldt														
Inyo														
Kern														
Kings														
Lake														
Lassen														
Los Angeles*	6	47	3	1		5	4			3	54	10		4
Madera														
Marin														
Mariposa											3			
Mendocino														
Merced			6								15			
Modoc											1			
Mono														
Monterey							1							
Napa			3											
Nevada		1												
Orange											9			
Placer											2			
Plumas	No report		on convictions.								12			2
Riverside														
Sacramento														
San Benito	No report		on convictions.											
San Bernardino		12			2	1	4				50	2		1
San Diego														
San Francisco	No report		on convictions.											
San Joaquin		8			1	1	1	2	1	11		3		1
San Luis Obispo	No report		on convictions.											
San Mateo														
Santa Barbara											1			
Santa Clara		1			1		1		3	8	1			
Santa Cruz	1											1		
Shasta			1								3			
Sierra			1								1			
Siskiyou			1								1			
Solano														
Sonoma	No report		on convictions.											
Stanislaus														
Sutter	No	convictions	for	misdemeanors.										
Tehama														
Trinity	No report		on convictions.											
Tulare														
Tuolumne										4	5			
Ventura											1			
Yolo			1											
Yuba			1		1					1	4			
Totals	34	50	72	4	4	23	9	17	2	22	209	27	1	12

*Exclusive of the City of Los Angeles.

Occupations of Persons Convicted of Misdemeanors in California for the Year ending
June 30, 1906. (Tabulated by Counties)—*Continued.*

County.	Plasterer	Pile-driver	Piano-tuner	Physician	Photographer	Peddler	Paperhanger	Painter	Orchardist	Optician	Nurse	No occupation	Newspaperman	Newsboy
Alameda	8	2	1	5	2	28	2	39	1	1	2	246	8	5
Alpine								1				report	No	No
Amador								1				report	No	No
Butte								1				report	No	No
Calaveras								1				1		
Colusa														
Contra Costa							1	4				1		
Del Norte														
El Dorado														
Fresno						3					3	1		
Glenn														
Humboldt														
Inyo												2		
Kern														
Kings												4		
Lake														
Lassen												4		
Los Angeles*	1					2	6	47			1	7	5	
Madera												2		
Marin														
Mariposa														
Mendocino														
Merced						1		5				2		
Modoc														
Mono														
Monterey								2				8		
Napa								2						
Nevada								5						
Orange														
Placer				1		2		2				17		
Plumas								1				report	No	No
Riverside								1						
Sacramento								1						
San Benito								1				report	No	No
San Bernardino				1		2	1	15		1		5		
San Diego								1						
San Francisco								1				report	No	No
San Joaquin					1	1	1	7				6	10	
San Luis Obispo								1				report	No	No
San Mateo	2							1						
Santa Barbara				1				1				1		
Santa Clara						2	1	6				13		
Santa Cruz				1				7				12		
Shasta								1						
Sierra														
Siskiyou								2						
Solano														
Sonoma								1				report	No	No
Stanislaus						1								
Sutter								1				convictions	No	No
Tehama														
Trinity								1				report	No	No
Tulare						1		2				4		
Tuolumne												2		
Ventura								3						
Yolo						1								
Yuba	2											2		
Totals	13	3	1	9	6	42	12	153	1	1	7	344	14	10

* Exclusive of the City of Los Angeles.

Occupations of Persons Convicted of Misdemeanors in California for the Year ending
June 30, 1906. (Tabulated by Counties)—*Continued.*

County.	Plumber	Porter	Powdermaker	Printer	Prospector	Real Estate Agent	Restaurant-keeper	Rigger	Riveter	Sailor	Salesman	Saloonkeeper	Sea Captain	Shepherd
Alameda	22	5	1	26		2	3	2	1	71		5	5	
Alpine	No	report	on	on	convictions.									
Amador					1									
Butte	No	report	on	on	convictions.									
Calaveras											1			
Colusa														
Contra Costa	2		2							8				
Del Norte														
El Dorado														
Fresno	1	3		2						1				
Glenn														
Humboldt														
Inyo														
Kern														
Kings														
Lake														
Lassen														
Los Angeles*	12	7		22		2	1			41		2		
Madera														
Marin	1													
Mariposa										1				
Mendocino				3										
Merced	1	1		1						1				
Modoc														
Mono														
Monterey				1										
Napa	6													1
Nevada	1													1
Orange														
Placer	1	1		5										
Plumas	No	report	on	on	convictions.									
Riverside														
Sacramento		1		2								1		
San Benito	No	report	on	on	convictions.									
San Bernardino	9	3		7						9				
San Diego														
San Francisco	No	report	on	on	convictions.									
San Joaquin	6			1			1	1		3			2	
San Luis Obispo	No	report	on	on	convictions.									
San Mateo				2						3				1
Santa Barbara										2				
Santa Clara	4			2						7				
Santa Cruz	2	2								4				
Shasta														
Sierra														
Siskiyou	1										1			
Solano										4				
Sonoma	No	report	on	on	convictions.									
Stanislaus														
Sutter	No	convictions	for	misde	meanors.									
Tehama														
Trinity	No	report	on	on	convictions.									
Tulare	1													
Tuolumne														
Ventura	1			1										
Yolo										2				
Yuba	3									2				
Totals	74	23	3	75	1	4	5	3	1	159	2	8	7	3

* Exclusive of the City of Los Angeles.

**Occupations of Persons Convicted of Misdemeanors in California for the Year ending
June 30, 1906. (Tabulated by Counties)—Continued.**

County.	Shingler	Shoemaker	Soldier	Solicitor	Stenographer	Stevadore	Steward	Stonecutter	Student	Surveyor	Switchman	Tailor	Tallyman	Tanner
Alameda	3	13	11	20	10	2	7	7	7	7	14	1		
Alpine	No	report	on	convictions.										
Amador														
Butte	No	report	on	convictions.										
Calaveras														
Colusa														
Contra Costa	1	2			1			1		2	1			
Del Norte														
El Dorado												1		
Fresno		4										1		
Glenn														
Humboldt														
Inyo														
Kern														
Kings														
Lake														
Lassen														
Los Angeles*	8	13	13			1	10	3		1	14			1
Madera														
Marin														
Mariposa														
Mendocino												1		
Merced		3												
Modoc														
Mono														
Monterey			4											
Napa	1	1	5	1										
Nevada											1			
Orange														
Placer								1						
Plumas	No	report	on	convictions.										
Riverside														
Sacramento														
San Benito	No	report	on	convictions.										
San Bernardino		1		3	2		2				2	5		
San Diego					1									
San Francisco	No	report	on	convictions.										
San Joaquin	1	7		2	4		2				2	2		2
San Luis Obispo	No	report	on	convictions.										
San Mateo												1		
Santa Barbara								1						
Santa Clara		1		4		1	1		1		4			
Santa Cruz		1												
Shasta														
Sierra														
Siskiyou		1												
Solano														
Sonoma	No	report	on	convictions.										
Stanislaus														
Sutter	No	convictions	formisde	meanors.										
Tehama														
Trinity	No	report	on	convictions.										
Tulare														
Tuolumne														
Ventura		1												
Yolo									1					
Yuba														
Totals	14	48	33	30	3	15	4	24	12	1	15	44	1	5

* Exclusive of the City of Los Angeles.

Occupations of Persons Convicted of Misdemeanors in California for the Year ending
June 30, 1906. (Tabulated by Counties)—*Continued.*

County.	Teamster	Telegraph Operator	Thiesetter	Tinner	Unknown	Upholsterer	Veterinary Surgeon	Waiter	Watchman	Weaver	Wellborer	Windowcleaner	Wireworker	Woodworker
Alameda	73	2		3		5	1	19	1	1	3	1	1	
Alpine	No	report		on		convictions.								
Amador														
Butte	No	report		on		convictions.								
Calaveras														
Colusa	1													
Contra Costa	5	1				2		1						1
Del Norte														
El Dorado								1						
Fresno						2		8						
Glenn														
Humboldt					39									
Inyo														
Kern														
Kings														
Lake														
Lassen														
Los Angeles*	57	7		6		5		46		1			2	5
Madera														
Marin		1			89									
Mariposa														
Mendocino	1													
Merced	7							2						
Modoc														
Mono														
Monterey	2			1	429									
Napa					5									
Nevada														
Orange					168						1			
Placer	7					2	2	4		1				
Plumas	No	report		on		convictions.								
Riverside														
Sacramento					117									
San Benito	No	report		on		convictions.								
San Bernardino	25	4		1				25		3				3
San Diego					189									
San Francisco	No	report		on		convictions.								
San Joaquin	17			2	91			2	1					2
San Luis Obispo	No	report		on		convictions.								
San Mateo	3							2						
Santa Barbara					179									
Santa Clara	14		1	2				8	1					1
Santa Cruz		1								1			1	
Shasta														
Sierra														
Siskiyou														
Solano					261									
Sonoma	No	report		on		convictions.								
Stanislaus	1													
Sutter	No	convictions		for		misdemeanors.								
Tehama					26									
Trinity	No	report		on		convictions.								
Tulare		1												1
Tuolumne														
Ventura														
Yolo					15									
Yuba								3						
Totals	213	17	1	15	1622	16	3	121	3	7	4	1	4	16

*Exclusive of the City of Los Angeles.

In compiling the preceding table, the actual occupation of each individual as given by the person reporting is adhered to, with the exception that prostitutes, sports, etc., are put under the class name of "No occupation." Of the total of 9,632, 4,039, or 44.7 per cent, give their occupation as laborer; 1,622, or 16.8 per cent, did not divulge their previous occupation; 344, or 3.5 per cent, have no occupation. Cooks come fourth with 215, teamsters a close fifth with 213, miners have 209, sailors 159, painters 153, carpenters 135, waiters 121, and clerks 101. These eleven divisions total 7,311 individuals, representing 75.9 per cent of the entire number. The remaining 24.1 per cent is distributed among 143 occupations, as shown by the table.

Table of Misdemeanors, Showing Nature of Offense for which Convictions were had during the Year ending June 30, 1906. (Tabulated by Counties.)

County.	Total	Assault	Automobile Limit	Speed	Battery	Beating Railroad	Begging	Bicycle Ordinance	City and Co Ord- nances not Specified	Concealed Weapons	Contempt of Court	Cruelty to Animals	Defaulting Witness	Defrauding Keeper	Inn-
Alameda	1999		23	61	1	3	17	39	23	1	9	1	2		
Alpine	No	report	sent in	on	misde	meanors.									
Amador	30		3											2	
Butte	No	report	sent in	on	misde	meanors.									
Calaveras	10	1		1										1	
Colusa	16	2		1										1	
Contra Costa	177	7		7	5									5	
Del Norte	1														
El Dorado	20			4										2	
Fresno	683	9		11				6	1	1	2			7	
Glenn	11			1											
Humboldt	39			3											
Inyo	22														
Kern	334			2											
Kings	79													2	
Lake	5	2		1											
Lassen	4			1											
Los Angeles*	1372	18		17	50			1		2	3			3	
Madera	27			2											
Marin	109			1											
Mariposa	9	1		1										1	
Mendocino	49	5		4											
Merced	190	6		2										2	
Modoc	7	1									1				
Mono	11														
Monterey	474	2		10							1			4	
Napa	72			1											
Nevada	40	1		2											
Orange	181	11		7					1					4	
Placer	225			4	7	6		2						4	
Plumas	No	report	sent in	on	misde	meanors.									
Riverside	100	1		1											
Sacramento	276	1		8				1		1					
San Benito	No	report	sent in	on	misde	meanors.									
San Bernardino	646	6		6	309			1	8						
San Diego	217			9					2						
San Francisco	No r	report on	convictions.	Records destroyed.											
San Joaquin	510	8		13	25	5		2	1	2				2	
San Luis Obispo	No	report	sent in	on	misde	meanors.									
San Mateo	90	2		5								1			
Santa Barbara	217	2		5										2	
Santa Clara	323	6		11		2		1		1	1			2	
Santa Cruz	107	1		3											
Shasta	45	2		4										2	
Sierra	2														
Siskiyou	25	2		1										2	
Solano	296	4		4	5									2	
Sonoma	No r	report on	convictions.	Records destroyed.											
Stanislaus	68	1		3	10							1			
Sutter	No c	onvictions	for	misde	meanors.										
Tehama	42	2		4											
Trinity	No	report	sent in	on	misde	meanors.									
Tulare	87	2		1											3
Tuolumne	21			6										4	
Ventura	161			1					1						
Yolo	93	2		2	2			1			3				
Yuba	110			15				2		1					
Totals	9632	108	23	249	414	16	17	56	37	11	20	1	59		

*Exclusive of the City of Los Angeles.

Table of Misdemeanors, Showing Nature of Offense for which Convictions were had during the Year ending June 30, 1906. (Tabulated by Counties)—Continued.

County.	Discharging Fire- arms.....	Disturbing the Peace	Drunk.....	Embezzlement	Fast Driving	Fish and Game Laws	Gambling	Incorrigible	Indecent Exposure	Juvenile Laws	Liquor Laws	Lottery Tickets	Malevolent Mischief
Alameda	6	105	1542	2	2	14	3	5	2	2	1	1	9
Alpine	No report	sent in	on			misdemeanors.							
Amador	14												
Butte	No report	sent in	on			misdemeanors.							
Calaveras	4												
Colusa	4												
Contra Costa	8	52						1	2	1			2
Del Norte													
El Dorado	7							1					
Fresno	148	153	2					4	13		2		8
Glenn		1											
Humboldt	9	8											2
Inyo		12									8		
Kern	204												1
Kings	28	4											
Lake											1		
Lassen											3		
Los Angeles*	289	44	7						3	1	3		29
Madera	7												
Marin	37												2
Mariposa		3							1				
Mendocino			1								5		
Merced	94							1	1				2
Modoc											4		
Mono													
Monterey	49		1					1	6				6
Napa	48				1					1			
Nevada	12	9				1			3				
Orange	51	2						1	1		2		4
Placer	27	13								1			1
Plumas	No report	sent in	on			misdemeanors.							
Riverside		3	1								2		1
Sacramento	45		5					2	1				
San Benito	No report	sent in	on			misdemeanors.							
San Bernardino	66	5							1		2		6
San Diego	23	137	2				2	1			1		6
San Francisco	No report	on convictions.											
San Joaquin	35	292	2						2				3
San Luis Obispo	No report	sent in	on			misdemeanors.							
San Mateo	29												
Santa Barbara	134		1						2		1		1
Santa Clara	25	3	2			1			4	1			2
Santa Cruz	27	3							2				
Shasta	16								1				
Sierra													
Siskiyou	9												
Solano	88	9	1			3			1				1
Sonoma	No report	on convictions.											
Stanislaus	13	1	1						1				
Sutter	No convictions	for misdemeanors.											
Tehama	5					2			1				
Trinity	No report	sent in	on			misdemeanors.							
Tulare	60	1											
Tuolumne	4								1				
Ventura	39								1				
Yolo	13	6							2				
Yuba	19								2				3
Totals	6	1795	2303	28	3	21	5	16	58	7	35	1	89

*Exclusive of the City of Los Angeles.

Table of Misdemeanors, Showing Nature of Offense for which Convictions were had during the Year ending June 30, 1906. (Tabulated by Counties)—Continued.

County.	Misdemeanors not Specified	Nuisance	Obtaining Money Under False Pretenses	Passing Fictitious Check	Petty Larceny	Resisting Officer and Breaking Jail	Sleeping Out	Threat to Kill	Vagrancy	Vulgar Language
Alameda		9			24	2	34		27	29
Alpine	No report		sent in on		misdemeanors.					
Amador					2				9	
Butte	No report		sent in on		misdemeanors.					
Calaveras					2				1	
Colusa	2				4				2	
Contra Costa	11				16	1			59	
Del Norte	1									
El Dorado	1								5	
Fresno	6		4		19	2			285	
Glenn	7				2					
Humboldt					11				6	
Inyo	2									
Kern	25				21				81	
Kings	5				10				30	
Lake					1					
Lassen										
Los Angeles*	427		10		49				416	
Madera					6				12	
Marin					1				68	
Mariposa	1					1				
Mendocino	7				2				25	
Merced	5		1		31				45	
Modoc					1					
Mono	11									
Monterey					13				381	
Napa					5			1	12	
Nevada					6				6	
Orange					7	1			89	
Placer	20		2		13				125	
Plumas	No report		sent in on		misdemeanors.					
Riverside	3				10				78	
Sacramento	19		1		86				106	
San Benito	No report		sent in on		misdemeanors.					
San Bernardino			4		46				186	
San Diego			3		12				19	
San Francisco	No report		on convictions.		Records destroyed.					
San Joaquin			5		44				69	
San Luis Obispo	No report		sent in on		misdemeanors.					
San Mateo					5				48	
Santa Barbara	18		2		15				34	
Santa Clara	15		5	2	22	2			215	
Santa Cruz	1		1		17	3			49	
Shasta					14			1	3	2
Sierra	2									
Siskiyou	5				5				1	
Solano			4		17	1			156	
Sonoma	No report		on convictions.		Records destroyed.					
Stanislaus	8				9	1			19	
Sutter	No convictions		for		misdemeanors.					
Tehama	7				4				17	
Trinity	No report		sent in on		misdemeanors.					
Tulare			1		7				12	
Tuolumne			1		5					
Ventura	7					2			110	
Yolo	3				10				49	
Yuba					42	1			25	
Totals	619	9	44	2	616	17	34	2	2880	31

*Exclusive of the City of Los Angeles.

The greatest number of convictions were had for vagrancy, 2,880, or 30 per cent, going to jail for this offense. Next comes disturbing the peace with 2,303 convictions, and drunkenness with 1,795. These latter together constitute the class usually designated as "drunk and disorderly." Invariably the arrests for these offenses in the country districts are denominated "disturbing the peace," while in the cities "drunk" is the charge. The two together amount to 3,098, or 32.1 per cent of the whole number considered. This can safely be put as the percentage representing the number of individuals in this State who were sent to jail directly on account of intoxicants. This and vagrancy, usually arising indirectly from the same cause, represent together 62 per cent of all the unfortunates getting into jail in the past year on conviction for misdemeanors.

For misdemeanors not specified, 619 people were convicted; for petit larceny, 616; beating railroad, 414; battery, 249; and assault, 108. The remaining 638, or 6.7 per cent, are distributed among twenty-nine different offenses.

Length of Sentence for Persons Convicted of Misdemeanors During the Year ending June 30, 1906. (Tabulated by Counties.)

County.	Total Number	3 Days and Under	4 and 5 Days	6 to 10 Days	11 to 30 Days	31 to 60 Days	Over 60 Days	Reform School	Probation
Alameda	1999	1676	109	52	71	36	36		19
Alpine	No report	sent	in on	misdemeanors.					
Amador	30	8	8	11	1	2			
Butte	No report	sent	in on	misdemeanors.					
Calaveras	10			6		4			
Colusa	16	1	1	5	4	3	2		
Contra Costa	177		17	30	91	12	26	1	
Del Norte	1				1				
El Dorado	20	3	4	6	4	1	2		
Fresno	683	1	159	168	261	46	44	4	
Glenn	11				6	1	3		
Humboldt	39		7	9	14	6	3		
Inyo	22		4		2	5	11		
Kern	334	1	42	89	113	24	65		
Kings	79		20	27	14	11	7		
Lake	5		2			1	2		
Lassen	4				2	1	1		
Los Angeles*	1372	1	117	735	371	60	88		
Madera	27	2	5	5	8	3	4		
Marin	109	29	34	36	8	2			
Mariposa	9		4	1	1		3		
Mendocino	49		1	11	16	8	13		
Merced	190	1	9	38	77	27	36	2	
Modoc	7	3				2	2		
Mono	11			1	7		3		
Monterey	474	3	73	317	45	18	17	1	
Napa	72		2	6	32	15	17		
Nevada	40		3	10	13	5	9		
Orange	181	2	23	67	63	7	18	1	
Placer	225	4	17	46	107	28	23		
Plumas	No report	sent	in on	misdemeanors.					
Riverside	100	1		22	59	8	9	1	
Sacramento	276		12	44	65	35	118	2	
San Benito	No report	sent	in on	misdemeanors.					
San Bernardino	646	2	91	198	261	42	52		
San Diego	217	110	22	33	27	8	17		
San Francisco	No record	of sentences.							
San Joaquin	510	41	226	110	79	14	40		
San Luis Obispo	No report	sent	in on	misdemeanors.					
San Mateo	90		3	22	43	7	15		
Santa Barbara	217		8	56	83	35	35		
Santa Clara	323		5	49	173	28	63		5
Santa Cruz	107		1	13	54	25	14		
Shasta	45			5	27	5	8		
Sierra	2	1			1				
Siskiyou	25			2	8	6	9		
Solano	296		50	52	120	36	38		
Sonoma	No report	sent in.	Records destroyed.						
Stanislaus	68	2	3	16	32	6	9		
Sutter	No convictions	for	misdemeanors.						
Tehama	42	3	3	6	21	3	6		
Trinity	No report	sent	in on	misdemeanors.					
Tulare	87		7	27	33	11	9		
Tuolumne	21		1	3	12	3	2		
Ventura	161		4	73	67	4	13		
Yolo	93			29	39	14	11		
Yuba	110	2	2	7	44	22	33		
Totals	9632	1889	1100	2434	2596	635	942	12	24

* Exclusive of City of Los Angeles.

There were 1,889 convictions for misdemeanors for which the sentence was for three days or under, and 1,676, or 88.2 per cent, of these were given in Alameda County, and all but 6 in the City of Oakland. Sentences of four and five days were imposed on 1,100 persons; six to ten days on 2,434; eleven to thirty days on 2,596; thirty-one to sixty days on 635, and 942 went to jail for over sixty days. The reform schools received 12 convicted of misdemeanors, and 24 were put on probation. The failure to get reports from Los Angeles City and San Francisco accounts for the small number of probationers for misdemeanor offenses.

It will be noted that the tendency in thickly populated counties is to short sentences, while the more rural districts give the longer terms. The records of convictions for misdemeanors in the City and County of San Francisco were consumed, but part of the books containing the arrests were saved. With a desire to show some of the tendencies manifested by the petty criminals in the metropolis, a copy of all the arrests made during the month of January, 1906, was made. This will show the age and occupation of the person arrested and the nature of the offense alleged to have been committed. There will, of course, be no record of sentences, and the number considered will be proportionately larger than in the other counties, where convictions alone are given, since here we have both the convicted and those against whom the charge was not proven.

A total of 2,444 arrests were made in San Francisco during the month. Of the persons arrested, 58 were under 15 years of age; 127 between 15 and 19; 782 between 20 and 29; 624 between 30 and 39; 495 between 40 and 49, and 358 had reached the 50-year mark. The proportion of arrests under 20 years of age represents 7.5 per cent; for the State as a whole the percentage of those convicted of misdemeanors, under this age, was about one per cent less than shown here for arrests.

The principal occupation was laborer, representing 565, or 23.1 per cent. The per cent for the State as a whole is 44.7, or almost twice as large as shown for the arrests in San Francisco. Teamsters come second with 153, or over 6 per cent, as against a little over 2 per cent for the State. Clerks and bookkeepers are third with 143; then come those of no occupation, with 141; then sailors, with 110. Other occupations showing a considerable number arrested are: barbers, 25; barkeepers, 49; blacksmiths, 23; boilermakers, 19; bricklayers, 15; butchers, 17; carpenters, 56; engineers, 20; firemen, 38; horsemen, 20; housewives, 85; laundry-workers, 25; machinists, 37; merchants, 54; miners, 32; painters, 39; peddlers, 42; plumbers, 26; porters, 15; printers, 20; shoe-workers, 15; soldiers, 38; solicitors, 57; students, 36; tailors, 22; and waiters, 53.

The nature of offense shows 396, or 16.2 per cent were vagrants, as against 30 per cent for the State as a whole in convictions. Disturbing

the peace and drunk give 164, or 6.7 per cent, as against 32.1 per cent for the entire State. In other words, while 30 per cent of all the convictions in the State, outside San Francisco and Los Angeles, for misdemeanor offenses were for vagrancy, in San Francisco only 16.2 per cent of the arrests were for this offense, and for drunk and disorderly almost five times as large a per cent were convicted in the State as were arrested in San Francisco. The nature of the offense as such ordinarily would not affect the number convicted, and there is no reason why the percentage in any occupation should be different in those convicted from those arrested and the comparison here instituted can safely be made.

Other offenses for which arrests were made are: gambling, 108; assault and battery, 116; begging, 30; miscellaneous city ordinances, 106; exceeding speed limit in automobiles and fast driving, 31; petit larceny, 83; malicious mischief, 27; carrying concealed weapons, 22; cruelty to animals, 21; offenses against children, 51; and liquor laws, 42.

The Chief of Police of the City of Los Angeles furnished data for the twelve months here considered, but not in the form covered by the investigation. The following table is compiled from this information.

**Arrests and Convictions for Misdemeanors in the City of Los Angeles for the
Twelve Months ending June 30, 1906.**

Nature of Offense.	1905.											
	JULY.		AUG.		SEPT.		OCT.		NOV.		DEC.	
	Arrests...	Convictions...	Arrests...	Convictions...	Arrests...	Convictions...	Arrests...	Convictions...	Arrests...	Convictions...	Arrests...	Convictions...
Battery	33	25	26	20	17	13	30	28	17	12	28	21
Begging	1	1			3	3	1	1	1	1	10	10
Bicycle ordinance	30	30	41	41	50	46	46	45	15	15	11	8
Concealed weapons	6	6	9	8	7	7	5	4	15	15	11	10
Contempt of court					2	1						
Cruelty to animals	5	5	3	2	2	2	4	4	2	1	11	11
Cruelty to children											1	
Curfew ordinance			9	9	2	2	10	6	11	8	10	7
Discharging firearms	1	1									2	1
Disorderly house					1	1						
Disturbing peace	39	31	33	24	54	43	36	32	44	35	36	34
Drunk	458	446	522	508	521	511	356	337	391	380	391	369
Embezzlement	1	1	3	3	1	1	2	2			2	2
Escapes					2	2						
False pretenses	1	1			1	1			1	1	5	3
Fast driving	1	1	4	4	8	7	4	4	12	12	3	3
Gambling	3	3	12	12	8	3			5	5	5	5
Health ordinance	2	2	2	2	2	1	3	3	3	3	3	2
Hitching ordinance	2	2	10	10	7	7	15	15	3	2	2	1
Illfame soliciting					1	1						
Incorrigible	3	3	7	7	1	1			1	1	3	3
Indecent exposure	4	4	2	1	3	3			1	1		
License ordinance	5	5			20	17			11	8		
Malicious mischief	2	2	2	2								
Misdemeanor unclassified	83	49	50	43	61	50	69	63	41	35	53	48
Petit larceny	18	16	35	34	33	30	18	18	17	17	28	25
Resisting officer												1
Sunday-closing ordinance											3	
Vagrancy	17	6	25	20	119	111	27	25	31	20	43	36
Totals	715	640	795	750	926	864	626	587	622	572	661	600

Nature of Offense.	1906.												Total Arrests	Total Convictions	Percentage of Convictions
	JAN.		FEB.		MARCH.		APRIL.		MAY.		JUNE.				
	Arrests...	Convic'ns	Arrests...	Convic'ns	Arrests...	Convic'ns	Arrests...	Convic'ns	Arrests...	Convic'ns	Arrests...	Convic'ns			
Battery	28	18	26	20	31	24	21	12	26	17	27	17	310	227	73.2
Begging	4	4	2	2	7	6	2	2	7	4	5	4	43	38	88.4
Bicycle ordinance	21	21	35	35	140	140	69	50	2	2	3	2	463	445	96.1
Concealed weapons	7	6	9	9	9	9	4	3	11	10	4	3	97	90	92.8
Contempt of court													2	1	50.0
Cruelty to animals	6	6	1	1	9	8	6	4	6	5	8	5	63	54	85.7
Cruelty to children													1		100.0
Curfew ordinance	2	1			7	3	4	3			2	2	57	41	71.9
Discharging firearms	4	3											7	5	71.4
Disorderly house													1	1	100.0
Disturbing peace	46	37	49	38	55	43	54	44	62	45	34	25	542	431	78.0
Drunk	397	380	360	342	413	398	382	365	532	523	490	479	5213	5038	96.6
Embezzlement	4	2	1	1	5	5	5	3	8	8	1	1	33	29	87.9
Escapes													2	2	100.0
False pretenses	1	1											9	7	77.7
Fast driving	5	5	7	6	7	4	16	13	3	2	35	27	105	88	83.8
Gambling	12	12	28	22	13	12	3	2			14	8	103	84	81.5
Health ordinance	7	6	2	2	3	3	2	2	3	3	7	5	39	34	87.2
Hitching ordinance	2	2	5	5	7	7	12	12			13	11	78	74	94.9
Illfame soliciting			3	3	5	3	1	1					10	8	80.0
Incorrigible			3	2					1	1			19	18	94.7
Indecent exposure	2	2	1	1			1	1	4	4	2	2	20	19	95.0
License ordinance	4	4	5	5	11	10	12	8	11	7	9	7	88	71	80.6
Malicious mischief					1	1	1	1					6	6	100.0
Misdemeanor unclassified	50	43	47	37	75	71	179	158	31	30	22	18	761	645	84.7
Petit larceny	22	19	28	25	25	23	17	17	36	24	33	27	310	275	88.7
Resisting officer	1				3								4		100.0
Sunday-closing ordinance			1	1			1	1					5	3	60.0
Vagrancy	89	82	84	77	55	52	33	29	39	29	27	23	589	510	86.5
Totals	714	654	697	634	881	822	825	741	782	714	736	666	8980	8244	91.7

During the year, 8,980 persons were arrested in Los Angeles, and 8,244, or 91.7 per cent, convicted. Drunks furnished 5,213 arrests, and 5,038 of these, or 96.6 per cent, were convicted. The 5,038 convicted drunks represent 61.1 per cent of the total number convicted, and is almost double the percentage convicted for this offense for the entire State. Vagrants represent 510 convictions, or 6 per cent of the whole, only one fifth as large as the percentage for this offense for the State.

During the month of January, 1906, as has already been shown, 164 people were arrested in San Francisco for drunkenness and disturbing the peace. During the same month 443 persons were arrested and 417 convicted for these two offenses in Los Angeles. In the same month 396 were arrested for vagrancy in San Francisco and 89 in Los Angeles, 82 of whom were convicted. Very often the different charges are confounded and a common drunk is sometimes "vagged," and *vice versa*. Totaling these offenses in the two cities we have in San Francisco 560 arrested for the three offenses, and in Los Angeles 532 arrested and 499 convicted.

A large number of persons were arrested in Los Angeles City during the year for violating the bicycle ordinance and most of them convicted, 463 being arrested and 445, or 96.1 per cent, convicted.

The remainder of the table is self-explanatory and requires no comment.

The data presented here, both for the entire State and the two cities given separately, is as complete as was possible under the circumstances, and points out some very striking characteristics of the minor criminal. He is for the most part fully matured, many having passed middle age and his woes are the result most often of drink. By far the greater proportion are common laborers. Very few skilled men by comparison are convicted of these minor offenses; it is ordinarily the great floating population that goes from one job to another, hoping for no promotion, and making no provision for the future. Ambitionless, aimless, these men are arrested for drunkenness on their payday spree, for vagrancy when going about the country on foot, or for beating the railroad when they would ride. Sometimes it is the more desperate criminal, by stress of circumstances driven to some minor crime, but most often just the aimless wanderer about the State.

FELONIES.

The data on felonies is absolutely complete, covering all offenses for which convictions were secured in every county in the State. The same plan has been followed as in misdemeanors, and tables covering the same subjects prepared. These will be considered in the same order as in the discussion of the minor offenses.

Ages of Persons Convicted of Felonies in This State for the Fiscal Year ending June 30, 1906. (Tabulated by Counties.)

County.	Total Number of Felonies.	Under 15 Years	15 to 19 Years	20 to 29 Years	30 to 39 Years	40 to 49 Years	50 Years and Over	Ages Unknown
Alameda	62		19	*25	8	6	4	
Alpine	1					2		
Amador	4			2		1	1	
Butte	35	2	7	11	12	2	1	
Calaveras	4			2	2			
Colusa	5		2	3				
Contra Costa	10			5	2	2	1	
Del Norte	1			1				
El Dorado	1					1		
Fresno	38	1	5	17	11	2	2	
Glenn	3			1	2			
Humboldt	9		3		4		2	
Inyo	3			2		1		
Kern	10			4	3	3		
Kings	6		2	2	1	1		
Lake	No	felonies.						
Lassen	No	felonies.						
Los Angeles	132	4	32	51	28	10	7	
Madera	2	1		1				
Marin	9		4	2	2	1		
Mariposa	No	felonies.						
Mendocino	5		1		3		1	
Merced	10			3	4	1	2	
Modoc	1					1		
Mono	1							1
Monterey	8	1	1					6
Napa	4	1		1		1	1	
Nevada	No	felonies.						
Orange	9	1	1		1			6
Placer	5			3	2			
Plumas	1			1				
Riverside	13		5	4	4			
Sacramento	10	1	5	3	1			
San Benito	2			2				
San Bernardino	10	2	2	2	2	1	1	
San Diego	22		1	1	1		1	18
San Francisco	133	1	30	50	30	13	9	
San Joaquin	56	2	9	24	11	4	6	
San Luis Obispo	11	1	5	2	2	1		
San Mateo	8		1	3	3	1		
Santa Barbara	2			1			1	
Santa Clara	19	2	6	3	5	1	2	
Santa Cruz	19	1	5	7	4	1	1	
Shasta	14			8	3	1	2	
Sierra	No	felonies.						
Siskiyou	6			5	1			
Solano	16	1	4					11
Sonoma	11		2	7	1	1		
Stanislaus	8		1					7
Sutter	3		1			2		
Tehama	5							5
Trinity	1						1	
Tulare	17		6	8	1	2		
Tuolumne	3			1	2			
Ventura	14		6	4	4			
Yolo	No	felonies.						
Yuba	10		1	4	3	1	1	
Totals	792	22	167	276	163	63	47	54

*Five of these are twenty years of age.

Of the total of 792 persons convicted of felonies during the year under consideration, 22, or 2.8 per cent, are under 15 years of age, and 167, or a little over 21 per cent, are between the ages of 15 and 20 years; showing a total of 24 per cent, or nearly one fourth of all the persons convicted of heinous offenses during the past year, to be under 20 years of age. It will be remembered that but 6.7 per cent of those convicted of misdemeanors were under the age of 20. We shall have occasion to discuss this feature more fully later in the article when treating of juvenile crime.

276 persons, representing 34.8 per cent, were between the ages of 20 and 30; 163 were over 30 and under 40; 63 were between 40 and 50, and 47 had passed 50 years of age.

**Occupations of Persons Convicted of Felonies in California, for the Year ending
June 30, 1906. (Tabulated by Counties.)**

County.	Total	Actor	Baker	Barber	Blacksmith	Boilermaker	Bookkeeper	Brickmaker	Butcher	Candy-maker	Capitalist	Carpenter	Clerk	Conductor	Cook	Dishwasher
Alameda	62	1	1	3	2		1			1		2	4	1	1	
Alpine	1															
Amador	4															
Butte	35						1					1			4	
Calaveras	4															
Colusa	5															
Contra Costa	10											1	1		1	
Del Norte	1															
El Dorado	1															
Fresno	38			1			1					2				
Glenn	3															
Humboldt	9															
Inyo	3															
Kern	10															
Kings	6															
Lake	No	fel	oni	es.												
Lassen	No	fel	oni	es.												
Los Angeles	132		2	1	2		1				2	4	7		10	
Madera	2															
Marin	9				1							2				
Mariposa	No	fel	oni	es.												
Mendocino	5															
Merced	10														1	
Modoc	1															
Mono	1															
Monterey	8															
Napa	4															
Nevada	No	fel	oni	es.												
Orange	9															
Placer	5															
Plumas	1															
Riverside	13						1									
Sacramento	10															
San Benito	2															
San Bernardino	10		1													
San Diego	22							1								
San Francisco	133			4	2	1			1	1			13		12	
San Joaquin	56	1		3	1	1	1					2	1		10	1
San Luis Obispo	11				1							1			1	
San Mateo	8															
Santa Barbara	2															
Santa Clara	19		1		2								1		1	
Santa Cruz	19				1			1					1		1	
Shasta	14	1												1	1	1
Sierra	No	fel	oni	es.												
Siskiyou	6															
Solano	16															
Sonoma	11						1									
Stanislaus	8												1			
Sutter	3															
Tehama	5															
Trinity	1															
Tulare	17	1	1													
Tuolumne	3											1				
Ventura	14			1											1	
Yolo	No	fel	oni	es.												
Yuba	10			1		1						1	1			
Totals	792	4	6	14	12	3	7	2	1	2	2	17	30	2	44	2

Occupations of Persons Convicted of Felonies in California, for the Year ending
June 30, 1906. (Tabulated by Counties.)--Continued.

County.	Draughtsman	Druggist	Farmer	Gambler	Gardener	Garment- worker	Glassworker	Horseman	Hostler	Housewife	Laborer	Lineman	Lumberman	Mechanic	Merchant
Alameda						1	1	1			17	1		1	
Alpine											1				
Amador											2				
Butte			2		1			1			11		1	1	
Calaveras															
Colusa			1								1				
Contra Costa			1								4				
Del Norte											1				
El Dorado			1												
Fresno			1								32				
Glenn											3				
Humboldt			3								2	1	1		
Inyo											3				
Kern											10				
Kings											5				
Lake	No	fel	oni	es.											
Lassen	No	fel	oni	es.											
Los Angeles	2		2		3	1			2		51	4		6	
Madera											1				
Marin			1								1				1
Mariposa	No	fel	oni	es.											
Mendocino			1								3		1		
Merced											5				
Modoc			1												
Mono											1				
Monterey															
Napa											2				
Nevada	No	fel	oni	es.											
Orange															
Placer											2				
Plumas			1												
Riverside	No										12				
Sacramento			1												
San Benito			1												
San Bernardino				1					1		3				
San Diego											2				
San Francisco									2	1	33	1		3	3
San Joaquin							1				14	1		1	1
San Luis Obispo			1								2				
San Mateo											4				
Santa Barbara											2				
Santa Clara											5			1	1
Santa Cruz	1		1								7	1			
Shasta											9				
Sierra	No	fel	oni	es.											
Siskiyou											5				
Solano											2				
Sonoma		1									4				
Stanislaus											5				
Sutter															
Tehama			1												
Trinity															
Tulare			1								13				
Tuolumne															
Ventura											12				
Yolo	No	fel	oni	es.											
Yuba											3				
Totals	3	1	21	1	4	2	2	2	5	1	295	9	3	13	6

**Occupations of Persons Convicted of Felonies in California, for the Year ending
June 30, 1906. (Tabulated by Counties)—Continued.**

County.	Messengerboy	Metalworker	Millhand	Miner	No Occupa- tion	Painter	Paperhanger	Peddler	Photographer	Plumber	Porter	Printer	Restaurant- keeper	Sailor	Saloonkeeper
Alameda	2				5	1				2	2		1		
Alpine															
Amador			1	1											
Butte		1		2	3	1					2				
Calaveras				4											
Colusa						1								1	
Contra Costa														2	
Del Norte															
El Dorado															
Fresno															
Glenn															
Humboldt					1										1
Inyo															
Kern															
Kings					1										
Lake	No	fel	oni	es.											
Lassen	No	fel	oni	es.											
Los Angeles	4			1	4	2					1	3		1	
Madera	1														
Marin					1									1	
Mariposa	No	fel	oni	es.											
Mendocino															
Merced				1				1							
Modoc															
Mono															
Monterey															
Napa															
Nevada	No	fel	oni	es.											
Orange					1			1							
Placer				2	1										
Plumas															
Riverside															
Sacramento		1		1		1									
San Benito				1											
San Bernardino	1						1								
San Diego										1		1			
San Francisco	1	1	1		4	9		1	1	1	1			6	
San Joaquin	1			1	7			1		1	1			3	
San Luis Obispo	1			1	1					1				1	
San Mateo					3					1					
Santa Barbara															
Santa Clara	2			2	2										
Santa Cruz					5										
Shasta															
Sierra	No	fel	oni	es.											
Siskiyou						1									
Solano					1										
Sonoma	1														
Stanislaus				1											
Sutter					2										
Tehama															
Trinity				1											
Tulare					1										
Tuolumne				2											
Ventura															
Yolo	No	fel	oni	es.											
Yuba															
Totals	14	3	2	21	43	16	1	4	1	6	7	4	1	15	1

Occupations of Persons Convicted of Felonies in California, for the Year ending
June 30, 1906. (Tabulated by Counties)—Continued.

County.	Shin- gler	Shoe- maker	Soldier	Solici- tor	Steno- grapher	Stone- cutter	Student	Tailor	Team- ster	Tele- graph Operator	Unknown	Up- holsterer	Waiter	Weaver	Wood- worker
Alameda	2				1			3	2			1	1		
Alpine															
Amador															
Butte								1	1				1		
Calaveras															
Colusa						1									
Contra Costa															
Del Norte															
El Dorado															
Fresno								1							
Glenn															
Humboldt															
Inyo															
Kern															
Kings															
Lake	No	fel	oni	es.											
Lassen	No	fel	oni	es.											
Los Angeles		1		6	1		1		1	2			4		
Madera															
Marin								1							
Mariposa	No	fel	oni	es.											
Mendocino															
Merced		1							1						
Modoc															
Mono															
Monterey											8				
Napa			1				1								
Nevada	No	fel	oni	es.											
Orange											7				
Placer															
Plumas															
Riverside															
Sacramento											6				
San Benito															
San Bernardino				1		1									
San Diego											17				
San Francisco		8						6	9				7		
San Joaquin				1									1		
San Luis Obispo										1					
San Mateo															
Santa Barbara															
Santa Clara				1											
Santa Cruz															
Shasta				1											
Sierra	No	fel	oni	es.											
Siskiyou															
Solano			2								11				
Sonoma		1							3						
Stanislaus		1													
Sutter							1								
Tehama											4				
Trinity															
Tulare															
Tuolumne															
Ventura															
Yolo	No	fel	oni	es.											
Yuba										1				1	1
Totals	2	12	3	10	2	2	3	12	17	4	53	1	14	1	1

As in the misdemeanors, laborers are in the majority, having 295 of the convicts for the year, representing 37.2 per cent. Cooks are still near the top, coming second with 44; and those with no occupation have third place with 43. Clerks have 30; farmers and miners, 21

each; carpenters and teamsters, 17 each; painters, 16; sailors, 15; and waiters and messengerboys, 14 each. The remainder represent 48 different occupations.

Table of Felonies, Showing Nature of Offense for which Convictions were Had During the Year ending June 30, 1906. (Tabulated by Counties.)

County.	Total	Abortion	Arson	Assault	Bigamy	Blowing up Mine	Burglary	Child Stealing	Crime against Nature	Embezzlement	Felonies not Specified	Forgery
Alameda	62			10			24	1		3		3
Alpine	1											
Amador	4						1					
Butte	35		1	6			9					
Calaveras	4			1		2						
Colusa	5						3					
Contra Costa	10						4		1			1
Del Norte	1											
El Dorado	1											1
Fresno	38	1		2			12					3
Glenn	3						1					
Humboldt	9			1			1			1		2
Inyo	3										1	
Kern	10						1			1	7	1
Kings	6						2					
Lake	No	fel	oni	es.								
Lassen	No	fel	oni	es.								
Los Angeles	132		3	7			51		1	3		13
Madera	2											
Marin	9		1	2			2		1			
Mariposa	No	fel	oni	es.								
Mendocino	5											1
Merced	10						5				1	1
Modoc	1			1								
Mono	1											
Monterey	8			1	1		1		1			2
Napa	4		1									
Nevada	No	fel	oni	es.								
Orange	9			1	1		3					
Placer	5						1					
Plumas	1											
Riverside	13			3			3					1
Sacramento	10			1			2					
San Benito	2											2
San Bernardino	10			4			1					
San Diego	22			1			14					
San Francisco	133	1	1	9	1		52		1	4		8
San Joaquin	56			7	1		26			1		7
San Luis Obispo	11			1			5			1		
San Mateo	8			1			1					
Santa Barbara	2						1					
Santa Clara	19						3			1		
Santa Cruz	19		1	2			8					3
Shasta	14			1			5					
Sierra	No	fel	oni	es.								
Siskiyou	6			2								
Solano	16						10		1			2
Sonoma	11						5			1		
Stanislaus	8			3			2					
Sutter	3						1					
Tehama	5						3					1
Trinity	1											
Tulare	17			2			10					
Tuolumne	3											1
Ventura	14		1	1			7					2
Yolo	No	fel	oni	es.								
Yuba	10			2			3					
Totals	792	2	9	72	4	2	283	1	6	16	9	55

Table of Felonies, Showing Nature of Offense for which Convictions were Had During the Year ending June 30, 1906. (Tabulated by Counties)—Continued.

County.	Grand Larceny	Jail Breaking	Manslaughter	Mayhem	Murder	Passing Fictitious Check	Perjury	Prior with Misdemeanor	Rape	Receiving Stolen Goods	Robbery	Train Wrecking
Alameda	10				2	1			1		7	
Alpine			1									
Amador					3							
Butte	12	1		2	1				1	1	1	
Calaveras					1							
Colusa	2											
Contra Costa									2		2	
Del Norte	1											
El Dorado												
Fresno	14				3			1			2	
Glenn											2	
Humboldt						1			3			
Inyo	2											
Kern												
Kings	3						1					
Lake	No	fel	onies.									
Lassen	No	fel	onies.									
Los Angeles	33		2		4	8		1	3		3	
Madera	1										1	
Marin	3											
Mariposa	No	fel	onies.									
Mendocino				1	3							
Merced	1								1		1	
Modoc												
Mono					1							
Monterey	2											
Napa	1				1	1						
Nevada	No	fel	onies.									
Orange	4											
Placer	2								1		1	
Plumas									1			
Riverside	6											
Sacramento	4		1		1						1	
San Benito												
San Bernardino	2				1				2			
San Diego	2				4	1						
San Francisco	23		4		8	3			1		17	
San Joaquin	9					3				1	1	
San Luis Obispo	3								1			
San Mateo	2	1									2	1
Santa Barbara									1			
Santa Clara	2				1				9		3	
Santa Cruz	2										3	
Shasta	2				1	1			2		2	
Sierra	No	fel	onies.									
Siskiyou					1						3	
Solano	1										2	
Sonoma	2				1	1					1	
Stanislaus	3											
Sutter		1									1	
Tehama	1											
Trinity					1							
Tulare	1										4	
Tuolumne					1				1			
Ventura									1		2	
Yolo	No	fel	onies.									
Yuba	1				1	1		1	1			
Totals	157	3	8	3	40	21	1	3	32	2	62	1

The table shows that by far the most common felony offense for which convictions have been secured is burglary. For the commission of this crime, 283 persons were convicted, being 35.7 per cent of the total number. Grand larceny led to 157 convictions, felonious assault 72, robbery 62, forgery 55, murder 40, and rape 32.

San Francisco comes first in convictions, with 133, but Los Angeles has 132—just one less. San Francisco is the greatest seaport town on the Coast and has much the larger population. From these figures one of two things must be inferred, either San Francisco is a cleaner city than the southern metropolis, or the latter has a better administration of justice in its police department and criminal courts. This must be left to the deduction of the reader.

Alameda County has 62 convictions, San Joaquin 56, Fresno 38, Butte 35, San-Diego 22, Santa Cruz and Santa Clara 19 each, Tulare 17, Solano 16, Shasta and Ventura 14 each, Riverside 13, San Luis Obispo and Sonoma 11 each, and Contra Costa, Kern, Merced, Sacramento, San Bernardino, and Yuba 10 each. These numbers show conclusively that the number of convicted criminals in a county does not depend upon the population. There are evidently two factors involved: the character of the people and the administration of justice. Where the administration of justice is lax and the population bad, there will be proportionately a small number of convictions. Where the population is bad and the administration of justice rigid, there will be, of necessity, a large number of persons sent to prison. Without knowing one of these two factors it is impossible to judge the character of the other.

The population of the different counties of the State has changed considerably in the last five years, with a general increase in all. We can take the population of five years ago as a basis of comparison, without doing violence to the truth. Where, therefore, San Francisco with a population of 342,782 has 133 convictions and Los Angeles County with a population of 170,298 has practically the same number of convictions, we can not but note the discrepancy. Still more striking is the case of Sacramento County with 45,915 people and 10 convictions, and San Joaquin with a population of 35,452 and 56 convictions.

**Length of Sentence for Persons Convicted of Felonies, During the Year ending June 30,
1906. (Tabulated by Counties.)**

County.	Totals	Under 2 Years	2 to 5 Years	6 to 10 Years	11 to 20 Years	Over 20 Years	Life	Death	Reform School	Probation
Alameda	62	11	18	11	1	1	2		7	11
Alpine	1			1						
Amador	4	3			1					
Butte	35	10	11	6	4		1		3	
Calaveras	4	1	2		1					
Colusa	5		3						1	1
Contra Costa	10	1	7			1				1
Del Norte	1	1								
El Dorado	1			1						
Fresno	38	10	18	6			1		3	
Glenn	3		1	2						
Humboldt	9	2	4	2					1	
Inyo	3		2	1						
Kern	10	1	7	1	1					
Kings	6	3	1	1					1	
Lake	No felonies.									
Lassen	No felonies.									
Los Angeles	132	28	65	13			2	2	22	
Madera	2					1			1	
Marin	9	3	1	1	1	1			2	
Mariposa	No felonies.									
Mendocino	5	1		1	1		1	1		
Merced	10	7	2	1						
Modoc	1	1								
Mono	1			1						
Monterey	8		3	1	1				3	
Napa	4		2	1					1	
Nevada	No felonies.									
Orange	9	5	1	1					2	
Placer	5	3			1	1				
Plumas	1					1				
Riverside	13	3	7	1	1				1	
Sacramento	10	1	5	1	1			1	1	
San Benito	2	2								
San Bernardino	10	6				1			3	
San Diego	22	4	6		3		1		5	3
San Francisco	133	23	46	27	15		4	2	16	
San Joaquin	56	12	28	5	6				5	
San Luis Obispo	11	4	2	1	1				3	
San Mateo	8	3	3	1						1
Santa Barbara	2	2								
Santa Clara	19	3	3	4	1	1	1		5	1
Santa Cruz	19	5	8	1	1				4	
Shasta	14	1	7	3	1		2			
Sierra	No felonies.									
Siskiyou	6	1	2		2	1				
Solano	16	4	9						3	
Sonoma	11	7	1	2					1	
Stanislaus	8	1	3	2	1				1	
Sutter	3			1		1			1	
Tehama	5	2	3							
Trinity	1						1			
Tulare	17	7	6	1		1			2	
Tuolumne	3	1				1				1
Ventura	14	4	6	1					3	
Yolo	No felonies.									
Yuba	10	2	4	1	1	1			1	
Totals	792	189	297	104	46	13	16	6	102	19

The table shows that 189 of the 792 convicted in the year were sentenced to the penitentiary for less than two years; 297 got from 2 to 5 years; 104 from 6 to 10; 46 from 11 to 20; 13 over 20 and less than life; 16 received life sentences; 6 were condemned to death; 102 went to reform school, and 19 were released on probation. Those probated in San Francisco and Sonoma counties and in the six counties failing to report are not included, as the penitentiary records do not show these.

On the whole, there appears a greater disposition to give longer terms in the less thickly populated counties. Of the 75 sent to penitentiaries for over 10 years, 36, or less than 50 per cent, were sent from San Francisco, Los Angeles, Alameda, Sacramento, San Joaquin, Fresno and San Diego, the seven most populous counties, representing 453, or over 57 per cent, of the convictions. These same counties represent 57 per cent of the sentences under five years, or exactly their quota. The main difference is thus seen to be in the medium sentence. The cities give short or medium sentences as a rule, while the rural counties either let a man off with a very short sentence or give him the limit.

JUVENILE CRIME.

In considering the ages of persons convicted of misdemeanors in this State, it was found that comparatively few of such offenders were children. This can be accounted for, partly by the tendency to condone in the youth that which we punish in the man, and partly because the most prevalent petty crimes are drunkenness and vagrancy, to neither of which the very young are addicted to as great a degree as the mature man. But when we investigate the more serious crimes,—burglary, robbery, rape, murder, and the like,—we find the boy under 20 years of age occupying an important place. The crime age is from 12 to 60, a period of forty-eight years. Few persons commit serious offenses under 12 or over 60. The first eight of these years give us 189 convicted of offenses of the grade of felony, from a total of 792, or 24 per cent. One would naturally think that these tender years would, year for year, yield less serious offenses than the years representing mature life. But representing $16\frac{2}{3}$ per cent of the crime age they give us 24 per cent of the crimes, and the period from 15 to 19 years inclusive gives more crimes per year than any other period of human life.

As an aid to the prosecution of this inquiry, data was secured from the two State reformatories, at Ione and Whittier, and the table given below is compiled from this information:

Table of Juvenile Crimes, Showing Ages and Condition of Offenders Committed to Preston and Whittier Schools for the Twelve Months ending June 30, 1906.

County.	Age	Sex.	Offense.	History, Occupation, Etc.
Alameda	16	Male	Felony— not specified.	Worked as errand boy; had no home.
	15	Male	Burglary	Worked at odd jobs about Oakland.
	15	Male	Robbery	Shipping clerk; played for dances.
	17	Male	Grand larceny	Plumber's shop; orphans' home for three years.
	17	Male	Grand larceny	Worked at odd jobs about Oakland.
	15	Male	Delinquent child; charged with rape, reduced to battery.	Grocery clerk; worked at canning factory and foundry.
	16	Male	Burglary	At home; odd jobs.
Alpine	No	commitments.		Boy tramp.
Amador	No	commitments.		
Butte	12	Male	Burglary	Odd jobs in Chico, and vagrant.
	10	Male	Burglary	At home in Gridley.
	16	Male	Robbery	On ranch; can not read or write.
Calaveras	13	Male	Incorrigibility	Unemployed.
Colusa	17	Male	Grand larceny	Worked as cowboy.
Contra Costa	14	Female	Dependent child; wayward.	Unemployed; eloped with man from Crockett.
Del Norte	No	commitments.		
El Dorado	No	commitments.		
Fresno	16	Male	Incorrigibility; petit larceny.	Odd jobs around Fresno.
	13	Male	Incorrigibility	Odd jobs around Fresno.
	12	Male	Burglary	No employment.
	12	Male	Incorrigibility	Ranch hand; teamster.
	16	Male	Burglary	Odd jobs around Fresno.
	17	Female	Incorrigibility	Has been employed as house servant.
Glenn	16	Male	Grand larceny	Ranch work.
Humboldt	No	commitments.		
Humboldt	15	Male	Rape	Worked at common labor.
	14	Male	Incorrigibility; petit larceny.	Has done work on farm.
Inyo	No	commitments.		
Kern	16	Female	Incorrigibility	Has worked in dry goods store.
Kings	15	Male	Burglary	Common tramp.
Los Angeles	14	Male	Grand larceny	Messenger boy.
	16	Male	Burglary	Common labor and tramp.
	16	Male	Burglary	Common labor and tramp.
	16	Male	Burglary	Common labor and tramp.
	15	Male	Burglary	Odd jobs.
	16	Male	Burglary	Common labor and tramp.
	16	Male	Burglary	Odd jobs.
	15	Male	Burglary	Odd jobs.
	16	Male	Burglary	Cooked on night lunch wagon.
	17	Male	Burglary	Odd jobs.
	16	Male	Burglary	Worked in father's grocery store.
	14	Male	Burglary	Odd jobs.
	15	Male	Incorrigibility	School boy—not employed.
	18	Female	Delinquent child	Servant girl.
	16	Male	Stole wheel, larceny	Messenger boy.
	15	Male	Dependent child	Has St. Vitus' dance; never employed.
	15	Male	Dependent child; vagrancy.	Tramp.
	14	Male	Petit larceny	Messenger boy.
	16	Male	Grand larceny	Messenger boy; stole motor cycle.
	16	Male	Dependent child	Worked in drug store.
	15	Male	Burglary	Assisting older person in theft.
	15	Male	Larceny	Unemployed.
	13	Male	Grand larceny	Unemployed; stole horse and buggy.

Table of Juvenile Crimes, Showing Ages and Condition of Offenders Committed to Preston and Whittier Schools for the Twelve Months ending June 30, 1906—*Continued.*

County.	Age	Sex.	Offense.	History, Occupation, Etc.
Los Angeles— <i>Continued.</i>	14	Male	Beat board bill	Laborer in Los Angeles.
	15	Female	Dependent child	Unemployed—colored.
	17	Male	Forgery	Forged check for \$65 in Compton.
	18	Male	Grand larceny	Messenger boy; stole a rig.
	16	Male	Petit larceny	Unemployed; stole cartridges from shooting gallery.
	12	Male	Dependent child	Has been in detention home.
	15	Male	Dependent child; vagrancy.	Unemployed negro boy.
	18	Male	Incorrigible; petit larceny.	Worked in bird store; stole books from Redondo library.
	14	Male	Larceny; dependent child.	Unemployed; has been in detention home.
	13	Male	Larceny; delinquent child.	Unemployed; has been in detention home.
	16	Male	Burglary; dependent child.	Tramp; broke into store in Los Angeles.
	16	Male	Delinquent child	Has been in detention home.
	18	Female	Incorrigible	Telephone girl and candy girl.
	16	Male	Arson	Farmer boy; attempted to destroy schoolhouse at Moneta.
	17	Male	Opium habit; incorrigible.	Farmer boy.
	15	Male	Moral depravity; delinquent child.	Unemployed.
	14	Male	Delinquent child	Unemployed; history unknown.
	12	Male	Delinquent child	Newsboy; has been in detention home.
	17	Male	Larceny; dependent child.	Janitor work; stole from employer.
	15	Male	Larceny; dependent child.	Worked in tailor shop; stole from butcher shop.
	15	Male	Burglary	Worked in printing shop.
	13	Male	Burglary	Unemployed; robbed till in restaurant.
	14	Male	Larceny	Messenger boy; stole shoes and kept bad company.
	13	Male	Delinquent child	Has been in detention home for two years.
	17	Male	Incorrigibility	Worked for abstract company; has been in Colorado reformatory.
	17	Male	Incorrigibility; vagrancy.	Boy tramp; would not stay at home.
	17	Female	Burglary	Nurse girl; committed burglary in Los Angeles.
	17	Male	Incorrigibility; burglary.	Odd jobs; stole whisky from a cellar.
	17	Male	Incorrigibility; indolence.	Farm hand; committed for indolency.
	15	Male	Delinquent child	Unemployed; colored boy.
	12	Male	Delinquent child; larceny.	Unemployed; has been in Los Angeles Detention Home.
	16	Male	Incorrigibility; moral depravity.	Laborer—Los Angeles.
	16	Female	Incorrigibility; wayward.	Unemployed; prostitute.
	15	Male	Delinquent child; vagrant.	Unemployed; has been in detention home.
	14	Male	Delinquent child; larceny.	Unemployed; has been in detention home.
	15	Male	Larceny	Ranch hand.
Madera	13	Male	Grand larceny	Worked in store; stole horse and buggy from mother.
Marin	15	Male	Incorrigibility; burglary.	Broke into house in San Rafael.
Mariposa	17	Male	Grand larceny	Seaman; odd jobs on land.
Mendocino	No	No	commitments.	
	No	No	commitments.	

Table of Juvenile Crimes, Showing Ages and Condition of Offenders Committed to Preston and Whittier Schools for the Twelve Months ending June 30, 1906—Continued.

County.	Age.	Sex.	Offense.	History, Occupation, Etc.
Merced	13	Male	Incorrigibility; larceny.	Unemployed; stole chickens in Merced.
	16	Male	Incorrigibility	Laborer; stole chickens in Merced.
Modoc	No	commitments.		
Mono	No	commitments.		
Monterey	16	Male	Lewd and dissolute person.	Ranch hand; allowed himself to be used by tramps.
	15	Male	Incorrigibility; burglary.	Electric supply house in Monterey.
	16	Male	Incorrigibility	Ranch hand; home in Kentucky.
	16	Female	Incorrigibility	Domestic and waitress.
	12	Male	Grand larceny	Newsboy; stole wheel in San Francisco.
Napa	17	Female	Grand larceny	Salesgirl.
	11	Male	Incorrigibility	Unemployed.
Nevada	No	commitments.		
Orange	17	Male	Burglary	Ranch work and messenger boy.
	15	Male	Burglary	Worked in packing-house.
Placer	No	commitments.		
Plumas	14	Female	Dependent child	History unknown.
Riverside	17	Male	Incorrigibility	Fruit-packer; boy tramp; lived with negroes.
	14	Male	Incorrigibility	Was too unruly for the public schools.
	11	Female	Incorrigibility	Colored girl; unemployed.
	8	Male	Incorrigibility	Colored boy; unemployed.
	16	Male	Petit larceny; incorrigibility.	Shoe-black.
	17	Male	Embezzlement.	Odd jobs about city.
	15	Male	Delinquent child	Worked in drug store; parents divorced and both remarried.
	16	Male	Beating way on trains; dependent child.	Employed as cash boy.
Sacramento	14	Male	Delinquent child; bad company.	Messenger boy.
	13	Male	Grand larceny; dependent child.	Horse thief, Sacramento.
	14	Male	Delinquent child; would not stay at home.	Janitor in barbershop.
	15	Male	Delinquent child	Employed in tailor shop; from Orphans' Home, San Rafael.
San Benito	No	commitments.		
San Bernardino	17	Male	Incorrigibility	Employed in store; was in Golden Reformatory.
	13	Male	Attempted rape	Odd jobs.
	13	Female	Attempted to poison family	Unemployed.
	15	Male	Petit larceny; incorrigibility	At home in Redlands.
	11	Male	Larceny	Unemployed; stole bicycle in San Bernardino.
San Diego	16	Male	Rape	Common laborer.
	16	Male	Burglary; incorrigibility	Worked in butcher shop.
	16	Male	Burglary; incorrigibility	Worked in trunk factory.
	16	Male	Burglary; incorrigibility	Worked in printing office.
	16	Male	Burglary; incorrigibility	Worked as bellboy.
San Francisco	14	Male	Petty thief; incorrigibility	Peddler and confirmed thief.
	15	Male	Robbery	Worked at can factory; robbed messenger boy.
	15	Male	Petit larceny	Lives at home; odd jobs.
	13	Male	Public institution	Learning barber's trade.
	14	Male	Petit larceny	No regular employment.

Table of Juvenile Crimes, Showing Ages and Condition of Offenders Committed to Preston and Whittier Schools for the Twelve Months ending June 30, 1906—Continued.

County.	Age.	Sex.	Offense.	History, Occupation, Etc.
San Francisco— <i>Continued.</i>	15	Male	Robbery	Odd jobs; leader of band of bad boys.
	16	Male	Burglary	Odd jobs.
	16	Male	Burglary	At home.
	13	Male	Burglary	At home.
	16	Male	Petit larceny	Out of orphan asylum four months.
	15	Male	Petit larceny	Working around a saloon.
	15	Male	Public institution	Lived in orphans' home from childhood.
	17	Male	Injuring a vessel	Balloonist.
	15	Male	Public institution	Lives at home; works as clerk.
	15	Male	Burglary	Works at father's store.
	16	Male	Burglary	Works at planing mill.
	16	Male	Attempted burglary	Odd jobs.
	16	Male	Burglary	Odd jobs.
	17	Male	Burglary	Worked in mother's cigar factory.
	17	Male	Burglary	Odd jobs; no certain home.
	15	Male	Petit larceny	Lives at home.
	16	Male	Petit larceny	Messenger boy; orphans' home six years.
	14	Male	Public institution	Odd jobs.
	15	Male	Petit larceny	Living at home, but vagrant.
	13	Male	Dependent child	Messenger boy.
	16	Male	Burglary	Working at peddling with father.
	13	Male	Petit larceny; incorrigibility	Errand boy.
San Joaquin.....	15	Male	Burglary	Odd jobs.
	19	Male	Attempted burglary	Candymaker.
	15	Male	Grand larceny	Odd jobs and tramp.
	15	Male	Burglary	Odd jobs in Stockton.
	12	Male	Burglary	At home.
	14	Male	Grand larceny	At home on fruit ranch.
	17	Male	Grand larceny	Odd jobs; stole tools.
San Luis Obispo.	15	Male	Grand larceny	Chinese boy; worked for friends after San Franc'o earthquake.
	17	Male	Grand larceny	Odd jobs.
	16	Male	Petit larceny; incorrigibility	Unemployed.
	13	Male	Burglary; incorrigibility	Unemployed.
San Mateo	16	Male	Burglary	Dairy work.
Santa Barbara ..	No	No	commitments.	
	15	Male	Petit larceny; incorrigibility	Ranch hand; stole from mother.
Santa Clara	16	Female	Incorrigibility	Unemployed.
	14	Female	Incorrigibility	Unemployed.
	13	Male	Incorrigibility	Farm work; would not stay at home.
	17	Male	Robbery	Odd jobs.
Santa Cruz	17	Male	Robbery	Odd jobs.
	15	Male	Attempted rape	At carpenter work; from Boys' and Girls' Aid Society.
	16	Male	Burglary	Driving junk wagon.
	13	Male	Larceny; incorrigibility	Unemployed.
	16	Male	Grand larceny	Worked in printing office.
Shasta	16	Female	Incorrigibility	Housework.
	16	Male	Burglary	Boy tramp.
	14	Male	Arson	Living at home.
	17	Male	Burglary	Odd jobs.
Shasta	15	Male	Petit larceny and prior	Worked on ranch.
	10	Male	Incorrigibility	Unemployed; father a degenerate, now serving term for unlawful cohabitation with daughter.
	16	Male	Raising check; incorrigibility	Employed in machine shop.

Table of Juvenile Crimes, Showing Ages and Condition of Offenders Committed to Preston and Whittier Schools for the Twelve Months ending June 30, 1906—Continued.

County.	Age	Sex.	Offense.	History, Occupation, Etc.
Sierra	No	commitments.		
Siskiyou.....	No	commitments.		
Solano.....	11	Male	Burglary	Broke into house in Benicia.
	15	Male	Grand larceny	Confirmed thief; from Boys' and Girls' Aid Society.
	14	Male	Burglary	Bootblack stand.
Sonoma	16	Male	Burglary	Errand boy.
	13	Male	Petit larceny; incorrigibility	Lived at home.
	12	Male	Incorrigibility	Lived at home, but beyond parents' control.
Stanislaus ..	17	Male	Grand larceny	Clerk; stole from employer.
Sutter	15	Male	Burglary	Boy tramp.
Tehama	16	Male	Cruelty to animals; incorrigibility	Worked as laborer.
	16	Male	Incorrigibility	Farm hand.
Trinity	No	commitments.		
Tulare	16	Male	Incorrigibility	Has lived and worked on a farm all his life.
	16	Male	Intemperance; incorrigibility	Farm hand.
	12	Male	Larceny; incorrigibility	Unemployed.
	13	Male	Larceny; incorrigibility	Attending school.
	16	Male	Robbery	At home on ranch; seriously injured man and robbed him.
	17	Male	Burglary	Odd jobs.
Tuolumne ..	No	commitments.		
Ventura	10	Male	Incorrigibility	Unemployed; home life good.
	16	Male	Incorrigibility	Ranch work.
	16	Male	Burglary	Boy tramp; home in the East.
	16	Male	Burglary	Boy tramp; home in the East.
	16	Male	Petit larceny	Living at home.
	17	Male	Burglary	Boy tramp; home in the East.
Yolo	No	commitments.		
Yuba	16	Male	Burglary	Made his own way since 13 years of age, tramping and working.

This table covers all commitments to these institutions for both misdemeanors and felonies, 98 being for the former and 102 for felonies. The remaining 87 of the 189 under 20 years of age convicted of felonies are in the penitentiaries at Folsom and San Quentin.

Of the 98 misdemeanors considered here, one child was 8 years of age, two were 10, three 11, six 12, twelve 13, sixteen 14, twenty-two 15, twenty-five 16, eight 17, and three 18. Of the 102 felonies, one was 10 years of age, one 11, four 12, eight 13, five 14, twenty-two 15, thirty-six 16, twenty-three 17, one 18, and one 19.

One colored girl, 11 years of age, was committed to the reform school during the year for incorrigibility; three white girls 14 years of age, one 15, five 16, one 17, and two 18; a total of 13 for minor offenses, in most cases for waywardness.

One girl of 13 was committed for trying to poison her family, one of 17 for burglary, and one of 17 for grand larceny; making a total of three females committed for felonies.

Twelve of the number under consideration had previously been inmates of detention homes, and 6 of orphan asylums. One is the child of a parent convicted of a felony, and at least one has parents divorced. Forty-five seem to have been pursuing steady, and 72 intermittent, employment; 22 lived at home, and only 2 are recorded as attending school. Nineteen are boy tramps.

The great number of these unfortunate youths that have been employed at either permanent or intermittent work and the comparatively small number attending school seems a significant fact. Thousands of neglected boys are tramping about the streets of our cities, and many mere children are confirmed tramps, learning, thus early, to live by their wits. Most of the youthful criminals in our penal institutions already have "records." Their first offenses have been condoned or undetected, and it is the usual thing to have "confirmed thief" or "boy tramp" or "released from detention home" written opposite the name of a child of 15 or 16 years. Of the 189 youthful felons convicted in this one year in our State, 87 are already so hardened in crime that it is thought useless by the courts to send them to the reform schools and they are consigned to the penitentiaries, where in company with older criminals they complete their education in crime. They have long been familiar with the inside of jails and the confinement no longer shames them. It is merely the restraint they dread. "Familiarity" has bred "contempt," and the most salutary effect of punishment is now lost. This is the testimony of the probation and juvenile court officers throughout the State. It would seem that contemplating the appalling number of juvenile offenders guilty of every offense, from petty stealing to highway robbery and murder, the record of which we have given here, every individual in the State must of necessity decide that something is wrong with our present methods. We have no new method to offer, but the facts are here referred with the hope that some improvement may be brought about when once the people are aware of the actual conditions.

DIVORCES.

On account of the destruction of the records of the County Clerk of San Francisco, not enough data on divorces could be secured from that county for the first six months of the present year to warrant a tabulation. For that reason, the number of divorces granted in the last six months of 1905 are tabulated. The number of marriages for the entire year is given, but the percentage of divorces to marriages is computed from the number of marriages occurring during the same six months covered by the divorces. Aside from this one county, the records are for the twelve months ending June 30, 1906, and will be so understood throughout this discussion. Only final decrees are considered.

Number of Divorces for the State of California for the Year ending June 30, 1906, with Percentages to Number of Marriages and Data Concerning Condition of Parties.

County.	Number of Marriages for Year	Number of Divorces for Year	Percentage of Divorces to Marriages	PLAINTIFF.		WHERE MARRIED			LENGTH OF TIME MARRIED.			
				Husband	Wife	California	Rest of U. S.	Foreign	Less than 5 Years	5 to 10 Years	10 to 20 Years	Over 20 Years
Alameda	2,221	180	8.1	52	128	136	40	4	38	58	53	31
Alpine	1	No divorce	s for year.									
Amador	56	11	19.6	3	8	10		1	2	5	3	1
Butte	103	28	27.1	8	20	25	3		10	6	10	2
Calaveras	51	9	17.6	3	6	9			2	4	3	
Colusa	38	No divorce	s for year.									
Contra Costa	155	18	11.6	5	13	14	4		5	8	3	2
Del Norte	15	6	40.0	1	5	4	2		1	2	1	2
El Dorado	56	13	23.2	4	9	12	1		5	4	3	1
Fresno	491	53	10.8	18	35	34	17	2	14	17	18	4
Glenn	35	5	14.2	2	3	3	2		1	2	1	1
Humboldt	170	34	20.0	6	28	24	8	2	8	9	10	7
Inyo	30	3	10.0	2	1	3				1	2	
Kern	140	29	20.7	5	24	22	6	1	8	8	11	2
Kings	112	18	16.0	9	9	13	4	1	1	12	2	3
Lake	32	10	31.2	5	5	8	2			6	2	2
Lassen	30	5	16.6	2	3	4	1		1		4	
Los Angeles	2,241	466	20.7	124	342	233	219	14	95	148	143	80
Madera	40	3	7.5	2	1	2	1		1	2		
Marin	619	13	2.1	5	8	10	3		3	6	3	1
Mariposa	11	4	36.3		4	3	1		1	1	1	1
Mendocino	181	8	4.4	1	7	7	1		1	3	4	
Merced	75	11	14.6	7	4	10	1		3	5	2	1
Modoc	44	No divorce	s for year.									
Mono	5	1	20.0		1	1					1	
Monterey	153	23	15.0	5	18	15	6	2	7	7	5	4
Napa	159	24	15.0	9	15	19	5		5	10	3	6
Nevada	118	20	17.0	4	16	18	1	1	6	8	4	2
Orange	421	19	4.5	7	12	10	7	2	2	6	5	6
Placer	41	7	17.0	2	5	6	1		1	1	3	2
Plumas	30	1	3.3		1	1			1			
Riverside	266	15	5.7	8	7	10	4	1	2	4	7	2
Sacramento	826	95	11.5	27	68	72	22	1	26	36	20	13
San Benito	66	4	6.0	3	1	1	2	1			1	3
San Bernardino	453	63	13.9	17	46	33	29	1	13	20	24	6
San Diego	480	43	9.0	9	34	27	15	1	8	13	15	7
San Francisco*	4,230	475	18.8	133	342	357	99	19	125	152	163	35
San Joaquin	456	40	8.7	9	31	28	8	4	7	12	15	6
San Luis Obispo	179	16	8.9	6	10	12	4		4	5	5	2
San Mateo	235	7	3.0	2	5	6		1	1	2	2	2
Santa Barbara	226	19	8.3	7	12	15	4		4	12	3	
Santa Clara	921	79	8.5	18	61	57	18	4	9	25	27	18
Santa Cruz	225	28	12.4	7	21	24	2	2	5	10	5	8
Shasta	132	37	28.0	13	24	30	6	1	8	9	9	11
Sierra	16	7	43.7	1	6	7			1	3	2	1
Siskiyou	111	25	22.5	3	22	18	7		7	7	7	4
Solano	158	11	7.0	5	6	11			4	6		1
Sonoma	237	37	15.6	2	35	31	5	1	5	15	12	5
Stanislaus	104	13	12.5	2	11	11	1	1	3	2	5	3
Sutter	35	4	11.8		4	3	1		2	1	1	
Tehama	81	6	7.0	2	4	5	1		4	1	1	
Trinity	12	6	50.0	2	4	5	1		2	1	3	
Tulare	20	29	14.1	9	20	23	6		6	12	6	5
Tuolumne	99	11	11.1	4	7	9	2		5	4	1	1
Ventura	137	12	8.7	6	6	6	6		3	5	4	
Yolo	95	21	22.1	2	19	18	3		7	7	5	2
Yuba	73	8	10.9		8	6	2		1	3	4	
Totals	17,932	2,133	13.1	588	1,545	1,481	584	68	484	706	647	296

*In San Francisco the percentages are based on divorce returns for the six months ending December 31, 1905, the data for the six months ending June 30, 1906, having been destroyed. The percentage of divorce to marriage is based on the 2,526 marriages occurring during six months ending December 31, 1905.

Number of Divorces for the State of California by Counties for the Year ending June 30, 1906, with Percentages to Number of Marriages and Data Concerning Condition of Parties—Continued.

County.	CAUSE FOR DIVORCE.						NUMBER AND AGES OF CHILDREN REPORTED.				CHILDREN.
	Adultery	Extreme Cruelty	Willful Desertion	Neglect and Failure to Provide	Intemperance	Conviction of a Felony	Number of Families Having No Children	Aged Less than 5 Years	Aged 5 to 10 Years	Aged Over 10 Years	Number Affected
Alameda	11	51	81	25	12		99	31	30	20	143
Alpine	No divorces for year.										
Amador		3	7	1			4	2	3	2	12
Butte		8	14	6			12	5	6	5	31
Calaveras	1	2	3	2	1		4		5		6
Colusa	No divorces for year.										
Contra Costa	2	3	7	5	1		10	3	3	2	10
Del Norte		1	3	1	1		1	3	2		11
El Dorado		6	6		1		6	3	2	2	15
Fresno	4	13	26	6	4		28	5	9	11	39
Glenn		1	3	1			4		1		3
Humboldt	3	9	9	12		1	13	10	7	4	42
Inyo			3				2		1		4
Kern	2	5	20	1	1		16	6	6	1	29
Kings		4	10	4			10	5	1	2	12
Lake		3	7				6	3	1		10
Lassen			4		1		2	1	2		4
Los Angeles	34	105	238	50	35	4	296	46	75	49	295
Madera	2	1					2	1			1
Marin		4	7		2		8	4	1		9
Mariposa		3		1			2	1	1		4
Mendocino	1	1	2	2	2		1	5		2	8
Merced	2		8	1			7	4			8
Modoc	No divorces for year.										
Mono			1					1			3
Monterey		10	10	3			10	6	4	3	32
Napa	2	6	12	1	3		15	6	2	1	20
Nevada	1	5	12	1	1		11	4	1	4	17
Orange		6	10	1	2		10	4	4	1	23
Placer	1	1	3	2			4		2	1	5
Plumas			1					1			1
Riverside		7	6	2			9	2	4		8
Sacramento	3	43	27	19	4		57	19	13	6	60
San Benito			4				2		2		4
San Bernardino	3	15	27	9	4	5	29	17	9	8	61
San Diego	2	13	22	5	1		29	6	4	4	28
San Francisco	18	134	193	102	25	3	324	50	58	4	231
San Joaquin	1	6	14	15	3	1	22	7	6	5	29
San Luis Obispo	1	2	12	1			12		2	2	8
San Mateo		5	2				4	1	1	1	6
Santa Barbara		4	13	1	1		15	1	2	1	6
Santa Clara	1	29	28	18	3		45	15	9	10	60
Santa Cruz	2	6	9	8	3		17	7	3	1	32
Shasta	2	11	17	4	3		23	8	3	3	38
Sierra			2	4		1	3	1	3		6
Siskiyou	1	11	12		1		17	5	2	1	15
Solano		5	5	1			6	4	1		7
Sonoma	1	10	20	5	1		19	8	5	5	32
Stanislaus		3	5	5			4	3	2	4	14
Sutter		4						3		1	5
Tehama	1	2	3				4	2			5
Trinity		3	2	1			3	1	1	1	4
Tulare		11	17		1		12	9	7	1	32
Tuolumne	1	4	3	3			6	4	1		10
Ventura	1		9	1	1		7	1	2	2	10
Yolo	1	9	7	1	1	2	11	5	3	2	17
Yuba		4	1	3			2	3	1	2	11
Totals	105	591	967	334	119	17	1,265	342	313	213	1,536

The total number of marriages for the year is 17,932, while 2,133 divorces are considered. The percentage of divorces to marriages, deducting from the total the number occurring in San Francisco the first six months of this year, is 13.1. San Francisco is first in number of divorces granted, having 475 for the half-year, or 950 for the entire year, if the same proportion prevailed throughout the year. Los Angeles is second with 466, and Alameda third with 180. Sacramento shows 95, Santa Clara 79, San Bernardino 63, and Fresno 53. Alpine, Colusa, and Modoc counties granted no final decrees of divorce during the entire year.

Husbands were plaintiffs in 588 instances, representing 27.6 per cent, and wives in 1,545 instances, or 72.4 per cent.

Divorces were given to 1,481 couples who had been married in California, to 584 married in the United States outside of California, and to 68 married in foreign countries, representing 69.4, 27.4, and 3.2 per cent respectively.

Parties divorced had been married less than 5 years in 484 instances; 706 from 5 to 10 years; 647 from 10 to 20 years, and 296 over 20 years; representing 22.7, 33.1, 30.4, and 13.8 per cent respectively.

The tabulation for causes of divorce follows the statutory divisions. Adultery brought about 105 divorces, or 4.9 per cent; extreme cruelty, 591 or 27.7 per cent; willful desertion, 967, or 45.3 per cent; neglect and failure to provide, 334, or 15.7 per cent; intemperance, 119, or 5.6 per cent; and conviction of a felony, 17, or .8 per cent.

Investigation into the family life of divorced parties shows that 1,265 families, representing 59.3 per cent of the total number, reported no children; 342, or 16 per cent, have children under 5 years of age; 313, or 14.7 per cent, have children under 10 years, but none under 5 years of age; 213 have children over 10, but none under that age. The total number of children involved is 1,536, or about three children to every four divorces. The large percentage of divorces given to families reporting no children, and the comparatively small number of children involved, suggest this absence of children as one of the potent causes of divorce.

In order to show percentages of divorces in the different counties under the several divisions, the table showing numbers above is reduced to percentages and is here given:

**Percentage of Divorces for the Several Counties of California, Classified to Show
Condition of Parties, for the Twelve Months ending June 30, 1906.**

Counties.	Number of Divorces.	PLAINTIFF.		WHERE MARRIED.			LENGTH OF TIME MARRIED.			
		Percentage.		Percentage.			Percentage.			
		Husbands	Wives	California	Rest of U. S.	Foreign	Less than 5 years	5 to 10 years	10 to 20 years	Over 20 years
Alameda	180	28.8	71.2	75.5	22.2	2.3	21.1	32.3	29.4	17.2
Alpine	No divorces for the year.									
Amador	11	27.3	72.7	90.9		9.9	18.2	45.4	27.3	9.1
Butte	28	28.6	71.4	89.3	10.7		35.7	21.4	35.7	7.2
Calaveras	9	33.3	66.7	100.0			22.2	44.5	33.3	
Colusa	No divorces for the year.									
Contra Costa	18	27.8	72.2	77.8	22.2		27.8	44.4	16.7	11.1
Del Norte	6	16.7	83.3	66.7	33.3		16.7	33.3	16.7	33.3
El Dorado	13	30.8	69.2	92.3	7.7		38.5	30.8	2.0	7.7
Fresno	53	34.0	66.0	64.1	32.1	3.8	26.4	32.0	34.0	7.6
Glenn	5	40.0	60.0	60.0	40.0		20.0	40.0	20.0	20.0
Humboldt	34	17.7	82.3	70.6	23.5	5.9	23.5	26.5	29.4	20.6
Inyo	3	66.7	33.3	100.0				33.3	66.7	
Kern	29	17.2	82.8	75.9	20.7	3.4	27.6	27.6	37.9	6.9
Kings	18	50.0	50.0	72.2	22.2	5.6	5.6	66.6	11.1	16.7
Lake	10	50.0	50.0	80.0	20.0			60.0	20.0	20.0
Lassen	5	40.0	60.0	80.0	20.0		20.0		80.0	
Los Angeles	466	26.6	73.4	49.8	44.8	6.4	20.4	31.8	30.7	17.1
Madera	3	66.6	33.3	66.6	33.3		33.3	66.6		
Marin	13	38.5	61.5	76.9	23.1		23.1	46.1	23.1	7.7
Mariposa	4		100.0	75.0	25.0		25.0	25.0	25.0	25.0
Mendocino	8	12.5	87.5	87.5	12.5		12.5	37.5	50.0	
Merced	11	63.6	36.4	90.9	9.1		27.3	45.4	18.2	9.1
Modoc	No divorces for the year.									
Mono	1		100.0	100.0					100.0	
Monterey	23	21.7	78.3	65.2	26.0	8.8	30.4	30.4	21.7	17.5
Napa	24	37.5	62.5	79.2	20.8		20.9	41.6	12.5	25.0
Nevada	20	20.0	80.0	90.0	5.0	5.0	30.0	40.0	20.0	10.0
Orange	19	36.8	63.3	52.5	36.8	10.6	10.6	31.6	26.2	31.6
Placer	7	28.6	71.4	85.7	14.3		14.3	14.3	42.8	28.6
Plumas	1		100.0	100.0			100.0			
Riverside	15	53.3	46.7	66.6	26.7	6.7	13.3	26.7	46.7	13.3
Sacramento	95	28.4	71.6	75.8	23.1	1.1	27.4	37.9	21.0	13.7
San Benito	4	75.0	25.0	25.0	50.0	25.0			75.0	25.0
San Bernardino	63	27.0	73.0	52.4	46.0	1.6	20.7	31.7	38.1	9.5
San Diego	43	20.9	79.1	62.8	34.9	2.3	18.6	30.2	34.9	16.3
San Francisco	475	28.0	72.0	75.1	20.9	4.0	26.2	32.0	34.4	7.4
San Joaquin	40	22.5	77.5	70.0	20.0	10.0	17.5	30.0	37.5	15.0
San Luis Obispo	16	37.5	62.5	75.0	25.0		25.0	31.2	31.2	12.5
San Mateo	7	28.6	71.4	85.7		14.3	14.2	28.6	28.6	28.6
Santa Barbara	19	36.8	63.2	78.9	21.1		21.1	63.2	15.7	
Santa Clara	79	22.8	77.2	72.1	22.8	5.1	11.4	31.6	34.2	22.8
Santa Cruz	28	25.0	75.0	85.7	7.1	7.1	17.9	35.7	17.9	28.5
Shasta	37	35.1	64.9	81.1	16.2	2.7	21.7	24.3	24.3	29.7
Sierra	7	14.3	85.7	100.0			14.3	42.9	28.5	14.3
Siskiyou	25	12.0	88.0	72.0	28.0		28.0	28.0	28.0	16.0
Solano	11	45.5	54.5	100.0			36.5	54.5		9.0
Sonoma	37	5.4	94.6	83.8	13.5	2.7	13.5	40.5	32.5	13.5
Stanislaus	13	15.4	84.6	84.6	7.7	7.7	23.0	15.4	38.5	23.0
Sutter	4		100.0	75.0	25.0		50.0	25.0	25.0	
Tehama	6	33.3	66.7	83.3	16.7		66.6	16.7	16.7	
Trinity	6	33.3	66.7	83.3	16.7		33.3	16.7	50.0	
Tulare	29	31.0	69.0	79.3	20.7		20.7	41.3	20.7	17.3
Tuolumne	11	36.3	63.7	81.8	18.2		45.4	36.4	9.1	9.1
Ventura	12	50.0	50.0	50.0	50.0		25.0	41.7	33.3	
Yolo	21	9.5	90.5	85.7	14.3		33.3	33.3	23.8	9.6
Yuba	8		100.0	75.0	25.0		12.5	37.5	50.0	
Whole State	2,133	27.6	72.4	69.4	27.4	3.2	27.7	33.1	30.4	13.8

Percentage of Divorces for the Several Counties of California, Classified to Show Condition of Parties, for the Twelve Months ending June 30, 1906—Continued.

Counties.	CAUSE FOR DIVORCE.						NUMBER AND AGES OF CHILDREN.				Percent of Children to Number of Divorces
	Percentage.						Percentage.				
	Adultery	Extreme Cruelty	Willful Desertion	Neglect and Failure to Provide	Intemperance	Conviction of Felony	No Children	Less than 5 years	5 to 10 years	Over 10 years	
Alameda	6.1	28.3	45.0	13.9	6.7		55.0	17.2	16.7	11.1	79.4
Alpine	No	divorces for the year.									
Amador		27.3	63.6	9.1			36.4	18.2	27.2	18.2	109.0
Butte		28.6	50.0	21.4			42.8	17.9	21.4	17.9	110.6
Calaveras	11.1	22.2	33.4	22.2	11.1		44.4		55.6		66.6
Colusa	No	divorces for the year.									
Contra Costa	11.1	16.7	38.9	27.8	5.5		55.5	16.7	16.7	11.1	55.5
Del Norte		16.6	50.0	16.6	16.6		16.7	50.0	33.3		183.3
El Dorado		46.2	46.2		7.6		46.2	23.1	15.3	15.3	115.4
Fresno	7.6	24.5	49.0	11.3	7.6		52.8	9.4	17.0	20.8	73.4
Glenn		20.0	60.0	20.0			80.0		20.0		60.0
Humboldt	8.8	26.4	26.4	35.5		2.9	38.2	29.4	20.6	11.8	123.5
Inyo			100.0				66.7		33.3		133.3
Kern	6.9	17.3	69.0	3.4	3.4		55.2	20.7	20.7	3.4	100.0
Kings		22.2	55.6	22.2			55.6	27.8	5.6	11.0	66.6
Lake		30.0	70.0				60.0	30.0	10.0		100.0
Lassen			80.0		20.0		40.0	20.0	40.0		40.0
Los Angeles	7.3	22.6	51.1	10.6	7.5	.9	63.5	9.9	16.1	10.5	63.3
Madera	66.6	33.3					66.6	33.3			33.3
Marin		30.8	53.8		15.4		61.5	30.8	7.7		69.2
Mariposa		75.0		25.0			50.0	25.0	25.0		100.0
Merced	12.5	12.5	25.0	25.0	25.0		12.5	62.5		25.0	100.0
Merced	18.2		72.7	9.1			63.6	36.4			72.7
Modoc	No	divorces for the year.									
Monterey			100.0					100.0			300.0
Monterey		43.5	43.5	13.0			43.5	26.1	17.4	13.0	139.1
Napa	8.3	25.0	50.0	4.2	12.5		62.5	25.0	8.3	4.2	81.7
Nevada	5.0	25.0	60.0	5.0	5.0		55.0	20.0	5.0	20.0	85.0
Orange		31.6	52.6	5.3	10.5		52.5	21.1	21.1	5.3	121.0
Placer	14.3	14.3	42.8	28.6			57.1		28.6	14.3	71.4
Plumas			100.0					100.0			100.0
Riverside		46.7	40.0	13.3			60.0	13.3	26.7		53.3
Sacramento	3.2	44.2	28.4	20.0	4.2		60.0	20.0	13.7	6.3	63.1
San Benito			100.0				50.0		50.0		100.0
San Bernardino	4.8	23.8	42.9	14.3	6.3	7.9	46.0	27.0	14.3	12.7	96.8
San Diego	4.6	30.2	51.2	11.8	2.3		67.4	14.0	9.3	9.3	65.1
San Francisco	3.8	28.2	40.7	21.5	5.2	.6	68.2	10.5	12.2	9.1	48.9
San Joaquin	25.0	15.0	35.0	37.5	7.5	2.5	55.0	17.5	15.0	12.5	72.5
San Luis Obispo	6.2	12.5	75.0	6.2			75.0		12.5	12.5	50.0
San Mateo		71.4	28.6				57.1	14.3	14.3	14.3	85.7
Santa Barbara		21.1	68.3	5.3	5.3		73.6	5.3	15.8	5.3	31.6
Santa Clara	1.3	36.7	35.4	22.8	3.8		56.9	19.0	11.4	12.7	76.0
Santa Cruz	7.2	21.4	32.1	28.6	10.7		60.7	25.0	10.7	3.6	114.3
Shasta	5.4	29.7	45.9	10.9	8.1		62.2	21.6	8.1	8.1	102.7
Sierra			28.5	57.2		14.3	42.9	14.2	42.9		85.7
Siskiyou	4.0	44.0	48.0		4.0		68.0	20.0	8.0	4.0	60.0
Solano		45.5	45.5	9.0			54.5	36.5	9.0		63.6
Sonoma	2.7	27.0	54.1	13.5	2.7		51.3	21.7	13.5	13.5	86.5
Stanislaus		23.0	38.5	38.5			30.8	23.0	15.4	30.8	107.7
Sutter		100.0						75.0		25.0	125.0
Tehama	16.7	33.3	50.0				66.7	33.3			83.3
Trinity		50.0	33.3	16.7			50.0	16.7	16.7	16.6	66.6
Tulare		37.8	58.8		3.4		41.4	31.0	24.2	3.4	110.3
Tuolumne	9.1	36.3	27.3	27.3			54.6	36.3	9.1		90.9
Ventura	8.4		75.0	8.3	8.3		58.3	8.3	16.7	16.7	83.3
Yolo	4.8	42.7	33.3	4.8	4.8	9.6	52.3	23.8	14.3	9.6	80.9
Yuba		50.0	12.5	37.5			25.0	37.5	12.5	25.0	137.5
Whole State	4.9	27.7	45.3	15.7	5.6	.8	59.3	16.0	14.7	10.0	71.5

MARRIAGES.

Two tables are given on marriage. One shows the number and condition of the parties, and the other the corresponding percentages. These tables, in slightly different form, were compiled by the State Board of Health. As has already been mentioned, that Department as well as this Bureau has the duty of collecting statistics on marriage.

Of the 17,932 marriages, 13,182, or 73.5 per cent, were the first of both parties; 1,958, or 10.9 per cent, were first of groom only; 1,450, or 8.1 per cent, first of bride only, and in 1,342 instances, representing 7.5 per cent, both parties had been married at least once before. Of the grooms, 15,140, or 84.4 per cent, were married for the first time, as against 14,632, or 81.6 per cent, brides likewise never married before. 1,655 husbands, or 9.2 per cent, had been married before and their wives had died, and 1,891 wives, or 10.5 per cent, had lost husbands by death. Of the men, 1,137, or 6.4 per cent, were divorcees, while 1,409, or 7.9 per cent, of the women had had similar matrimonial experiences. The women are thus seen to exceed in the number of widowed and divorced who remarry. In five counties only did the number of divorced men exceed the number of divorced women remarrying; the counties are Colusa (where no divorces were granted during the time in question), Kings, Monterey, Placer, and San Luis Obispo. Fourteen counties had more widowers than widows remarry; they are Calaveras, Kings, Merced, Monterey, Riverside, San Benito, San Bernardino, San Diego, San Luis Obispo, Santa Barbara, Santa Cruz, Siskiyou, Sutter, and Tehama.

Marriages, Classified by Number and Marital Condition of Parties, by Counties, July 1, 1905, to June 30, 1906, inclusive.

County.	Total Marriages.	NUMBER OF MARRIAGES.				GROOM.			BRIDE.		
		First of Both Parties	First of Groom Only	First of Bride Only	Second or Over of Both	Single	Widowed	Divorced	Single	Widowed	Divorced
Alameda	2,221	1,611	238	179	193	1,849	210	162	1,790	233	198
Alpine	1	1				1			1		
Amador	56	44	8	3	1	52	4		47	7	2
Butte	103	75	14	8	6	89	8	6	83	13	7
Calaveras	51	42	4	3	2	46	2	3	45	1	5
Colusa	38	30	3	3	2	33	2	3	33	4	1
Contra Costa	155	110	22	12	11	132	16	7	122	19	14
Del Norte	15	12	2	1		14	1		13	1	1
El Dorado	56	54	1	1		55	1		55		1
Fresno	491	390	38	31	32	428	46	17	421	50	20
Glenn	35	25	6	1	3	31	3	1	26	6	3
Humboldt	170	136	18	10	6	154	12	4	146	17	7
Inyo	30	28	1	1		29	1		29	1	
Kern	140	95	26	10	9	121	10	9	105	22	13
Kings	112	95	4	8	5	99	9	4	103	7	2
Lake	32	27	1	1	3	28	3	1	28	3	1
Lassen	30	20	4	3	3	24	5	1	23	6	1
Los Angeles	2,241	1,630	216	205	190	1,846	240	155	1,835	246	160
Madera	40	35	3	1	1	38	1	1	36	3	1
Marin	619	368	116	66	69	484	55	80	434	89	96
Mariposa	11	11				11			11		
Mendocino	181	134	22	13	12	156	20	5	147	24	10
Merced	75	60	9	3	3	69	4	2	63	5	7
Modoc	44	38	5	1		43	1		39	4	1
Mono	5	5				5			5		
Monterey	153	110	14	20	9	124	14	15	130	11	12
Napa	159	114	21	10	14	135	15	9	124	26	9
Nevada	118	82	18	7	11	100	11	7	89	19	10
Orange	421	284	46	39	52	330	56	35	323	56	42
Placer	41	30	6	2	3	36	1	4	32	6	3
Plumas	30	26	1	2	1	27	3		28	2	
Riverside	266	193	24	25	24	217	32	17	218	26	22
Sacramento	826	585	108	63	70	693	71	62	648	92	86
San Benito	66	56	3	4	3	59	5	2	60	2	4
San Bernardino	453	339	42	40	32	381	51	21	379	49	25
San Diego	480	307	61	61	51	368	75	37	368	68	44
San Francisco	4,230	3,217	456	312	245	3,673	311	246	3,529	388	313
San Joaquin	456	325	52	43	36	377	43	36	368	49	39
San Luis Obispo	179	140	14	18	7	154	17	8	158	15	6
San Mateo	235	152	39	25	19	191	23	21	177	25	33
Santa Barbara	226	147	29	30	20	176	35	15	177	32	17
Santa Clara	921	681	95	76	69	776	83	62	757	89	75
Santa Cruz	225	160	19	23	23	179	25	21	183	21	21
Shasta	132	87	20	11	14	107	16	9	98	19	15
Sierra	16	13	2	1		15		1	14	1	1
Siskiyou	111	84	8	9	10	92	15	4	93	9	9
Solano	158	122	15	9	12	137	14	7	131	14	13
Sonoma	237	186	23	14	14	209	20	8	200	24	13
Stanislaus	104	84	8	6	6	92	8	4	90	10	4
Sutter	35	28	5	2		33	2		30	1	4
Tehama	81	64	8	7	2	72	8	1	71	7	3
Trinity	12	10	2			12			10	1	1
Tulare	205	165	17	10	13	182	15	8	175	16	14
Tuolumne	99	77	11	4	7	88	8	3	81	15	3
Ventura	137	104	15	7	11	119	9	9	111	17	9
Yolo	95	77	10	2	6	87	5	3	79	10	6
Yuba	73	57	5	4	7	62	10	1	61	10	2
Totals	17,982	13,182	1,958	1,450	1,342	15,140	1,655	1,137	14,632	1,891	1,409

**Marriages—Marital Condition of Parties by Percentages for Counties, July 1, 1905,
to June 30, 1906, inclusive.**

County.	Total Marriages	PER CENT OF MARRIAGES.				PER CENT OF GROOMS.			PER CENT OF BRIDES.		
		First of Both Parties	First of Groom Only	First of Bride Only	Second or Over of Both	Single	Widowed	Divorced	Single	Widowed	Divorced
Alameda	2,221	72.5	10.7	8.1	8.7	83.2	9.5	7.3	80.6	10.5	8.9
Alpine	1	100.0				100.0			100.0		
Amador	56	78.6	14.3	5.3	1.8	92.9	7.1		83.9	12.5	3.6
Butte	103	72.8	13.6	7.8	5.8	86.4	7.8	5.8	80.6	12.6	6.8
Calaveras	51	82.4	7.8	5.9	3.9	90.2	3.9	5.9	88.2	2.0	9.8
Colusa	38	78.9	7.9	7.9	5.3	86.8	5.3	7.9	86.8	10.5	2.7
Contra-Costa	155	71.0	14.2	7.7	7.1	85.2	10.3	4.5	78.7	12.3	9.0
Del Norte	15	80.0	13.3	6.7		93.3	6.7		86.6	6.7	6.7
El Dorado	56	96.4	1.8	1.8		98.2	1.8		98.2	1.8	
Fresno	491	79.4	7.8	6.3	6.5	87.2	9.4	3.4	85.7	10.2	4.1
Glenn	35	71.4	17.1	2.9	8.6	88.5	8.6	2.9	74.3	17.1	8.6
Humboldt	170	80.0	10.6	5.9	3.5	90.6	7.1	2.3	85.9	10.0	4.1
Inyo	30	93.4	3.3	3.3		96.7	3.3		96.7	3.3	
Kern	140	67.9	18.6	7.1	6.4	86.4	7.2	6.4	75.0	15.7	9.3
Kings	112	84.8	3.6	7.1	4.5	88.4	8.0	3.6	92.0	6.2	1.8
Lake	32	84.4	3.1	3.1	9.4	87.5	9.4	3.1	87.5	9.4	3.1
Lassen	30	66.7	13.3	10.0	10.0	80.0	16.7	3.3	76.7	20.0	3.3
Los Angeles	2,241	72.7	9.6	9.2	8.5	82.4	10.7	6.9	81.9	11.0	7.1
Madera	40	87.5	7.5	2.5	2.5	95.0	2.5	2.5	90.0	7.5	2.5
Marin	619	59.5	18.7	10.7	11.1	78.2	8.9	12.9	70.1	14.4	15.5
Mariposa	11	100.0				100.0			100.0		
Mendocino	181	74.0	12.2	7.2	6.6	86.2	11.0	2.8	81.2	13.3	5.5
Merced	75	80.0	12.0	4.0	4.0	92.0	15.3	2.7	84.0	6.7	9.3
Modoc	44	86.3	11.4	2.3		97.7	2.3		88.6	9.1	2.3
Mono	5	100.0				100.0			100.0		
Monterey	153	71.9	9.1	13.1	5.9	81.1	9.1	9.8	85.0	7.2	7.8
Napa	159	71.7	13.2	6.3	8.8	84.9	9.4	5.7	78.0	16.3	5.7
Nevada	118	69.5	15.3	5.9	9.3	84.8	9.3	5.9	75.4	16.1	8.5
Orange	421	67.5	10.9	9.3	12.3	78.4	13.3	8.3	76.7	13.3	10.0
Placer	41	73.2	14.6	4.9	7.3	87.8	2.4	9.8	78.1	14.6	7.3
Plumas	31	86.7	3.3	6.7	3.3	90.0	10.0		93.3	6.7	
Riverside	266	72.6	9.0	9.4	9.0	81.6	12.0	6.4	81.9	9.8	8.3
Sacramento	826	70.8	13.1	7.6	8.5	83.9	8.6	7.5	78.5	11.1	10.4
San Benito	66	84.9	4.5	6.1	4.5	89.4	7.6	3.0	90.9	3.0	6.1
San Bernardino	453	74.8	9.3	8.8	7.1	84.1	11.3	4.6	83.7	10.8	5.5
San Diego	480	64.0	12.7	12.7	10.6	76.7	15.6	7.7	76.7	14.2	9.1
San Francisco	4,230	76.0	10.8	7.4	5.8	86.8	7.4	5.8	83.4	9.2	7.4
San Joaquin	456	71.3	11.4	9.4	7.9	82.7	9.4	7.9	80.7	10.7	8.6
San Luis Obispo	179	78.2	7.8	10.1	3.9	86.0	9.5	4.5	88.3	8.4	3.3
San Mateo	235	64.7	16.6	10.6	8.1	81.3	9.8	8.9	75.3	10.6	14.1
Santa Barbara	226	65.1	12.8	13.3	8.8	77.9	15.6	6.6	78.3	14.2	7.5
Santa Clara	921	73.9	10.3	8.3	7.5	84.3	9.0	6.7	82.2	9.7	8.1
Santa Cruz	225	71.1	8.5	10.2	10.2	79.6	11.1	9.3	81.4	9.3	9.3
Shasta	132	65.9	15.7	8.3	10.6	81.1	12.1	6.8	74.2	14.4	11.4
Sierra	16	81.3	12.5	6.2		93.8	6.2		87.5	6.3	6.2
Siskiyou	111	75.7	7.2	8.1	9.0	82.9	13.5	3.6	83.8	8.1	8.1
Solano	158	77.2	9.5	5.7	7.6	86.7	8.9	4.4	82.9	8.9	8.2
Sonoma	237	78.5	9.7	5.9	5.9	88.2	8.4	3.4	84.4	10.1	5.5
Stanislaus	104	80.7	7.7	5.8	5.8	88.4	7.7	3.9	86.5	9.6	3.9
Sutter	35	80.0	14.3	5.7		94.3	5.7		85.7	2.9	11.4
Tehama	81	79.0	9.9	8.6	2.5	88.9	9.9	1.2	87.7	8.6	3.7
Trinity	12	83.3	16.7			100.0			83.4	8.3	8.3
Tulare	205	80.5	8.3	4.9	6.3	88.8	7.3	3.9	85.4	7.8	6.8
Tuolumne	99	77.8	11.1	4.0	7.1	88.9	8.1	3.0	81.8	15.2	3.0
Ventura	137	75.9	11.0	5.1	8.0	86.6	6.6	6.6	81.0	12.4	6.6
Yolo	95	81.1	10.5	2.1	6.3	91.6	5.3	3.1	83.2	10.5	6.3
Yuba	73	78.1	6.8	5.5	9.6	84.9	13.7	1.4	83.6	13.7	2.7
Whole State	17,932	73.5	10.9	8.1	7.5	84.4	9.2	6.4	81.6	10.5	7.9

CHINESE AND JAPANESE—THEIR NUMBER AND CONDITION.

In the last Biennial Report of this Bureau an investigation into the condition of the Orientals in the State was undertaken. During the past two years this inquiry has been prosecuted more exhaustively along similar lines. The former report led to the conclusion that on October 1, 1904, there were upwards of 20,000 Japanese and in the neighborhood of 40,000 Chinese resident in our State. Since that time all the passenger steamship lines running vessels to San Francisco have reported monthly the arrival and departure of Chinese and Japanese.

The following table shows these figures in detail for the two years beginning October 1, 1904:

**Arrival and Departure of Orientals, Port of San Francisco, During the Two Years
Ending September 30, 1906.**

Race and Year.	ASIA.				HAWAIIAN ISLANDS.				Net In- crease.	Net De- crease.
	Arriv- als.	Depart- ures.	In- crease.	De- crease.	Arriv- als.	Depart- ures.	In- crease.	De- crease.		
Oct. 1, '04, to Sept. 30, '05—										
Japanese	1,426	2,447	-----	1,021	6,348	77	6,721	-----	5,250	-----
Chinese	1,554	5,617	-----	4,063	52	-----	52	-----	-----	4,011
Oct. 1, '05, to Sept. 30, '06—										
Japanese	1,224	2,022	-----	798	9,320	114	9,206	-----	8,408	-----
Chinese	1,961	5,756	-----	3,795	60	2	58	-----	-----	3,737
Totals—										
Japanese	2,650	4,469	-----	1,819	15,668	191	15,477	-----	13,658	-----
Chinese	3,515	11,373	-----	7,858	112	2	110	-----	-----	7,748

By far the greater number of Japanese coming to San Francisco arrive from the Hawaiian Islands; the increase from this point during the first year considered being 6,271, and during the year just passed 9,206, making a total addition of 15,477 to our Japanese population from that source, taking into consideration all departures. During the year ending September 30, 1905, the departures to Asia from this port exceeded the arrivals from the same source by 1,020. This covered the time of the Russo-Japanese war. During the last year the decrease in population due to departures to the home country was 798, making

a total of 1,819 for the two years. Deducting this from the increase due to arrivals from the Hawaiian Islands, there remains a net increase of 13,658, which number represents the increase in Japanese population coming through the Golden Gate alone. The 15,477 increase from Honolulu and other island points is not recorded by the immigration authorities, from the fact that these are considered domestic ports, and no record is kept of travel between such ports.

The numbers given here do not represent *estimates*, but *actual figures*, taken from the records of the steamship companies.

During the time in question a net decrease in Chinese population is shown, amounting to 7,748 people. The decrease in the first year was 4,011, and in the year just ended 3,737. The old men of this race are constantly going back to their native land to spend their remaining years, and the Exclusion Law prevents the influx of the younger generation. The arrivals shown in the table are for the most part the return of certificated Chinese after a visit to their country.

Before the destruction of the records of this Bureau, data from several hundred individual establishments employing Oriental labor had been collected, mainly in San Francisco. Immediately after that time the investigation was resumed for the purpose of ascertaining the exact condition of the Oriental throughout the State as regards his wages, cost of living, mode of life, marital condition, etc. One hundred and fifty establishments, covering 818 Chinese and 199 Japanese, were investigated and individual data collected at first hand from these people. This was done in addition to the farm-labor inquiry, detailed information on which is found on pages 72 to 81 of this report. The data contained here was gathered in San Francisco, Oakland, Sacramento, San José, Fresno, Stockton, Bakersfield, and Los Angeles.

The following tables show the wages paid in different occupations to Chinese and Japanese, together with the number in each occupation:

Wages and Occupations of Chinese in San Francisco, in Selected Occupations, Excluding Agricultural Labor, for the Year 1906. (Wages include board in every instance.)

Occupation.	Total	WAGES BY THE DAY.						WAGES BY THE WEEK.						WAGES BY MONTH.		Doing own work
		\$1.00	\$1.10	\$1.25	\$1.50	\$2.50	\$3.00	\$6.00	\$7.00	\$8.00	\$9.00	\$10.00	\$11.00	\$12.00	\$14.00	
Cigarmakers	27	16	6	2	1											2
Cigar-packers	3				2											1
Clerks	24															2
Cooks	1															1
Garment cutters	2						1									
Garment machine-operators	7					7										
Ironers	218							23	85	63	23	7				17
Tobacco strippers	4	1														
Washers—Laundry	73							2			6	27	19	12	2	5
Totals	359	17	6	2	3	7	1	25	85	63	29	34	19	12	2	44

Wages and Occupations of Chinese in Oakland, in Selected Occupations, Exclusive of Agricultural Labor, for the Year 1906. (Wages in every instance include board.)

Occupation.	WAGES BY THE DAY.				WAGES BY THE WEEK.								WAGES BY THE MONTH.										Doing own work
	\$1.00...	\$1.25...	\$1.50...	\$2.00...	\$5.00...	\$6.00...	\$7.00...	\$8.00...	\$9.00...	\$10.00...	\$11.00...	\$12.00...	\$20.00...	\$25.00...	\$30.00...	\$35.00...	\$40.00...	\$50.00...	\$60.00...	\$65.00...	\$100.00...		
Butchers	31			4									4				3					20	
Cigarmakers	60					6	4	2														3	
Cigar-packers	29		9			2	2							1			3					25	
Clerks	9														5			4	2				
Compositors	10												1		3		3			1			
Cooks	10					1									2								
Dishwashers	7														3								
Garment-cutters	24						6	5	1				2		4				2			3	
Garment machine-operators	34			1		2	2	2	2				5		6		9					8	
Ironers—Laundry	66					9	37	16	3													1	
Janitors	1														1								
Jewelers	8							8															
Managers	7																						
Porters	2														1							6	
Pressmen	3																3						
Reporters	3																	3					
Tailors	3			3																			
Tobacco strippers	12																						
Waiters	4			1		1	8						2										
Washers	23			1				1	1	10	2	3		3	1		1	2	1				
Totals	346	20	19	9	9	3	26	49	24	15	10	3	10	16	17	10	26	7	3	1	1	66	

Wages and Occupations of Chinese at Points Outside of San Francisco and Oakland, in Selected Occupations, Excluding Agricultural Labor, for the Year 1906. (Wages include board in every instance.)

Occupation.	WAGES PER DAY.	WAGES BY THE WEEK.						WAGES BY THE MONTH.							Doing own work
		\$8.00	\$9.00	\$10.00	\$11.00	\$12.00	\$14.00	\$25.00	\$30.00	\$35.00	\$40.00	\$45.00	\$50.00	\$60.00	
Total	19							2	2	2		1	1	1	13
Clerks	3														
Cooks	2														
Dishwashers	6	2						2		1	1				
Garment-cutters	7														
Garment machine-operators	18	7													
Ironers	3	7								5					2
Waiters	18	6			2	5	1			3					2
Washer-Laundry										2					
Totals	76	7	15	4	2	5	1	4	7	8	1	1	1	1	17

Wages and Occupations of Japanese in Different Sections of California, Exclusive of Agricultural Labor, for the Year 1906. (Wages include board, unless otherwise specified.)

Occupation.	WAGES PER HOUR.	WAGES BY THE DAY.			WAGES BY THE WEEK.				WAGES BY THE MONTH.											Doing own work	
		\$1.00	\$1.25	\$3.50	\$5.00	\$9.00	\$10.00	\$11.00	\$20.00	\$25.00	\$30.00	\$35.00	\$40.00	\$45.00	\$50.00	\$60.00	\$65.00	\$70.00	\$85.00		\$125.00
Total	25c	1		3	1	1	1		3	9	1	3								1	
Bookkeepers		3																			
Carpenters																					
Clerks																					
Cooks																					
Dishwashers																					
House-cleaners																					
Ironers																					
Laundry manglers																					
Porters																					
Shoe-repairers																					
Tailors																					
Waiters																					
Washers—Laundry																					
Totals		14	1	5	3	1	1	1	2	13	28	10	12	9	3	2	2	1	3	2	1
								</													

* Without board.

Wage data was not obtained on all the 818 Chinese and 199 Japanese, the aggregate number covered by these wage tables being 783 Chinese and 133 Japanese, exclusive of the 1,951 farm laborers already referred to.

The Orientals operate a great many small establishments, and in most every instance the proprietor will be found working with his men and managing the business at the same time. This is noted in the last column headed "Doing Own Work." These men are employed and could not be omitted from the general table. The wages paid in stores and factories do not differ materially from the rates paid to agricultural laborers. The higher rates are received by the more skilled workmen and the expert clerks.

It was noted that the white employer of Oriental labor seldom, if ever, furnished board. The Oriental employer, on the contrary, does this invariably. With these people, the employés are regularly housed and fed under the roof of the employer. This results from two circumstances: the comparatively small number employed in an establishment and the lack of family life among this class of people, especially the Chinese.

Another notable feature of Oriental labor is the total lack of employment of women and children. It is not the Chinese or Japanese custom to put out the women and children to work, and in the cases where there are Oriental families here, there is no employment for females and children outside the home.

The most common occupations of the Chinese in the cities are keeping stores, laundries, making garments and cigars, and serving as cooks, waiters, etc.

The Japanese are engaged in the same occupations, and in addition are taking up many vocations not heretofore entered by the Chinese. The Chinese content themselves with the old hand laundry or wash house. This has been one of their favorite occupations for many years. The Japanese were running nine fully equipped steam laundries in the City of San Francisco alone, prior to the fire, and they are bringing the most improved methods to bear in every occupation in which they are engaged. The individual worker commands about the same wage as his Chinese competitor, which is, as has been seen, considerably lower than the prevailing rate paid for white labor of the same kind. With his improved machinery and methods of work he undoubtedly is able to accomplish much more.

Each Oriental considered was asked certain questions concerning his marital condition, birthplace, ability to read the English language, cost of board, cost of clothing, and percentage of food and clothing of Oriental production outside the United States.

Of the 818 Chinese considered, 594 were married and 224 single. Of

the 594 married, 550 had their wives in China and but 44 had their wives in this country with them. Of the 199 Japanese, there were 36 married and 163 single. Of the 36 married men, 29 had their wives here and only 7 left them in Japan. The character of our population of these two races can be readily understood from these figures. The majority of the Chinese are middle-aged married men. Their families in over 92 per cent of the instances are in China, where their real homes are, where their money is constantly sent, and where the old Chinaman retires to spend his declining years.

The Jap, on the other hand, is usually a young, unmarried man. When he is married his wife is here with him.

Of the 818 Chinese, 490, or over 59 per cent, can not read the English language; and 84, or 42 per cent of the 199 Japanese considered, are illiterate.

One hundred and sixty-one Chinese claimed to be native sons, while but five Japanese boasted a like distinction.

In collecting the data on cost of board and clothing, and percentage produced in the Orient, great care was used to arrive at correct results and not mere opinion. To this end the Oriental questioned was required to recall as nearly as possible the items going to make up his expenditure along the line under consideration. This was very easy as far as the cost of board was concerned. Here usually the man was boarded by his employer, who had a very accurate record of his expenditure.

Of the Chinese, 20 gave their yearly cost of clothing at \$20; 48 at \$25; 240 at \$30; 289 at \$35; 116 at \$40; 19 at \$45; 7 at \$60; 9 at \$65; 32 at \$70; 13 at \$75, and 25 at \$80. The monthly cost of board was given by 19 at \$7; 47 at \$8; 17 at \$9; 160 at \$10; 163 at \$11; 323 at \$12; 41 at \$14, and 48 at \$15. As regards percentage of food brought from the Orient, 155 Chinese gave 20 per cent foreign; 240 gave 25 per cent; 217 gave 30 per cent; 101 gave 35 per cent; 11 gave 40 per cent; 78 gave 50 per cent; 3 gave 55 per cent, and 13 gave 60 per cent. The percentage of clothing coming from China was given by 240 as 3 per cent; 180 as 5 per cent; 111 as 7 per cent; 210 as 10 per cent, and 77 as 15 per cent.

Of the Japanese, 3 put their yearly cost of clothing at \$35; 17 at \$45; 9 at \$50; 24 at \$60; 53 at \$65; 62 at \$75; 3 at \$80; 5 at \$85; and 23 at \$90. Cost of board was given by 9 at \$10 per month; 17 at \$11; 87 at \$12; 35 at \$14; 49 at \$15, and 2 at \$18. The percentage of food coming from the Orient was given by 4 Japanese as nothing; 5 as 5 per cent; 52 as 10 per cent; 14 as 15 per cent; 76 as 20 per cent, and 46 as 30 per cent. The percentage of clothing brought from the Orient, 100 Japanese gave as nothing; 66 as 3 per cent; 23 as 5 per cent, and 10 as 10 per cent.

These figures cover a considerable range, but it must be remembered

that men engaged in very different kinds of labor are involved. The higher rates are for clerks and managers, men who usually wear American clothes and live on a higher scale than those engaged in the other branches of work considered. The prevailing rate for board for Chinese is seen to be from \$10 to \$12 per month, while the cost of their clothes per year is in the neighborhood of \$35 on the average; while the Japanese pay from \$12 to \$15 for board, and their clothing costs them on the average about \$65 per year.

About the proportion of food and clothing of foreign production, there is considerable diversity of opinion. The Chinese agree, however, that aside from slippers and silks, most of their clothing is produced and made here. Even their native costumes are manufactured in California from American material. The Japanese, we all know, invariably wear American clothing and next to nothing in this line is imported by them. A considerably larger proportion of the foodstuffs consumed by both the Chinaman and the Jap is brought from Asia. According to the data produced here, the Chinese import about 35 per cent of their provisions on the average, and the Japanese about 20 per cent. It must be remembered that these figures are for city Orientals, who consume large quantities of fish, meat, and vegetables of American production. Although we have gathered no data along this line on farm laborers, it is generally known that these people subsist on a much simpler diet, consisting almost entirely of rice and dried fish.

In this investigation, care has been exercised to state nothing but the plain facts, leaving the reader to make his own deductions. In collecting this data, and the much larger amount on hand before the fire of April 18, many significant facts have been brought to light that do not appear in the figures, but which, nevertheless, emphasize the formidable character of the Japanese competition especially. His up-to-date methods and use of machinery have already been referred to. It was found in many instances that four or five Japanese living together, were running, under one roof, several kinds of business. A very common combination is a shoe-repair shop and house-cleaning establishment. All spare time, when not engaged in working out, is devoted to repairing shoes, even the evening being employed in this manner. Besides, the men live in the same room, thus having a home for several people and the headquarters for two distinct businesses in quarters no more than adequate for housing one American.

With a view to ascertaining the effect on a community where the Japanese are present in great numbers, several investigations were made in different sections of the State.

The Japanese in and around Watsonville.—A visit to Watsonville, made September 20, 1906, shows about 700 Japanese as permanent residents of the Pajaro Valley, of which Watsonville is the center.

There are also about 250 Chinese. These latter are generally aged and slowly decreasing in number. The Japanese are engaged principally in fruit picking and in harvesting beets and potatoes, probably 500 of them cultivating and picking strawberries, which are produced in this valley during almost the entire year.

Men of standing in the community who employ Japanese and who have no race prejudice apparently, and who are distinctly opposed to labor unions, largely on account of the opposition of the latter to Orientals, declare the Japanese to be decidedly dishonest and totally inferior in this regard to the Chinese. When the Japanese arrived in the Pajaro Valley they were welcomed by the merchants largely on account of the fact that they wore American clothing and showed a decided disposition to trade along American lines, and rented houses without herding together as do the Chinese. To-day the merchants bitterly complain that the Jap has become their very close competitor. He also runs restaurants, barbershops, billiard halls, saloons, groceries, dry-goods and ready-made clothing stores in the city of Watsonville, and operates 'buses and delivery wagons in the adjacent territory.

One bank in Watsonville positively refuses to open any account with the Japanese, because of their absolute dishonesty, the same bank welcoming business from the Chinese. The local postmaster places the Jap in a class by himself, and will not cash his money orders without other evidence than the possession of the order; and there is a large postoffice money order business with the Japanese, on account of the fact that certain banks decline to do business with them. It is charged that when they catch their employer in extremities, they will strike without any provocation, simply to get an increase, regardless of agreement. Their work in the berry and beet fields is all contract work on shares, so that their wages in this particular neighborhood are difficult to place; but they seem to fill a gap in the Pajaro Valley that decidedly exists, and yet their service is considered very unsatisfactory, even by those who advocate their presence as being the best labor obtainable under existing conditions.

The Japanese in Vaca Valley.—An investigation made at Vacaville, in the center of the Vaca Valley, Solano County, shows that the Japanese came into that valley about fifteen years ago and commenced working at very low wages. Their numbers increased until they not only displaced about all the white labor, but almost entirely ran out the Chinese. They then began to rent orchards, paying cash in advance, thereby undermining the Chinese, who generally paid with the share of the crop. The Jap outbid the Chinaman, until he ceased to be a factor. This condition developed until the Japanese control, by lease and ownership, half of the fruit farms of the valley at this time. Lat-

terly their handling of leased ranches has been less satisfactory. They cultivate indifferently, or for immediate results, to the serious detriment of the property. Prior to the advent of the Japanese the Vaca Valley was renowned for its orchards, which attracted wide attention, especially on account of the superior methods of pruning and cultivating. To-day there can be no boasting in this respect. Large shipping firms give the Japanese credit and backing and aid them in obtaining leases, etc., on account of their ability to obtain labor in the fruit season, tying them by contract to ship through these firms. The white rancher can scarcely obtain such aid, on account of his lack of assurance of sufficient help. In other words, the Japanese have the best organization.

It is generally conceded that ninety per cent of all the people met, walking or driving, on all of the country roads around Vacaville, are Japanese. One of the prominent fruit-growers and shippers of the valley estimates the fruit orchards of Vaca Valley and adjoining foothills at 15,000 acres, more than half of which are in the hands of Japanese lessees or owners, principally leased. He declares the Jap to be an expert at drawing all of the vitality out of the land and the trees. Land values have shrunk one third in the past fifteen years. Low prices of fruit and scarcity of suitable labor are held to be responsible. The Japanese stores, of which there are six in Vacaville, are doing more than fifty per cent of the general merchandise business of the town and ninety per cent of the farm supply business. A prominent Japanese merchant estimates the Japanese population employed in the valley last year at 3,000; that 1,200 of these stayed all winter; that in July of this year there were 2,000, about 500 of whom have since gone to Fresno to pick grapes, and about 1,500 are still in the valley; that about 900 may be considered permanent residents around Vacaville, and about 1,400 of the interior valley; that about 150 are engaged in mercantile pursuits, about 15 of whom have families; that 5 own fruit farms containing some 200 acres, and that some 60 lease ranches, he himself leasing three. He states the wages paid as follows: \$1.25 per day for summer work; \$1.50 at some seasons, on account of scarcity of help; \$1.15 average year round, and \$1.00 in dull years.

It seems to be the case in this section that the farmers ceased to provide even the crude accommodations of the past for the floating white laborer, when the Jap became available. He has followed up his advantage until the farmers are at his mercy. The solution seems to lie, to some extent, in cutting up the large holdings, putting small farms on the market at reasonable figures, and making an especial endeavor to attract men with families who can raise small fruits, sweet corn, poultry, etc., among the large fruits.

The Japanese in Fresno County.—In Fresno County there are employed about 5,000 Japanese and 500 Chinese in the fruit and vineyard industry—this number from the middle of August to the middle of September, when raisin grapes with other fruits are ready for picking. At this writing (September 25, 1906), 1,500 Japanese have left. A little later 1,500 more will leave. The remaining 2,000, together with the 500 Chinese, will stay in and around Fresno through the year, doing pruning, hoeing, and other farm labor and vineyard work.

During the grape-picking season the Japs make from \$3 to \$4 per day. It is claimed that white men at the same rates would make not more than \$1 per day. The Oriental seems to be able to render good service in a squatting position. For the balance of the year the 2,000 remaining will receive about \$1.25 to \$1.50 per day and board themselves. The 3,000 that will have left scatter, throughout the State, working on railroads, cutting wood, getting out tanning bark, etc.

The permanent local Japanese population of Fresno is about 300, exclusive of the farm labor coming and going to the hotels and boarding-houses. About 50 are in business in Fresno in general merchandise, hotels, boarding-houses, restaurants, billiard halls, barbershops, shoe stores, jewelry and clothing stores. There are about 30 Japanese families in Fresno, with an aggregate of about 20 children. About 25 Japanese own farms, principally vineyards, none less than 20 acres, one of 320 and two of 160 acres each; they all average 60 acres each. All these are around Fresno. About 25 Japanese lease vineyards and fruit farms, principally vineyards, with an average of 60 acres each. This is a new departure and has grown up entirely in the last three or four years. These figures are from Japanese sources and without doubt are conservative. They are borne out, however, by Americans who are familiar with the situation.

The Japanese save their money to a great extent, but at least one fourth of all of the earnings of the 5,000 around Fresno is gambled away in Chinese gambling-houses. Three hundred so-called Chinese business houses deal principally in lottery tickets, and while the Japanese, as a people, seem to be averse to gambling-houses, they fall into the habit very completely whenever they mix with the Chinamen. These Chinese gambling-houses at Fresno are all over the Chinatown of that city; this is an old settlement and has a large population, exclusive of the 500 agricultural Chinamen mentioned earlier in this story.

In Fresno, as at other points, it is generally conceded that the Jap is merciless when he has his employer at a disadvantage; that he will work cheaply until all competition is eliminated, and then strike for higher wages, totally disregarding any agreement or contract.

There is no place in the State where the problem is so grave, from the fact that the huge raisin territory (and Fresno is the greatest producer

of raisins on the planet) depends almost entirely upon Orientals. Last year over 4,000 cars of raisins were shipped from Fresno. The more intelligent citizens realize the gravity of the situation from both the economic and racial sides. Similar conditions in a lesser degree exist in the different berry and sugar-beet sections of the State. The general persistency with which the Japanese are breaking into many industries, their frugality, their ambition, and their lack of business morality, render them more formidable even than the Chinese.

CONDITION OF FARM LABOR IN CALIFORNIA.

In the first division of Section 3 of the Act creating this Bureau, it is provided that the Commissioner shall collect statistics on agricultural labor. Up to the present time little has been done along this line. With a view to carrying out the provisions of this important section, an investigation was prosecuted throughout the State during the present year, with the results contained herein. Much of this material was collected at first hand by the agents of this Bureau and the remainder by correspondence. An endeavor has been made to cover every section of the State, and the counties grouped together were so arranged on account of the similarity of products and general conditions. The table on the opposite page shows the general results obtained from nine groups, covering 29 counties, and 147 individual farmers.

In the first group 15 farmers were interviewed in different sections of Alameda, Contra Costa, Napa, and Sonoma counties. In this section, small fruits, deciduous fruits, hay, and grain are the principal products. Of the 15 farms, 11 are purely agricultural, while the remaining 4 are devoted to agriculture and horticulture combined. 70 permanent and 191 temporary white employés were employed, and 94 permanent and 178 temporary Oriental employés. The Orientals were mostly Japanese.

One of the discouraging features of California farming and fruit-raising is the lack of available reliable help. With a view to ascertaining just what was being done to encourage a respectable class of people to take up this work and become more or less fixtures in the community, a question was propounded to each farmer interviewed whether or not he employed men with families and what provision he made for their housing. Furthermore, an inquiry was made into the number of children in such families. In the group under consideration, 6 of the 15 men interviewed were employing men with families, and the families so employed amounted to 17, in which there was a total of 25 children. Of the 7 farmers employing men with families, 5 furnished them houses free of rent, and the total number of such free houses was 7; so 7 of the 17 employés who are heads of families are encouraged to remain by having their house rent free. An endeavor was made to ascertain in how many instances bathing facilities were furnished. In the 15 farmers in the first group, but 4 provided bathing facilities for their employés.

Section.	PRODUCT.			WHITE EMPLOYEES.		ORIENTAL EMPLOYEES.		Number of Farms Considered.	Number of Farmers Employing Children in Field Work.	Number of Farmers Employing Women in Field Work.	Number of Farmers Preferring Oriental Domestic Labor.	Number of Farmers Preferring White Domestic Labor.	Number of Farmers Employing Oriental Domestic.	Number of Farmers Employing White Female Domestic.	Number of Farmers Furnishing Bathing Facilities for Employees.	Number of Houses Furnished Free.	Number of Farmers Furnishing Houses Rent Free.	Number of Children in such Families.	Number of Families so Employed.	Number of Farmers Employing Men with Families.
	Agriculture.	Horticulture.	Mixed.	Permanent.	Temporary.	Permanent.	Temporary.													
Alameda	11	4	70	191	94	178	6	17	25	5	7	4	5	6	4	4	6	7	3	4
Contra Costa	21	5	35	109	78	77	11	19	31	12	14	4	6	6	4	4	4	4	4	3
Napa	5	5	56	23	46	194	5	7	16	4	6	6	3	4	6	6	4	6	2	2
Sonoma	13	2	477	11	80	80	6	57	109	6	57	3	3	3	3	3	3	3	1	1
Santa Clara	3	14	848	111	486	183	15	26	40	15	22	10	6	15	5	3	3	3	4	4
Santa Cruz	2	4	144	353	50	105	5	33	91	5	6	3	3	3	3	3	3	3	3	3
Sacramento	7	3	115	79	72	---	5	11	23	5	10	3	2	9	2	2	2	2	2	2
San Joaquin	5	2	186	26	67	201	9	23	44	6	14	5	7	3	6	2	2	2	2	1
Madera	14	4	103	1	33	7	13	27	53	10	24	6	2	3	3	2	2	2	2	2
Mercer	30	76	41	2,034	926	1,025	75	220	432	68	160	46	58	56	27	26	22	22	22	22
Stanislaus	26	3	26	10	12	10	26	10	16	15	22	10	6	15	5	3	3	3	3	3
Presno	10	2	4	353	50	105	5	33	91	5	6	3	3	3	3	3	3	3	3	3
Kern	7	2	3	115	79	72	5	11	23	5	10	3	2	9	2	2	2	2	2	2
Tulare	5	2	186	26	67	201	9	23	44	6	14	5	7	3	6	2	2	2	2	2
Butte	14	4	103	1	33	7	13	27	53	10	24	6	2	3	3	2	2	2	2	2
Colusa	30	76	41	2,034	926	1,025	75	220	432	68	160	46	58	56	27	26	22	22	22	22
Yolo	26	3	26	10	12	10	26	10	16	15	22	10	6	15	5	3	3	3	3	3
Lassen	10	2	4	353	50	105	5	33	91	5	6	3	3	3	3	3	3	3	3	3
Placer	7	2	3	115	79	72	5	11	23	5	10	3	2	9	2	2	2	2	2	2
Shasta	5	2	186	26	67	201	9	23	44	6	14	5	7	3	6	2	2	2	2	2
Siskiyou	14	4	103	1	33	7	13	27	53	10	24	6	2	3	3	2	2	2	2	2
Tehama	30	76	41	2,034	926	1,025	75	220	432	68	160	46	58	56	27	26	22	22	22	22
Santa Barbara	26	3	26	10	12	10	26	10	16	15	22	10	6	15	5	3	3	3	3	3
Ventura	10	2	4	353	50	105	5	33	91	5	6	3	3	3	3	3	3	3	3	3
Los Angeles	7	2	3	115	79	72	5	11	23	5	10	3	2	9	2	2	2	2	2	2
Orange	5	2	186	26	67	201	9	23	44	6	14	5	7	3	6	2	2	2	2	2
Riverside	14	4	103	1	33	7	13	27	53	10	24	6	2	3	3	2	2	2	2	2
San Bernardino	30	76	41	2,034	926	1,025	75	220	432	68	160	46	58	56	27	26	22	22	22	22
San Diego	26	3	26	10	12	10	26	10	16	15	22	10	6	15	5	3	3	3	3	3
Totals	147	30	76	41	2,034	926	1,025	75	220	432	68	160	46	58	56	27	26	22	22	22

The domestic help problem is a factor in the farmer's life as well as of the inhabitant of the cities. Of the 15 interviewed in the group under consideration, 5 employed white female domestic help and 6 Oriental, and 7 expressed their preference for the white girl, while 3 thought the Oriental more desirable. Six farmers employed women in field work and 4 employed children. These employes were engaged mostly in picking fruit, berries, etc., and in no instance were used for the rougher farm labor.

In the Santa Clara Valley and the Santa Cruz country, 26 individuals were interviewed. The Santa Clara Valley is given up almost entirely to horticulture. Prunes constitute the principal crop of a large district. This district is broken up into ranches, running for the most part from five to twenty acres. For a great part of the year the proprietor and his family do the work required on the ranch. When a man is hired for this regular work, it is usually some one living in the vicinity. In cherry and prune seasons, work is let out by contract on the larger ranches to Italians and Japanese. The former often bring their families, and all assist. The usual price paid for picking up prunes is \$2.50 per ton. The Japanese sometimes make as high as \$3 per day at this work. In very few cases do the farmers board their help.

The proportion of permanent white help is smaller and Oriental larger in this entire section than in the one considered previously. Eleven farmers employ 19 men with families, in which there are 31 children. On 12 farms, houses were furnished free and 14 families were provided for. In 4 instances bathing facilities were provided. Five farmers employed female domestic help and 6 Oriental. Seven preferred the white help and 3 the Oriental. In 6 cases women, and in 3 children, were used in field work.

In Sacramento and San Joaquin counties more permanent white help and less permanent Oriental help was employed. In other respects conditions were practically the same as in the preceding division.

Of the 18 farms considered in Madera, Merced and Stanislaus counties, 13 were devoted exclusively to agriculture. Many of these are the alfalfa and dairy farms around Los Banos. The proportion of permanent help, both white and Oriental, is very high. The former are mostly Swiss and Italians, a great number of whom have families. In every instance where a family man is employed, a house is furnished rent free. Taking it all in all, this section has the best labor condition of any section investigated, due no doubt partly to the prevalence of permanent help and the efforts put forth to provide for such employes and partly to the race employed. The Italians and Swiss make among the most reliable and steadiest farm employes.

Fresno, Kern, and Tulare counties, in the 26 farms considered, furnished several of the largest single holdings in the State. A great

number of the employés of these large ranches are classed as permanent, when as a matter of fact it is only the work that is permanent, the employés changing continually. These were classed as permanent, for lack of any better classification.

The counties of Butte, Colusa, and Yolo furnish no new features, the conditions being much similar to those in the lower San Joaquin Valley.

The 12 farms considered in the large territory embracing the counties of Lassen, Placer, Shasta, Siskiyou, and Tehama furnish 7 on which agricultural products are of most importance. Hay, grain, and dairying are the principal crops produced. Very few Orientals are used in this district.

The last two divisions are in the orange belt. Here Orientals are used to a considerable degree in picking fruit and irrigating, but most of the latter work is performed by white labor. Mexicans work on the grain farms and are occupied in clearing land and digging ditches.

The wages paid to farm laborers is considered in the two tables following.

Wages Paid for Farm Work to White Male Employees in Different Sections of California during the Year 1906.

Section.	PERMANENT EMPLOYÉS.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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	Without Bo'rd.				With Board.		Without Board.					With Board.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
	\$1.00.	\$1.50.	\$1.75.	\$2.00.	\$1.00.	\$1.10.	\$1.15.	\$1.25.	\$1.4.	\$1.50.	\$1.75.	\$25.00.	\$30.00.	\$35.00.	\$38.00.	\$40.00.	\$45.00.	\$50.00.	\$60.00.	\$65.00.	\$75.00.	\$100.00.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
Number of Farms Considered.....	15	26	10	18	26	10	18	10	2	1	261	1	8	1	2	18	10	3	10	1	1	9	1	25.00.	30.00.	35.00.	38.00.	40.00.	45.00.	50.00.	60.00.	65.00.	75.00.	100.00.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
Number of Em- ployés Considered	15	261	144	79	488	959	497	194	212	104	2,938	1	87	4	4	12	30	397	182	36	20	1	2	25	32	38	7	1	2	1	44	719	241	1	17	43	48	17	11	11																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
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Wages Paid for Farm Work to White Male Employees in Different Sections of California during the Year 1906—Continued.

TEMPORARY EMPLOYEES.

Section.	WAGES BY THE DAY.					WAGES BY THE MONTH.															
	Without Board.			With Board.		Without Board.							With Board.								
	\$1.50	\$1.75	\$2.00	\$2.50		\$1.15	\$1.25	\$1.75	\$2.00	\$36.00	\$37.50	\$40.00	\$45.00	\$50.00	\$52.00	\$60.00	\$25.00	\$30.00	\$35.00	\$40.00	\$65.00
Alameda	87		53	1	20						19							5	6		
Contra Costa																					
Napa																					
Solano																					
Sonoma																					
Santa Clara	36										17	18			3	10		25			
Santa Cruz																					
Sacramento																					
San Joaquin																					
Madera																					
Merced																		8			
Stanislaus																					
Fresno			10	2														3	51		
Kern																					
Tulare																					
Butte																					
Colusa	2	150			40						8							92	46	15	
Yolo																					
Lassen																					
Placer																					
Shasta			8							7	30							12	22		
Siskiyou																					
Tehama																					
Santa Barbara										20								6			
Ventura																					
Los Angeles																					
Orange																					
Riverside	1																				
San Bernardino																					
San Diego																					
Totals	126	160	63	1	40	46	20	7	30	17	45	40	5	3	10	3	199	28	46		15

Wages Paid for Farm Work to Oriental Male Employees in Different Sections of California during the Year 1906.

Section	Number of Farms Considered	Number of Em- ployés Con- sidered	PERMANENT EMPLOYÉS.										PERMANENT EMPLOYÉS.										WAGES BY THE MONTH, WITH BOARD.*				
			WAGES BY THE DAY, WITHOUT BOARD.										WAGES BY THE MONTH, WITHOUT BOARD.														
			\$1.00....	\$1.12½....	\$1.15....	\$1.25....	\$1.35....	\$1.37½....	\$1.40....	\$1.50....	\$1.60....	\$1.75....	\$2.00....	\$25.00....	\$30.00....	\$32.50....	\$35.00....	\$36.00....	\$37.50....	\$40.00....	\$45.00....	\$50.00....	\$26.00....	\$30.00....	\$35.00....	\$40.00....	\$45.00....
Alameda.....	15	272	44	15	15	67	2	6	10									2									
Contra Costa.....																											
Napa.....																											
Solano.....																											
Sonoma.....																											
Santa Clara.....	26	155								3																	
Santa Cruz.....																											
Sacramento.....	10	240				20			10									6					10				
San Joaquin.....																											
Madera.....																											
Merced.....	18	80																									
Stanislaus.....																											
Fresno.....	26	639	32		215	22				6	124	28	1				16			3				18	10	10	
Kern.....																											
Tulare.....																											
Butte.....																											
Colusa.....	10	155			10					15																	
Yolo.....																											
Lassen.....																											
Placer.....																											
Shasta.....	12	72			48							2												1		1	
Siskiyou.....																											
Tehama.....																											
Santa Barbara.....																											
Ventura.....	12	268								26	20						13							4		3	
Los Angeles.....																											
Orange.....																											
Riverside.....																											
San Bernardino.....	18	40								2							10		15	3	1	2					
San Diego.....																											
Totals.....	147	1,951	76	15	48	327	24	6	20	52	144	30	1	20	32	10	31	6	17	3	4	2	10	22	11	13	12

* Cooks and waiters—mostly Chinese.

Wages Paid for Farm Work to Oriental Male Employees in Different Sections of California during the Year 1908—Continued.

Section.	TEMPORARY EMPLOYÉS.									
	WAGES BY THE DAY, WITHOUT BOARD.					WAGES BY THE MONTH, WITHOUT BOARD.				
	\$1.00....	\$1.25....	\$1.35....	\$1.40....	\$1.45....	\$1.50....	\$1.60....	\$1.75....	\$2.00....	
Alameda.....										\$50.00....
Contra Costa.....										\$45.00....
Napa.....	35	61	3		3	40				\$40.00....
Solano.....										\$37.50....
Sonoma.....										\$35.00....
Santa Clara.....	20	45	12							\$30.00....
Santa Cruz.....										
Sacramento.....		108		3			12			2
San Joaquin.....										
Madera.....						30		30	10	
Mercer.....										
Stanislaus.....										
Fresno.....										
Kern.....	25	49		4						15
Tulare.....										
Butte.....						12			3	
Colusa.....		90								
Yolo.....										
Lassen.....										
Placer.....										
Shasta.....										
Siskiyou.....										
Tehama.....										
Santa Barbara.....										
Ventura.....						190		5		6
Los Angeles.....										
Orange.....										
Riverside.....										
San Bernardino.....										3
San Diego.....										
Totals.....	80	353	15	7	3	272	12	35	13	11

Actual wages are given in every instance. From the fact that some farmers pay by the day and some by the month, and in some instances board is included and in others not, and again, often different rates are paid to permanent and temporary employés, it became necessary to make divisions covering these different methods. The tables (one for whites and the other for Orientals) show first, divisions into permanent and temporary employés; next, under each of these divisions, those paid by the day and those paid by the month; and still further under these divisions, those whose wages are given in addition to board, and those who must pay for their board separately or board themselves.

In the first division the most common rate for those permanent employés paid by the day without board is \$1.50, and with board \$1.25. By the month without board \$45, and with board \$30. For temporary day employés without board the rate is \$1.50, and with board \$1.25. For monthly employés without board \$40, and with board between \$30 and \$35. For Orientals in the same section the rate is \$1 to \$1.25 per day and \$35 per month without board. The temporary employés get practically the same. There is no instance furnished where Oriental field hands are boarded by their employers in this section, and but few in the State. Where such a rate is given it is usually for cooks and waiters, whose wages have been included with the farm laborers.

In Santa Clara and Santa Cruz counties no daily wage for permanent white employés is given. The custom is to pay permanent help by the month. The prevailing rate is \$40 per month without board. For temporary white help the rate is \$1.50 per day without board. Orientals in the same section are paid \$1.25 per day without board. No attempt is made to fix a rate for contract work.

In Sacramento and San Joaquin counties the daily rate for white employés is \$1.50 to \$1.75 and the monthly rate \$45 without board. The rate with board is, by the day \$1.10 to \$1.25, and by the month \$30. For Orientals in the same section, without board, daily \$1.25; monthly, \$35.

The section around Merced County pays its white help \$1.25 per day and board and \$30 per month with board, while the Orientals receive a daily wage of \$1.50 and a monthly wage of \$40 without board.

In Fresno and vicinity white labor without board receives \$1.75 per day, and \$45 when paid by the month. With board they receive \$1.15 to \$1.25 per day and \$30 per month. Orientals get \$1.25 per day and \$35 per month, without board.

In the next division in Northern California white labor without board commands a daily wage of \$2, and with board a daily wage of \$1.25 and a monthly wage of \$35. Orientals get about \$30 per month, without board.

The two southern sections pay, without board, a daily wage to its

white help of \$1.50, and a monthly wage of from \$45 to \$50. With board, \$1.25 per day and \$30 per month for the same class of help. Orientals get a daily wage of \$1.50 without board, and from \$35 to \$45 per month.

Taking the entire State, there is very little difference between the amounts paid for temporary and permanent employés, except in harvest time, when the wages are greatly increased. The wages can safely be put at \$1.25 per day and \$30 per month with board for white help the State over, and \$1.50 per day and \$45 per month for the same kind of help without board. Harvest hands must be rated an exception. Oriental laborers command a rate of \$1.25 per day and \$35 per month, always without board. Chinese cooks and waiters on ranches, and Japanese working by contract, must be rated as exceptions.

It is believed that this investigation shows conclusively the actual conditions prevailing in ranch work. The constant complaint, heard from every section of the State, of the scarcity of farm laborers, plainly indicates the necessity of some radical change in our present system. The encouragement of permanent employés with families, to whom houses are furnished free, and the providing of baths, well-cared-for bunk houses and improved table fare, will certainly do much toward solving this problem, especially where the tendency is to cut up the large holdings.

WAGE STATISTICS.

RAILROAD CONSTRUCTION, STEAM AND ELECTRIC RAILWAY EMPLOYEES.

In addition to the store and factory data, information was collected concerning the employés of railroad contractors around San Francisco, street railway employés in Southern California, and steam railway employés throughout the State.

The table on railway construction shows a total of 2,302 employés, of whom 423 work nine, and 1,879 ten hours, representing 17.9 and 82.1 per cent respectively. Over 80 per cent of these receive between \$9 and \$18 per week, the wages centering around \$2 and \$2.25 per day.

The street and electric railway employés in the southern part of the State represent an employment of 4,752 people. The usual day's work consists of ten hours. The wage rates are given in hourly rates, by far the greater number of such employés being paid on this basis. Over 87 per cent are paid less than 25 cents per hour, and over 60 per cent less than 20 cents per hour.

In the employ of the principal steam railroads of the State there are 41,516 persons, over 90 per cent of whom are male. Six divisions are considered, which represent the principal occupations followed in railroad work. These are general office, including clerks and office employés of every sort; transportation, representing the operating departments exclusive of enginemen, such as conductors, brakemen, switchmen, and all other employés engaged in passenger and freight transportation; enginemen, including engineers and firemen; maintenance of way employés, embracing all those engaged in repairing and keeping in order track, bridges, trestles, such as section hands, bridge carpenters, etc.; motive power and cars, including employés of shops, engine and car works, and the like; and engineering, representing those engaged in civil engineering pursuits, such as civil engineers, draughtsmen, etc. A seventh division includes all employés not covered by the other six divisions. The wages are given in monthly rates, any other standard being impossible, on account of the nature of much of the employment on railways—the variations in hours, pay by the "run," etc., making any but a monthly basis not feasible. The wages run from \$15 to \$200 and over per month. The table is self-explanatory, and the rates under each occupation easily deducible.

Wages and Hours of Employees Engaged in Railway Construction in and Around San Francisco.

Occupation.	Number of		HOURS PER DAY.					WAGES PER WEEK.											
	Establish- ments....	Employees.	8.	9.	10.	11.	12.	\$6.00 to \$9.00	Over \$9.00 to \$12.00	Over \$12.00 to \$15.00	Over \$15.00 to \$18.00	Over \$18.00 to \$21.00	Over \$21.00 to \$25.00	Over \$25.00 to \$30.00	Over \$30.00 to \$35.00	Over \$35.00 to \$40.00	Over \$40.00 to \$45.00	Over \$45.00 to \$50.00	
Blacksmiths	8	19		2	17						16	3	1	16	2				
Blacksmiths' helpers	7	19		3	16									2					
Bookkeepers	1	3		3												1			
Brakemen	2	5			5														
Brickmasons	5	42			42										42				
Brickmasons' helpers	5	114			114														
Car-repairers	3	5			5														
Carpenters	6	125			125										124	1			
Carpenters' helpers	6	96			96														
Cooks	9	35		2	33			2						7	1				
Corral bosses	1	3		3										4					
Cranemen	3	5			5										1				
Drillers—rock	3	24			24						16	8							
Electricians	5	13			13									13					
Engineers	4	22		1	21						2	5	9		2	3	1		
Firemen	8	19			19						9		2	8					
Foremen	10	73		20	53						15	14	9	27	6				2
Foremen	1	1		1								1							
Harnessmakers	1	992		357	635			488			504								
Laborers	11																		
Machinists	1	1			1							1							
Machinists' helpers	1	2			2						2								
Miners	5	384			384						80	304							
Pile-drivers	1	15		15										15					
Pitmen	1	4			4						4								
Powdermen	2	3			3														
Stablemen	2	3			3														
Stewards	1	1		1										1					
Superintendents	3	6		3	3										3	1	2		
Teamsters	5	181		6	175						76	104	1						
Timekeepers	3	7			7						1		3						
Trackmen	1	5			5														
Waiters	8	64		5	59														
Watchmen	3	10			10						2	10							
Wheelwrights	1	1		1									1						
Totals		2302		423	1876			64	492	938	481	179	44	86	4	11	1		2

Wages and Hours of Street Railway Employees in Southern California.

Occupation.	Number of Establishments.	Number of Employees.	HOURS PER DAY.					WAGES PER HOUR.													
			8.	9.	10.	11.	12.	10c. to 15c.	Over 15c. to 17½c.	Over 17½c. to 20c.	Over 20c. to 22½c.	Over 22½c. to 25c.	Over 25c. to 27½c.	Over 27½c. to 30c.	Over 30c. to 32½c.	Over 32½c. to 35c.	Over 35c. to 37½c.	Over 37½c. to 40c.	Over 40c. to 42½c.	Over 42½c. to 45c.	
Armature-winders	3	14			14								14		3		10	2	1		
Blacksmiths	3	16			16																
Blacksmiths' apprentices	3	8			8																
Blacksmiths' helpers	3	15			15																
Car-repairers	3	62			62																
Car-repairers' helpers	3	64			64																
Dynamo-tenders	3	25			25																
Electrical machinists	3	9			9																
Electrical mach'ists' apprentices	3	7			7																
Electrical machinists' helpers	3	8			8																
Electrical switchboard tenders	3	22			22																
Engineers	3	24			24																
Engine-wipers	3	23			23																
Firemen	3	51			51																
Linemen	3	57			57																
Linemen apprentices	3	9			9																
Linemen helpers	3	37			37																
Machine hands	3	45			45																
Machinists	3	57			57																
Machinists' apprentices	3	26			26																
Machinists' helpers	3	27			27																
Oilers	3	40			40																
Painters	3	18			18																
Painters' apprentices	3	10			10																
Platform-men	3	1865			1865																
Shop boys	3	75			75																
Shop laborers	3	277			277																
Track construction and repair	3	1831			1831																
Woodworkers	3	18			18																
Woodworkers' apprentices	3	12			12																
Totals		4752			4752			1279	341	236	1115	1165	235	144	59	92	43	20	2	1	

Wages of Steam Railway Employees Throughout California.

Occupation.	Number of Establishments	Number of Employees	WAGES PER MONTH.											
			Over \$15.00 to \$20.00	Over \$20.00 to \$25.00	Over \$25.00 to \$30.00	Over \$30.00 to \$35.00	Over \$35.00 to \$40.00	Over \$40.00 to \$45.00	Over \$45.00 to \$50.00	Over \$50.00 to \$55.00	Over \$55.00 to \$60.00	Over \$60.00 to \$65.00	Over \$65.00 to \$70.00	Over \$70.00 to \$75.00
			to	to	to	to	to	to	to	to	to	to	to	to
Engineering	3	2,270			75	47	73	37	50	147	725	3	252	280
Enginemen	3	2,749					1	3		1	4		438	583
General office	3	1,620	14	56	40	28	65	40	87	27	92	76	68	206
Maintenance of way	3	15,224	1	1	1,569	95	955	1,418	3,848	2,909	1,421	161	945	463
Motive power and cars	3	8,683	3	3	121	1	80	295	42	342	1,762	76	1,068	1,061
Transportation	3	8,881	23	28	50	68	116	94	245	53	1,579	1,088	421	321
Miscellaneous	3	2,089	13	207	148	14	116	127	93	38	243	176	202	305
Totals		41,516	54	295	2,003	253	1,406	2,014	4,366	2820	5827	1,580	3,394	4,326

Wages of Steam Railway Employees Throughout California—Continued.

Occupation.	WAGES PER MONTH.											
	Over \$75.00 to \$80.00	Over \$80.00 to \$85.00	Over \$85.00 to \$90.00	Over \$90.00 to \$95.00	Over \$95.00 to \$100.00	Over \$100.00 to \$110.00	Over \$110.00 to \$120.00	Over \$120.00 to \$130.00	Over \$130.00 to \$150.00	Over \$150.00 to \$175.00	Over \$175.00 to \$200.00	Over \$200.00 to \$250.00
	to	to	to	to	to	to	to	to	to	to	to	to
Engineering	2	74	229		17	125	55	12	34	14	9	10
Enginemen	394	4				3	385	909	6			
General office	76	99	82	51	141	66	27	61	81	29	22	86
Maintenance of way	32	493	637	2	279	386	48	50	125	9	6	8
Motive power and cars	60	586	395	16	292	681	694	101	75	8	12	9
Transportation	660	450	1,362	651	278	263	384	161	310	49	6	21
Miscellaneous	70	60	61	4	88	14	11	28	31	27	1	11
Totals	1,294	1,762	2,770	724	1,095	1,548	1,064	1,322	662	136	56	145

STORES AND FACTORIES.

In making classifications for the purpose of submitting wage data, the divisions may be made along the line of the general groups, each embracing the occupations covered by a particular industry, as for example, "Trade and Transportation," "Manufacturing and Mechanical Pursuits," etc., under which system the same employment may occur under different divisions, and no logical basis is given for a comparison. In the data presented here, it has been thought better for wage comparisons to make the divisions as nearly as possible, so as to bring all employés of related crafts together under one group.

To this end twenty-nine divisions have been used, and while no claim is made for this arrangement, other than that it brings together related crafts for comparison in their entirety, for the purpose of this investigation it is believed it is superior to the division into the larger occupation groups often used. The divisions are:

1. Bakeries and Restaurants.
2. Breweries and Bottling Works.
3. Building Trades.
4. Butcher Shops and Slaughter Houses.
5. Candy, Confectionery, and Sugar.
6. Canneries.
7. Cigars and Tobacco.
8. Clothing, Shoes, etc.
9. Dairy Employés.
10. Electrical Workers.
11. Glassblowers, etc.
12. Laborers—General.
13. Laundry Workers, Dyers, Cleaners, etc.
14. Machine and Repair Shops, and Iron and Steel Workers.
15. Metal Workers (other than Iron, Steel and Tin).
16. Plumbers, Pipe Fitters, etc.
17. Printing Trades.
18. Sheet Metal Workers.
19. Ship Builders, Riggers, etc.
20. Soap and Candle Workers.
21. Store Employés.
22. Structural Iron Workers.
23. Tannery Employés.
24. Textile Workers.
25. Teamsters, Hostlers, etc. *

26. Trunkmakers, Harnessmakers, etc.
27. Upholsterers, Carpet Sewers, etc.
28. Woodworkers.
29. Miscellaneous.

These divisions represent the employés included in the investigation. Several large and important groups have been omitted, merely because it was impossible in the limited time, since May—during which period this data has been collected—to cover a larger field.

Weekly wage rates are used as furnishing the most satisfactory standard. When daily wages are paid, the actual earnings for a standard week of six days, at the number of hours per day indicated in the column of hours, are taken.

Several occupations are included in which the piecework system prevails. In such cases, the actual earnings for an entire week of six days, as shown by the time roll, are used. Within the limits set down, the amount of wages paid is absolutely correct and is obtained from actual weekly earnings. No attempt is made to present the amount of lost time during the year, but the nature of the work in many instances will be indicative of this fact. The canning industry, for example, lasts but a small portion of the year. Whatever idleness may occur in any occupation, by nature permanent, is at the present time, due to causes affecting the individual employé and not the industry. The total earnings per year in most trades represented may be considered as practically the amount earned at the rate given, by the employé working continuously.

The twenty-ninth division covers those employés who, from the nature of their duties, come under several of the groups named, as, for example, foremen, managers, superintendents, and watchmen; or who fall entirely outside any division we are considering, as brickmakers, broom-makers, etc. The other divisions are self-explanatory.

Wage schedules were secured in each important section of the State except the extreme north and extreme south. Before the destruction of the records, a much greater amount had been collected, but it was impossible to reach every section a second time.

Eleven tables are presented, ten of which represent the data collected from San Francisco, Oakland, Los Angeles, San José, Sacramento, Stockton, Fresno, Bakersfield, Berkeley, and Alameda, and the eleventh is made up from material from smaller towns which, individually, did not furnish enough data to warrant separate tabulation.

Individual Wages Paid in Stores and Factories in the CITY OF SAN September 1. (Tabulated by

INDUSTRY AND OCCUPATION.	Number of Establishments.	Number of Employed Considered.	HOURS PER DAY.				
			8	9	10	11	12
1. Bakery and Restaurant Employés.							
Bakers	8	128		128			
Bakers, apprentices	1	1		1			
Bakers, helpers	8	21		21			
Cooks	13	44			36	7	1
Cooks, helpers	12	51	1		38	11	1
Tamale-makers	1	3		3			
Waiters	14	119			115	1	3
Totals		367	1	153	189	19	5
2. Breweries, Bottling Works, Etc.							
Beer bottlers	7	118	118				
Beer bottlers, apprentices	1	6	6				
Brewery workers	3	24	24				
Bottle washers	1	5	5				
Chemists	2	2	2				
Totals		155	155				
3. Building Trades.							
Carpenters	13	54	38	5	11		
Carpenters, helpers	1	2		2			
Housesmiths	2	13		13			
Housesmiths, helpers	2	6		6			
Painters	1	151	149	1	1		
Painters, apprentices	2	2	2				
Painters, helpers	2	20	20				
Quarrymen	1	9	9				
Stairbuilders	3	18	18				
Stairbuilders, apprentices	2	3	3				
Stonemasons	3	92	92				
Stonemasons, apprentices	2	5	5				
Stone sawyers	2	4	4				
Tilesetters	1	10	10				
Tilesetters, helpers	1	10	10				
Totals		399	360	27	12		
4. Butcher Shop and Slaughter-house Employés							
Butchers	2	4			4		
Killers and dressers	8	48	2	42	4		
Killers and dressers, apprentices	2	3		3			
Sausage-makers	2	6		6			
Vaqueros	3	9		8	1		
Totals		70	2	59	9		
5. Candy, Confectionery, and Sugar Workers.							
Candy dippers	8	21		21			
Candymakers	7	8	1	7			
Candymakers, apprentices	1	1		1			
Candymakers, helpers	6	9	2	7			
Ice cream makers	4	4		3	1		
Ice cream makers, helpers	1	1		1			
Soda fountain employés	4	11		5	6		
Sugar workers	1	14	7	7			
Totals		69	10	52	7		

FRANCISCO During the Year 1906, Subsequent to April 18 and Prior to Industries and Occupations.)

WAGES PER WEEK.

Under \$3.	\$3 to \$6.	Over \$6 to \$9.	Over \$9 to \$12.	Over \$12 to \$15.	Over \$15 to \$18.	Over \$18 to \$21.	Over \$21 to \$25.	Over \$25 to \$30.	Over \$30 to \$35.	Over \$35 to \$40.	Over \$40 to \$45.	Over \$45 to \$50.	Over \$50 to \$55.	Over \$55 to \$60.	Over \$60 to \$65.	Over \$65 to \$70.	Over \$70 to \$75.	Over \$75 to \$80.	Over \$80 to \$85.	Over \$85 to \$90.	Over \$90 to \$100.
			2		22	73	27		3	1											
			1		4	1															
	1	3	10	3	23	8	3	1	1												
	1	38	13																		
		2			3																
		49	59	8																	
	2	98	86	15	49	81	30	1	4	1											
			3	29	86																
			6			19		3								2					
		5				1	1														
		5	9	29	36	20	1	3								2					
			1	1	3	3	43	3													
				2			9	3	1												
				6	1	74	25	6	40												
			1	5																	
		2	18	5	4																
		1	2				3	15													
	1	1	2	1				92													
							2	2													
			10					10													
	1	4	34	21	8	86	76	129	40												
					2	1															
				5	4	11	23	2	3												
			2		1																
		1	1	7																	
		1	3	12	13	12	24	2	3												
		13	8																		
					4	1	2		1												
	1				4	1															
		4			2	2															
					1																
					1	2															
		2	2	1	2	2	2														
			9	5																	
	1	19	19	13	9	3	4		1												

**Individual Wages Paid in Stores and Factories in the CITY OF SAN
September 1. (Tabulated by Industries)**

INDUSTRY AND OCCUPATION.	Number of Establishments.	Number of Employes Considered.	HOURS PER DAY.				
			8	9	10	11	12
6. Cannery Employés.							
Fruit canners—men	2	108			108		
Fruit canners—women	2	602		202	400		
Fruit canners—boys	2	12			12		
Fruit canners—girls	2	49		49			
Totals		771		251	520		
7. Cigars and Tobacco Workers. No statistics on account of fire.							
8. Clothing, Shoes, Etc.							
Bag workers	3	18		18			
Boot and shoe workers	2	267			267		
Boot and shoe workers, apprentices	1	11		11			
Bushelmen	22	72		17	55		
Cutters	16	38	8	22	8		
Furriers	3	26		26			
Furriers, apprentices	2	2		2			
Hatmakers	19	99		85	14		
Hat trimmers	13	22		22			
Milliners	9	43		21	22		
Milliners, apprentices	3	27		27			
Seamstresses	13	83	22	58	3		
Shirtmakers	2	400		400			
Tailors	16	87	40	10	37		
Tailors, apprentices	4	4	4				
Tailors, finishers	11	32	9	11	12		
Tailors finishers, apprentices	1	2		2			
Totals		1,233	83	732	418		
9. Dairy Employés.							
Buttermakers	3	4		2	2		
Can washers	2	11			3		8
Separator men	2	2			2		
Storekeepers	1	5			1		4
Totals		22		2	8		12
10. Electrical Workers.							
Electricians	4	107	27	79	1		
Electricians, apprentices	2	30	4	26			
Electricians, helpers	2	70	12	58			
Totals		207	43	163	1		
11. Glassblowers, Etc.							
Bottle caners	2	51		51			
Glassblowers	2	195		195			
Glassblowers, apprentices	2	32	32				
Mold boys	2	276		276			
Totals		554	32	522			
12. Laborers—General.							
Laborers	73	1,535	74	714	747		

Individual Wages Paid in Stores and Factories in the CITY OF SAN September 1. (Tabulated by Industries)

INDUSTRY AND OCCUPATION.	Number of Es- tablishments.	Number of Em- ployes Con- sidered.	HOURS PER DAY.				
			8	9	10	11	12
13. Laundry Workers, Dyers, Etc.							
Dyers and cleaners	2	129		129			
Ironers, machine	12	103	4	47	52		
Laundry workers	17	558		504		54	
Laundry workers, apprentices	5	10		9		1	
Pressers	1	1		1			
Totals		801	4	690	52	55	
14. Machine and Repair Shops, Iron and Steel Mills, Etc.							
Blacksmiths	13	45	2	30	13		
Blacksmiths, helpers	6	51		34	17		
Boilermakers	6	278		278			
Boilermakers, apprentices	4	55	49	6			
Boilermakers, helpers	5	181		181			
Casting chippers	8	89		89			
Core-makers	8	36		36			
Cupola-men	9	16		16			
Draughtsmen	6	74	7	67			
Drillers	3	132		132			
Flaskmakers	6	9		9			
Foundry helpers	9	157		157			
Hammer boys	1	3		3			
Horseshoers	2	15	1	14			
Machine hands	20	329		329			
Machinists	20	382	2	373	7		
Machinists, apprentices	10	194		194			
Machinists, helpers	10	325		304	21		
Molders	10	225		225			
Molders, apprentices	10	55		55			
Pipemakers	1	28		28			
Rivet heaters	2	8		8			
Stove-mounters	3	7		7			
Stove-mounters, helpers	2	4		4			
Totals		2698	61	2579	58		
15. Metal Workers, Excluding Iron, Steel, and Sheet Metal.							
Brass workers	2	28		28			
Brass workers, helpers	1	16		16			
Coppersmiths	3	80		80			
Coppersmiths, apprentices	2	3		3			
Coppersmiths, helpers	3	57		57			
Totals		184		184			
16. Plumbers, Pipefitters, Etc.							
Plumbers	7	85	82	2	1		
Plumbers, apprentices	2	14	14				
Plumbers, helpers	2	40	40				
Steamfitters	2	33		33			
Steamfitters, helpers	3	36		36			
Totals		208	136	71	1		
17. Printing Trades.							
Bindery girls	7	54	54				
Bookbinders	3	39	39				
Bookbinders, apprentices	2	22	22				

FRANCISCO During the Year 1906, Subsequent to April 18 and Prior to
and Occupations.)—Continued.

[illegible]

**Individual Wages Paid in Stores and Factories in the CITY OF SAN
September 1. (Tabulated by Industries)**

INDUSTRY AND OCCUPATION	Number of Es- tablishments	Number of Em- ployed Con- sidered	HOURS PER DAY.				
			8	9	10	11	12
17. Printing Trades.—Continued.							
Compositors	12	57	57				
Compositors, apprentices	4	9	9				
Copyholders	1	4	4				
Linotype operators	5	21	21				
Paper cutters	4	5	4	1			
Photo engravers	2	12	12				
Photo engravers, apprentices	1	3	3				
Press feeders	12	33	33				
Pressmen	13	29	29				
Pressmen, apprentices	2	3	3				
Proofreaders	4	12	12				
Totals		303	302	1			
18. Sheet Metal Workers.							
Canmakers	1	398		398			
Galvanizers	1	3		3			
Galvanizers, apprentices	1	8		8			
Sheet metal workers	16	303	283	20			
Sheet metal workers, apprentices	6	30	21	9			
Sheet metal workers, helpers	8	132	71	61			
Totals		874	375	499			
19. Ship Builders and Riggers.							
Boat builders	5	33		33			
Boat builders, apprentices	3	11		11			
Derrick men	3	41	41				
Hookmen	1	2	2				
Riggers	2	29		29			
Riggers, helpers	2	38		38			
Ship carpenters	2	84		84			
Ship carpenters, apprentices	2	20	20				
Ship carpenters, helpers	2	18		18			
Ship caulkers	2	51		51			
Ship fitters	2	188		188			
Ship fitters, apprentices	1	43	43				
Ship fitters, helpers	2	66		66			
Ship joiners	2	97		97			
Ship joiners, helpers	1	24		24			
Totals		745	106	639			
20. Soap and Candle Workers.							
Candle-makers	1	9		9			
Soapmakers	8	36		36			
Soapmakers, helpers	3	10		10			
Soapwrappers	5	14		14			
Totals		69		69			
21. Store Employés							
Alteration hands	20	244	22	162	60		
Bookkeepers	107	176	52	99	23	2	
Cash and errand boys	38	136	13	123			
Cash and errand girls	12	138	6	132			
Cashiers	32	78	6	11	61		
Clerks, office	103	946	508	180	243		15
Department managers	9	59		49	10		
Drapers	1	3	3				

**Individual Wages Paid in Stores and Factories in the CITY OF SAN
September 1. (Tabulated by Industries**

INDUSTRY AND OCCUPATION.	Number of Es- tablishments.	Number of Em- ployés Con- sidered.	HOURS PER DAY.				
			8	9	10	11	12
21. Store Employés.—Continued.							
Drapers, apprentices	1	2	2				
Drivers	101	445	79	334	32		
Foremen	83	152	33	88	30		1
Forewomen	10	58		21	37		
Porters and packers	54	218	5	119	61		33
Salesmen	81	992	113	593	286		
Saleswomen	74	1104	32	765	305	2	
Stenographers	54	101	28	50	23		
Watchmen	6	22		17	5		
Wrappers	23	127	4	74	49		
Totals		5001	906	2817	1225	4	49
22. Structural Iron Workers.							
Steel workers	1	38		38			
Structural iron workers	4	19		19			
Structural iron workers, apprentices	1	4	4				
Structural iron workers, helpers	1	15		15			
Totals		76	4	72			
23. Tannery Employés.							
Beam hands	12	85		85			
Curriers and finishers	16	168		168			
Curriers, apprentices	1	9		9			
Tanners	7	35		35			
Yardmen	3	17		17			
Totals		314		314			
24. Textile Workers. No employés considered.							
25. Teamsters, Hostlers, Etc.							
Light wagon drivers	4	15	3	12			
Stablemen	21	54	12	16	8	8	10
Teamsters	20	94			94		
Totals		163	15	28	102	8	10
26. Trunks, Harness, Etc.							
Harnessmakers	1	1			1		
Suit-case makers	4	24		24			
Suit-case makers, apprentices	1	4		4			
Trunkmakers	3	80		80			
Trunkmakers, apprentices	2	8		8			
Totals		117		116	1		
27. Upholsterers, Carpet-layers, Etc.							
Carpet-layers	3	20	17	3			
Carpet-sewers	2	6	5	1			
Mattressmakers	4	42	22	20			
Mattressmakers, apprentices	2	5	5				
Mattressmakers, helpers	2	13		13			
Pillowmakers	2	7	2	5			
Upholsterers	2	12	12				
Upholsterers, apprentices	3	6	6				
Wire-spring makers	3	36	8	14	14		
Totals		147	77	56	14		

FRANCISCO During the Year 1906, Subsequent to April 18 and Prior to
and Occupations.)—Continued.

WAGES PER WEEK.

[illegible]

**Individual Wages Paid in Stores and Factories in the CITY OF SAN
September 1. (Tabulated by Industries)**

INDUSTRY AND OCCUPATION.	Number of Establishments	Number of Employes Considered	HOURS PER DAY.				
			8	9	10	11	12
28. Woodworkers.							
Benchhands	9	65	62	3			
Benchhands, apprentices	5	8	8				
Box machine operators	1	29		29			
Boxmakers	4	9		9			
Cabinetmakers	3	127	127				
Cabinetmakers, apprentices	6	12	8	4			
Coopers	12	160	5	154	1		
Coopers, helpers	2	6		6			
Framemakers	2	9		9			
Furniture-makers	1	30		30			
Lock joiners	1	1		1			
Matchers	2	2	2				
Millhands	9	47	36	9	2		
Millhelpers	12	91	42	49			
Nailers	2	57		57			
Patternmakers	6	59		59			
Patternmakers, apprentices	4	14	7	7			
Planers	13	24	20	4			
Sash and door men	3	15	15				
Saw filers	3	3	1	2			
Sawyers	18	48	24	24			
Stickermen	11	27	27				
Tallymen	3	20	20				
Woodturners	1	6					
Totals		869	410	456	3		
29. Miscellaneous Employés.							
Basket-makers	1	31		31			
Casket-makers	1	17			17		
Engineers	63	83	12	62	9		
Errand boys	30	64	36	26	2		
Firemen	28	50	18	26	6		
Fireworks-makers	1	8		8			
Office clerks	18	121	6	106	9		
Stevedores	10	504		504			
Superintendents and managers	15	23	14	6	3		
Terra cotta workers	2	29	2		27		
Warehousemen	2	88		88			
Watchmen	29	51	2	23	13	13	
Wire workers	1	29			29		
Totals		1098	90	880	115	13	

In San Francisco 19,049 employés are considered, representing all twenty-nine divisions except cigars and tobacco, and textile employés. The former of these was confined largely to the burnt district in and around "Chinatown" and had not been resumed at the time of the investigation, and the latter is not represented to any great extent. The greatest number considered comes under store employés, representing 5,001 persons. Of these, 18.1 per cent work eight hours per day; 56.3 per cent, nine hours: 24.5 per cent, 10 hours, and only 1.1 per cent over ten hours.

Necessarily, there must be a great range in wages in a group like this, including every one, from office and cash boys at \$3 and \$4 to head salesmen at \$90 per week, yet by far the greater portion lies between \$3 per week and \$25 per week. There are 873 who receive from \$6 to \$9 per week,

Individual Wages Paid in Stores and Factories in the CITY OF September 1. (Tabulated by

INDUSTRY AND OCCUPATION.	Number of Es- tablishments.	Number of Em- ployés Con- sidered.	HOURS PER DAY.				
			8	9	10	11	12
1. Bakery and Restaurant Employés.							
Bakers	7	50	6	21	23		
Bakers, helpers	5	13		9	4		
Cooks	8	22		2	12	8	
Cooks, helpers	2	12				12	
Waiters	4	36			29	7	
Waitresses	2	4		1		3	
Totals		137	6	33	68	30	
2. Breweries, Bottling Works, Etc.							
Beer bottlers	4	30	25	5			
Bottle washers	2	6		8			
Brewery workers	1	3		3			
Totals		39	25	14			
3. Building Trades.							
Bricklayers	5	39	34		5		
Bricklayers, apprentices	2	2	2				
Carpenters	12	403	327	70	6		
Carpenters, apprentices	3	12	12				
Carpenters, helpers	1	30		30			
Cement workers	1	7	7				
Gas fixture makers	1	8		8			
Gas fixture hangers	1	3	3				
Glaziers	2	8	1		7		
Hodcarriers	4	39	39				
Painters	4	73	73				
Painters, apprentices	5	12	12				
Paperhangers	1	8	8				
Sign painters	5	76	76				
Stairbuilders	2	10	10				
Tile setters	3	11	11				
Tile setters, helpers	3	11	11				
Totals		752	626	108	18		
4. Butcher Shop and Slaughter-house Em- ployés.							
Killers and dressers	1	8			8		
Meat cutters	7	52			52		
Sausage-makers	3	20		3	17		
Sausage-makers, helpers	1	1			1		
Vaqueros	1	2			2		
Totals		83		3	80		
5. Candy, Confectionery, and Sugar Workers.							
Candy dippers	5	19		19			
Candymakers	6	11		11			
Candymakers, helpers	4	11		11			
Ice cream makers	2	4		4			
Totals		45		45			
6. Cannery Employés.							
Canners	2	91		40	51		
Canners, Chinese	1	15			15		
Canners, Japanese	2	53			53		
Cannery boys	1	39		39			

**Individual Wages Paid in Stores and Factories in the CITY OF
September 1. (Tabulated by**

INDUSTRY AND OCCUPATION.	Number of Es- tablishments.	Number of Em- ployés Con- sidered.	HOURS PER DAY.				
			8	9	10	11	12
6. Cannery Employés.--Continued.							
Cannery girls	1	11		11			
Cannery men	1	48			48		
Cannery women	1	38			38		
Fruit-room men	1	8		8			
Labelers	2	10		0	4		
Preparers	2	594	75		519		
Totals		907	75	104	728		
7. Cigar and Tobacco Workers.							
Cigarmakers	2	7	7				
Tobacco strippers	2	3	3				
Totals		10	10				
8. Clothing, Shoes, Etc.							
Bushelmen	7	12		1	11		
Glove cutters	1	10		10			
Glove cutters, apprentices	1	2		2			
Hatmakers	8	40			40		
Milliners	8	8			8		
Milliners, apprentices	2	2		2			
Shoemakers	1	5			5		
Shoe repairers	3	13			13		
Shoe repairers, apprentices	2	2			2		
Seamstresses	4	6	1	5			
Sewing-machine operators	6	108	1	107			
Tailors	4	13		13			
Tailors, apprentices	1	1		1			
Tailors, cutters	4	4		4			
Tailors, finishers	4	20		20			
Totals		246	2	165	79		
9. Dairy Employés.							
Buttermakers	4	6		4	2		
Buttermakers, helpers	2	4		3	1		
Can washers	1	1		1			
Separator men	1	2		2			
Totals		13		10	3		
10. Electrical Workers.							
Electricians	3	5		4	1		
11. Glassblowers. Industry not represented.							
12. Laborers--General.							
Laborers	30	878	62	329	487		
13. Laundryworkers, Dyers, Etc.							
Dry Cleaners	1	2		2			
Dyers	1	1		1			
Laundryworkers	9	442		420		22	
Pressers	1	19		19			
Spotters	1	3		3			
Totals		467		445		22	

Individual Wages Paid in Stores and Factories in the CITY OF September 1. (Tabulated by Industries)

INDUSTRY AND OCCUPATION.	Number of Establishments.	Number of Employés considered.	HOURS PER DAY.				
			8	9	10	11	12
14. <i>Machine and Repair Shops, Iron and Steel Mills, Etc.</i>							
Blacksmiths	8	21		18	3		
Blacksmiths, apprentices	1	4	4				
Blacksmiths, helpers	3	5		3	2		
Boilermakers	3	12		12			
Boilermakers, helpers	2	6		6			
Carriage finishers	2	9		9			
Carriage painters	2	8		8			
Casting chippers	3	8		8			
Coremakers	2	11		11			
Cupola men	2	2		2			
Draughtsmen	1	3		3			
Draughtsmen, apprentices	1	5		5			
Flaskmakers	1	1		1			
Foundry helpers	4	57		57			
Machine hands	4	15		15			
Machinists	9	88	1	84	3		
Machinists, apprentices	5	22		22			
Machinists, helpers	3	31		31			
Molders	4	62		62			
Molders, apprentices	2	7		7			
Oilers	2	3	1		2		
Tool-room men	1	1		1			
Totals		381	6	365	10		
15. <i>Metal Workers, excluding Iron, Steel and Tin.</i>	No	employés	considered.				
16. <i>Plumbers, Pipefitters, Etc.</i>							
Gas and steamfitters	1	8		8			
Gas and steamfitters, helpers	1	6		6			
Plumbers	8	47	26	21			
Plumbers, apprentices	7	28	28				
Plumbers, helpers	3	7	2	5			
Totals		96	58	40			
17. <i>Printing Trades.</i>							
Bindery girls	5	28	28				
Bookbinders	2	7	7				
Bookbinders, helpers	1	20	20				
Compositors	8	65	65				
Compositors, apprentices	5	13	13				
Linotype operators	2	8	8				
Papercutters	3	7	1	6			
Pressfeeders	8	46	46				
Pressmen	8	43	43				
Proofreaders	2	3	3				
Totals		240	234	6			
18. <i>Sheet Metal Workers.</i>							
Sheet metal workers	5	37	18	19			
Sheet metal workers, apprentices	5	7	7				
Sheet metal workers, helpers	2	2	1	1			
Solderers	2	6	5		1		
Totals		52	31	21	1		

OAKLAND During the Year 1906, Subsequent to April 18 and Prior to and Occupations.)—*Continued.*

WAGES PER WEEK.

Under \$3.	\$3 to \$6.	Over \$6 to \$9.	Over \$9 to \$12.	Over \$12 to \$15.	Over \$15 to \$18.	Over \$18 to \$21.	Over \$21 to \$25.	Over \$25 to \$30.	Over \$30 to \$35.	Over \$35 to \$40.	Over \$40 to \$45.	Over \$45 to \$50.	Over \$50 to \$55.	Over \$55 to \$60.	Over \$60 to \$65.	Over \$65 to \$70.	Over \$70 to \$80.	Over \$80 to \$100.
			4	1	7	9	4											
		1	1	2	1	5	7											
			4	2	4	4												
			2	7	1	11												
			3	4	1	1												
				1	1	1	1											
	2	3		1	1	1												
					1	1												
			52	4	1													
				1	14	87	1											
	11	10	1															
			30	1			62											
	4	1		2														
				3														
				1														
	17	15	97	30	35	119	68											
				6			8											
							38	8	1									
	1	25				1	1											
		7																
	1	32		6		1	1	46	8	1								
	10	18																
				2	4	1												
	13	7																
			2		7	52	2	1	1									
	1	7	5															
				1	3	1		8										
		1	42	3														
			2	2	24	11	6											
		1	2															
	24	34	53	8	38	65	8	9	1									
								37										
	3	2	2															
		1	1															
		1	5															
	3	4	8					37										

Individual Wages Paid in Stores and Factories in the CITY OF September 1. (Tabulated by Industries

INDUSTRY AND OCCUPATION.	Number of Establishments.	Number of Employees Considered.	HOURS PER DAY.				
			8	9	10	11	12
19. <i>Ship Builders, Riggers, Etc.</i>							
Riggers	1	3			3		
Sailmakers	1	2	2				
Ship caulkers	2	26		26			
Ship caulkers, apprentices	2	8		8			
Shipwrights	2	66		66			
Shipwrights, apprentices	2	8		8			
Totals		113	2	108	3		
20. <i>Soap and Candle Workers.</i> No employés considered.							
21. <i>Store Employés.</i>							
Alteration hands	1	14		14			
Bookkeepers	68	91	21	47	23		
Cash boys and girls	5	105		105			
Cashiers	16	41		21	20		
Clerks, office	29	94	42	52			
Collectors	7	8	1	6	1		
Drivers	63	226	55	143	28		
Drug clerks	2	2		2			
Druggists	3	15		15			
Floor walkers	1	6		6			
Forewomen	7	28		21	7		
Porters and packers	11	94		87	7		
Shipping clerks, girls	1	4		4			
Salesmen	31	299	10	283	6		
Saleswomen	27	319	4	311	4		
Stenographers	15	19	4	14	1		
Window dressers	3	4		4			
Wrappers	16	73		32	40	1	
Totals		1442	137	1167	137	1	
22. <i>Structural Iron Workers.</i> No employés considered.							
23. <i>Tannery Employés.</i>							
Beam housemen	1	7		7			
Curriers and finishers	1	10		10			
Tanners	1	10		10			
Yardmen	1	2		2			
Totals		29		29			
24. <i>Textile Workers.</i>							
Loom fixers	1	5		5			
Machine tenders	2	5		5			
Mill boys	1	26		26			
Miscellaneous cotton mill employés	1	75		75			
Quilters	1	54		54			
Spinners	1	105		105			
Spoolers	1	37		37			
Twisters	1	43		43			
Weavers	1	53		53			
Totals		403		403			
25. <i>Teamsters, Hostlers, Etc.</i>							
Stablemen	11	19	2	12	5		

**Individual Wages Paid in Stores and Factories in the CITY OF
September 1. (Tabulated by Industries)**

INDUSTRY AND OCCUPATION.	Number of Establishments.	Number of Employés Considered.	HOURS PER DAY.				
			8	9	10	11	12
26. Trunks, Harness, Etc.							
Harnessmakers	3	11			11		
Harnessmakers, apprentices.	1	1		1			
Totals		12		1	11		
27. Upholsterers, Carpet Sewers, Etc.							
Carpet layers	2	6		6			
Carpet sewers	1	1		1			
Mattressmakers	2	15	15				
Shademakers	2	6	6				
Tentmakers	2	16		16			
Tentmakers, apprentices.	1	5		5			
Upholsterers	1	2		2			
Totals		51	21	30			
28. Woodworkers.							
Band sawyers	9	10	8	2			
Bench hands	11	136	130		6		
Bench hands, apprentices.	6	18	18				
Box factory boys	2	6		6			
Boxmakers	2	48		48			
Cabinetmakers	2	7	3	4			
Lumber handlers	13	249	70	105	74		
Mill helpers	7	44	33	11			
Mill men	5	13	5	4	4		
Mill men, apprentices	1	7	7				
Nailers	2	13		9	4		
Patternmakers	3	10		10			
Patternmakers, apprentices	2	7		7			
Planermen	13	19	16	2	1		
Sanders	3	3	3				
Sash and door men	1	1	1				
Saw filers	3	5	1	3	1		
Sawyers	11	22	11	5	6		
Shapers	2	2	2				
Stickermen	9	19	19				
Tallymen	9	44	17	26	1		
Wagonmakers	7	12	4	8			
Totals		695	348	250	97		
29. Miscellaneous Employés.							
Bituminous men	1	6	6				
Broommakers	1	3		3			
Errand boys	19	61	5	56			
Engineers	27	42	8	18	16		
Firemen	3	3	2	1			
Foremen	37	95	27	36	32		
Longshoremen	3	48	15	33			
Managers and superintendents	13	22	2	16	4		
Match factory employés.	1	10			10		
Millers, flour	2	4		1	3		
Pottery workers	2	47			47		
Shoekties	2	3		2	1		
Watchmen	9	11	6	4	1		
Totals		355	71	170	114		

Practically the same conditions prevail in Oakland as in San Francisco. No data was secured on glassblowers (No. 11), metal workers (No. 15), and soap and candle workers (No. 20). Some information

OAKLAND During the Year 1906, Subsequent to April 18 and Prior to and Occupations.)—*Continued.*

WAGES PER WEEK.

Under \$3.	\$3 to \$6.	Over \$6 to \$9.	Over \$9 to \$12.	Over \$12 to \$15.	Over \$15 to \$18.	Over \$18 to \$21.	Over \$21 to \$25.	Over \$25 to \$30.	Over \$30 to \$35.	Over \$35 to \$40.	Over \$40 to \$45.	Over \$45 to \$50.	Over \$50 to \$55.	Over \$55 to \$60.	Over \$60 to \$65.	Over \$65 to \$70.	Over \$70 to \$80.	Over \$80 to \$100.
	1				10	1												
	1				10	1												
			1				6											
		2	1	12														
		4	4	8	3	2	1											
	5				2													
	5	6	6	20	5	8	1											
					1	8	7	5										
		7	6	5	5	118												
	4	2			6	1	5											
	10	20	12	1	160	13	6											
		20	65	5	8	3	2											
			16	8	2													
		1	4	9	1	1	2											
							9											
	2	2	3	4	5	7	2											
			1	1	1													
		2		1	4	7	4	1										
						2	6											
							19											
				3	36	5												
				3	3	6												
	16	54	108	53	223	164	70	7										
				6														
		2	1															
	58	3																
		1			7	12	8	10	3	1								
			2		1													
					5	17	9	29	24	7	4							
						21	15	12	4	8								
						2	5				3							
		9	1		1	1	1											
			17	14	9	7												
				3														
			5	6														
	58	16	26	43	60	41	51	31	16	4	3							

workers are included. Wages and length of day's work vary but little from those existing in San Francisco. The same may be said for Berkeley and Alameda.

Individual Wages Paid in Stores and Factories in the CITY OF LOS

September 1. (Tabulated by

INDUSTRY AND OCCUPATION.	Number of Establishments.	Number of Employés Considered.	HOURS PER DAY.				
			8	9	10	11	12
1. Bakery and Restaurant Employés.							
Bakers	3	61			61		
Cooks	4	27			19	8	
Dishwashers	2	7			1	6	
Pantrymen	3	6			3	3	
Waiters	11	80		26	14	40	
Totals		181		26	98	57	
2. Breweries and Bottling Works.							
Beer bottlers	4	93	93				
Brewery workers	2	20	20				
Brewery workers; apprentices	2	2	2				
Totals		115	115				
3. Building Trades.							
Carpenters	1	5		5			
Glaziers	3	20	20				
Totals		25	20	5			
4. Butcher Shop and Slaughter-house Employés.							
Casing cleaners	1	5		5			
Killers and dressers	1	39			39		
Lard packers	1	10		4	11		
Livestock buyers	1	5		5			
Meat canners	1	16			16		
Meat cutters	3	12			12		
Meat packers	1	17		17			
Meat shippers	1	24		24			
Sausagemakers	1	10		5	5		
Yardmen	1	6			6		
Totals		144		60	84		
5. Candy, Confectionery, and Sugar Workers.							
Candy girls	2	18			18		
Candymakers	4	11		11			
Totals		29		11	18		
6. Cannery Employés.							
Cannery employés, boys and girls	2	48		48			
Cannery employés, men	2	50			50		
Cannery employés, women	2	290			290		
Totals		388		48	340		
7. Cigar and Tobacco Workers.							
Cigarmakers	3	73	73				
Tobacco strippers	3	18	18				
Totals		91	91				
8. Clothing, Shoes, Etc.							
Glove cutters	1	5		5			
Glove layers off	1	1		1			
Milliners	1	9		9			
Seamstresses	1	9		9			

Individual Wages Paid in Stores and Factories in the CITY OF LOS
September 1. (Tabulated by Industries)

INDUSTRY AND OCCUPATION.	Number of Establishments.	Number of Employés Considered.	HOURS PER DAY.				
			8	9	10	11	12
8. Clothing, Shoes, Etc.—Continued.							
Sewing-machine operators.....	6	210		210			
Shoe cutters.....	1	4		4			
Tailors.....	2	25			25		
Tailors, cutters.....	4	8	3	5			
Tent and awning makers.....	2	44		44			
Totals.....		315	3	287	25		
9. Dairy Employés. No employés considered.							
10. Electrical Workers.							
Electricians.....	1	17		17			
11. Glassblowers. No employés considered.							
12. Laborers—General.							
Laborers.....	11	272	8	264			
13. Laundry Workers, Dyers, Etc.							
Ironers.....	7	235		135	100		
Mangle hands.....	7	170		75	95		
Markers.....	7	42		12	30		
Totals.....		447		222	225		
14. Machine and Repair Shop, Iron and Steel Mills.							
Blacksmiths.....	3	25	2	23			
Coremakers.....	4	11		11			
Draughtsmen.....	2	21		21			
Machinists.....	10	116		116			
Machinists, helpers.....	10	112		112			
Molders.....	5	50		50			
Molders, helpers.....	5	35		35			
Totals.....		370	2	368			
15. Metal Workers, excluding Iron, Steel and Tin.							
Metal polishers.....	1	28	8	20			
16. Plumbers, Pipefitters, Etc.							
Plumbers.....	1	4	4				
Plumbers, helpers.....	1	3	3				
Steamfitters.....	1	2		2			
Totals.....		9	7	2			
17. Printing Trades.							
Bookbinders.....	4	18	1	17			
Compositors.....	6	33	11	22			
Paper cutters.....	3	3		3			
Press feeders.....	6	27	5	22			
Pressmen.....	6	12	4	8			
Totals.....		93	21	72			
18. Sheet Metal Workers.							
Cornicemakers.....	3	14	14				
19. Ship Builders, Riggers, Etc. No employés	considere d.						
20. Soap and Candle Workers. No employés	considere d.						

Individual Wages Paid in Stores and Factories in the CITY OF LOS September 1. (Tabulated by Industries)

INDUSTRY AND OCCUPATION.	Number of Es- tablishments.	Number of Em- ployés Con- sidered.	HOURS PER DAY.				
			8	9	10	11	12
21. <i>Store Employés.</i>							
Alteration hands.....	1	14		14			
Bookkeepers.....	31	60	11	49			
Cash and office boys and girls.....	24	64	8	56			
Cashiers.....	12	27	4	23			
Clerks, office.....	22	85	13	72			
Janitors.....	6	7	3	4			
Porters and packers.....	14	77	7	70			
Salesmen.....	21	316	15	248	53		
Saleswomen.....	7	462	6	168	288		
Solicitors.....	3	8	2	6			
Stenographers.....	14	21	1	20			
Wrappers.....	2	22		22			
Totals.....		1163	70	752	341		
22. <i>Structural Ironworkers.</i> No employés considered.							
23. <i>Tannery Employés.</i> No employés considered.							
24. <i>Textile Workers.</i> No employés considered.							
25. <i>Teamsters, Hostlers, Etc.</i>							
Teamsters.....	23	202		22	45	35	
26. <i>Trunks, Harness, Etc.</i>							
Harnessmakers.....	3	26		26			
Harnessmakers, apprentices.....	3	3		3			
Totals.....		29		29			
27. <i>Upholsterers, Carpet Layers, Etc.</i> No employés considered.							
28. <i>Woodworkers.</i>							
Bench hands.....	2	16	10	6			
Cabinetmakers.....	1	20	20				
Coopers.....	1	15		15			
Lumber handlers.....	2	24	11	13			
Mill hands.....	2	19	19				
Patternmakers.....	3	31		31			
Planermen.....	1	1	1				
Sawyers.....	2	6	6				
Shaper hands.....	1	1	1				
Stickermen.....	3	13	8	5			
Tenoners.....	1	2	2				
Wagonmakers.....	1	5		5			
Woodturners.....	2	2	2				
Totals.....		155	80	75			
29. <i>Miscellaneous Employés.</i>							
Engineers.....	13	28	19	9			
Firemen.....	3	6	4	2			
Foremen.....	23	58	14	44			
Managers and superintendents.....	14	89	1	88			
Telephone operators.....	9	23	3	20			
Watchmen.....	8	10	3	7			
Totals.....		214	44	170			

In Los Angeles, wage data on 4,301 people was obtained. The employés of stores number 1,163. Here, as in San Francisco, the major portion of such employés work nine hours, but only 6 per cent, as against 18 per cent in San Francisco, work eight hours, and 29.3 per cent, as against 24.5 per cent in the northern city, work ten hours per day.

ANGELES During the Year 1906, Subsequent to April 18 and Prior to and Occupations.)—*Continued.*

WAGES PER WEEK.

Under \$3.	\$3 to \$5.	Over \$6 to \$9.	Over \$9 to \$12.	Over \$12 to \$15.	Over \$15 to \$18.	Over \$18 to \$21.	Over \$21 to \$25.	Over \$25 to \$30.	Over \$30 to \$35.	Over \$35 to \$40.	Over \$40 to \$45.	Over \$45 to \$50.	Over \$50 to \$55.	Over \$55 to \$60.	Over \$60 to \$65.	Over \$65 to \$70.	Over \$70 to \$75.	Over \$75 to \$80.	Over \$80 to \$90.	Over \$90 to \$100.
		9	2	2	1															
		27	12	3	9	5	1													
	43	21																		
		14	3	3		1		4												
		14	21	17	9	9	9	4	2											
			4	2	1															
		17	46	7	4	2	1													
		26	95	80	40	19	13	28	6	2	7									
		356	61	35	7	1	2		1	1										
				6																
		2	6		8															
	19	1	2	5																
	62	487	252	160	79	37	26	37	9	2	12									
		17	53	45	57	30														
		3	2	3	4	14	1	2												
		3	2	3	4	14	1	2												
					14	2														
						17	3													
			10	4	1															
					9	15														
		1	2	4	10	2														
			11	6	7	6	1													
				1																
						4	2													
							1													
					4	3	6													
							2													
				2			2	3												
					2															
		1	23	17	47	49	18													
			1	2	3	2	13		1	3	3									
					5	1														
			3	3	6	6	14	19	2	2	3									
				2	11	3	2	34	4	11	22									
	4	17	1	1																
			1	8	1															
	4	17	6	16	26	12	29	53	7	16	28									

Considered as a whole, of the 4,301 employes investigated in Los Angeles, 465, or 10.8 per cent, work eight hours per day, as against 17 per cent in San Francisco; 1,783, or 41.4 per cent, nine hours, as against 61 per cent in San Francisco; and 1,544, or 35.9 per cent, have a ten-hour day, while but 14 per cent of the employes considered in the northern city work as long hours.

**Individual Wages Paid in Stores and Factories in the CITY OF SAN
September 1. (Tabulated by**

INDUSTRY AND OCCUPATION.	Number of Es- tablishments.	Number of Em- ployés Con- sidered.....	HOURS PER DAY.				
			8	9	10	11	12
1. Bakery and Restaurant Employés.							
Bakers	4	22		3	19		
Bakers, apprentices	1	2		2			
Bakers, helpers	1	5			5		
Cooks	2	5					5
Cooks, helpers	2	3					3
Pastemakers	1	5		5			
Waiters	2	8			1		7
Waitresses	1	3			3		
Totals		53		10	28		15
2. Breweries and Bottling Works, Etc.							
Barkeepers	2	2	2				
Brewery workers	3	40	40				
Brewery workers, apprentices	3	3	3				
Brewmasters	1	1	1				
Totals		46	46				
3. Building Trades.							
Bricklayers	1	8	8				
Carpenters	4	22	22				
Cement workers	1	14	14				
Glaziers	3	9	9				
Glaziers, apprentices	1	1	1				
Granite cutters	2	12	12				
Granite cutters, apprentices	2	2	2				
Hodcarriers	1	9	9				
Marble cutters	2	2	2				
Marble cutters, apprentices	1	1	1				
Painters	3	100	100				
Painters, apprentices	2	7	7				
Totals		187	187				
4. Butcher Shop and Slaughter-house Em- ployés.							
Butchers	1	2			2		
Killers and dressers	1	2					2
Meat cutters	3	11			7		4
Sausagemakers	2	2			1		1
Sausagemakers, helpers	1	1			1		
Totals		18			11		7
5. Candy, Confectionery, and Sugar Workers.							
Candymakers	4	12	3	1	8		
Candymakers, helpers	4	7			7		
Ice cream makers	1	1			1		
Soda men	1	2			2		
Totals		22	3	1	18		
6. Cannery Employés.							
Cannery employés, boys	1	2		2			
Cannery employés, men	2	115			115		
Cannery employés, women	2	869			869		
Totals		986		2	984		

JOSE During the Year 1906, Subsequent to April 18 and Prior to Industries and Occupations.)

WAGES PER WEEK.

[illegible]

**Individual Wages Paid in Stores and Factories in the CITY OF SAN
September 1. (Tabulated by Industries**

INDUSTRY AND OCCUPATION.	Number of Establishments.	Number of Employed.	HOURS PER DAY.				
			8	9	10	11	12
7. Cigar and Tobacco Workers.							
Cigarmakers	3	12	12				
Cigarmakers, apprentices	1	1	1				
Cigar packers	2	4	4				
Tobacco strippers	2	3	3				
Totals		20	20				
8. Clothing Shoes, Etc.							
Bushelmen	1	1			1		
Finishers	1	2		2			
Glovemakers	1	19		19			
Hatmakers	2	4			4		
Hat trimmers	3	3			3		
Pressers	1	1		1			
Seamstresses	1	1		1			
Shoe repairers	1	1			1		
Shoe repairers, apprentices	1	1		1			
Tailors	1	7		7			
Totals		40		31	9		
9. Dairy Employés. No employés considered							
10. Electrical Workers.							
Electricians	2	4	4				
11. Glassblowers. No employés considered.							
12. Laborers—General.							
Laborers	8	37	14	3	20		
13. Laundry Workers, Dyers, Etc.							
Dyers and cleaners	3	8			8		
Dyers and cleaners, helpers	3	3		3			
Laundry workers	7	126		126			
Totals		137		129	8		
14. Machine and Repair Shops, Iron and Steel Mills.							
Blacksmiths	3	4		4			
Blacksmiths, apprentices	1	1		1			
Blacksmiths, helpers	1	1		1			
Casting chippers	2	4		4			
Draughtsmen	1	4	4				
Foundry helpers	2	2		2			
Machinists	4	23	3	20			
Machinists, apprentices	3	8		8			
Machinists, helpers	1	1		1			
Molders	3	14		14			
Molders, apprentices	3	5		5			
Totals		67	7	60			
15. Metal Workers, Excluding Iron, Steel, and Sheet Metal. No employés considered.							

**Individual Wages Paid in Stores and Factories in the CITY OF SAN
September 1. (Tabulated by Industries)**

INDUSTRY AND OCCUPATION	Number of Es- tablishments	Number of Em- ployés Con- sidered	HOURS PER DAY.				
			8	9	10	11	12
16. Plumbers, Pipefitters, Etc.							
Plumbers	3	16	16				
Plumbers, apprentices	2	6	6				
Plumbers, helpers	1	10	10				
Totals		32	32				
17. Printing Trades.							
Bindery girls	1	2	2				
Compositors	3	6	6				
Compositors, apprentices	1	2	2				
Press feeders	1	2	2				
Pressmen	3	3	3				
Pressmen, apprentices	2	2	2				
Totals		17	17				
18. Sheet Metal Workers.							
Improvers	2	6	6				
Sheet metal workers	5	19	19				
Sheet metal workers, apprentices	1	3	3				
Totals		28	28				
19. Ship Builders, Riggers, Etc. No employés	considere	d.					
20. Soap and Candle Workers. No employés	considere	d.					
21. Store Employés.							
Alteration hands	3	10		3	7		
Bookkeepers	23	26	6	5	14	1	
Cash boys	9	15		15			
Cashiers	6	4		2	2	1	1
Clerks, office	14	27	9	8	10		
Drivers	22	72	13	29	30		
Forewomen	4	25		2	23		
Porters and packers	10	103	1	3	97	2	
Salesmen	12	95		50	45		
Saleswomen	15	148		78	70		
Stenographers	7	7	2	3	2		
Wrappers	3	8		8			
Totals		542	31	206	300	4	1
22. Structural Iron Workers.							
Structural iron workers	1	5	5				
23. Tannery Employés. No employés considered.							
24. Textile Workers.							
Woolen mill employés	1	54			54		
25. Teamsters, Hostlers, Etc.							
Stablemen	6	8	4	1	1	1	1
26. Trunks, Harness, Etc.							
Harnessmakers	1	2		2			
Trunkmakers	1	1		1			
Totals		3		3			

JOSE During the Year 1906, Subsequent to April 18 and Prior to and Occupations.)—*Continued.*

WAGES PER WEEK.

Under \$3.	\$3 to \$6.	Over \$6 to \$9.	Over \$9 to \$12.	Over \$12 to \$15.	Over \$15 to \$18.	Over \$18 to \$21.	Over \$21 to \$25.	Over \$25 to \$30.	Over \$30 to \$35.	Over \$35 to \$40.	Over \$40 to \$45.	Over \$45 to \$50.	Over \$50 to \$55.	Over \$55 to \$60.	Over \$60 to \$65.	Over \$65 to \$70.	Over \$70 to \$80.	Over \$80 to \$100.	Over \$100.
1	2	3	3				16												
1	5	2																	
1	7	5	3				16												
		1	1																
	2			1	4	2													
1		1			1														
1	2	2	1	1	8	2													
			3	3															
	3				2	1	8	8											
	3		3	3	2	1	8	8											
	1	8	1																
2	13	4	6	5	1	3	4	1		1									
	4	5	1																
		7	3	4	2	1	6												
		6	12	17	25	2	9	1											
	1	8	16																
	1	86	13	2	1														
2	6	6	15	14	15	17	13	2	7										
	47	56	28	9	2	1	1												
	1	3	1																
	7	1		2															
4	82	192	96	53	46	24	33	4	7	1									
								4	1										
	13	39	2																
		1	1	1	3	1	1												
				2															
			1																
			1	2															

**Individual Wages Paid in Stores and Factories in the CITY OF SAN
September 1. (Tabulated by Industries)**

INDUSTRY AND OCCUPATION.	Number of Es- tablishments.	Number of Em- ployees Con- sidered	HOURS PER DAY.				
			8	9	10	11	12
27. Upholsterers, Carpet Layers, Etc.							
Carpet layers	2	6	6				
Upholsterers	2	6	3	3			
Totals		12	9	3			
28. Woodworkers.							
Bench hands	5	54	54				
Cabinetmakers	1	2	2				
Coopers	2	10	10				
Mill helpers	4	37	37				
Millmen	5	25	25				
Millmen, apprentices	2	6	6				
Patternmakers	1	2		2			
Patternmakers, apprentices	1	2		2			
Sawyers	5	30	22	8			
Stickermen	3	10	8	2			
Yardmen	2	43	43				
Totals		221	207	14			
29. Miscellaneous Employés.							
Barbers	3	14				14	
Engineers	10	13	7	4	2		
Firemen	2	2	1		1		
Foremen	15	31	8	9	14		
Managers and Superintendents	4	8	1	1	6		
Watchmen	3	4	1	3			
Totals		72	18	17	23	14	

JOSE During the Year 1906, Subsequent to April 18 and Prior to and Occupations.)—*Continued.*

WAGES PER WEEK.

Under \$3.	\$3 to \$6.	Over \$6 to \$9	Over \$9 to \$12	Over \$12 to \$15	Over \$15 to \$18	Over \$18 to \$21	Over \$21 to \$25	Over \$25 to \$30	Over \$30 to \$35	Over \$35 to \$40	Over \$40 to \$45	Over \$45 to \$50	Over \$50 to \$55	Over \$55 to \$60	Over \$60 to \$65	Over \$65 to \$70	Over \$70 to \$80	Over \$80 to \$100
-----	-----	-----	-----	2	5	2	2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	2	5	3	2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	2	11	41	2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	12	16	3	6	8	2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	2	1	2	1	12	13	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	1	-----	1	-----	-----	2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	4	4	5	9	8	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	4	1	9	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	43	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	15	21	12	67	79	25	2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	2	5	7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	1	-----	4	6	2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	1	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	2	2	6	5	11	3	1	3	1	2	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	3	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	6	10	18	12	13	3	4	3	1	2	-----	-----	-----	-----	-----	-----

Individual Wages Paid in Stores and Factories in the CITY OF SAC
September 1. (Tabulated by

INDUSTRY AND OCCUPATION.	Number of Establishments	Number of Employés Considered	HOURS PER DAY.				
			8	9	10	11	12
1. Bakery and Restaurant Employés.							
Bakers	2	11			11		
Bakers, helpers	2	4			4		
Cooks	3	4			3		
Waitresses	2	8			1	7	
Totals		27			19	8	
2. Breweries, Bottling Works, Etc.							
Beerbottlers	3	69	64	5			
Bottle washers	2	11			10	1	
Brewers	2	54	54				
Totals		134	118	5	10	1	
3. Building Trades.							
Carpenters	1	4	2	2			
Painters	3	4	1	3			
Totals		8	3	5			
4. Butcher Shop and Slaughter-house Employés.							
Lardmakers	1	1			1		
Meat cutters	1	3			3		
Pork packers	1	22			22		
Sausagemakers	1	1			1		
Slaughters	1	2			2		
Totals		29			29		
5. Candy, Confectionery, and Sugar Workers.							
Candy dippers	1	8		8			
Candymakers	1	2		2			
Candymakers, apprentices	1	4		4			
Ice cream makers	1	2				2	
Totals		16		14		2	
6. Cannery Employés.							
Cannery employés, boys and girls	1	52		52			
Cannery employés, Chinese	1	2			2		
Cannery employés, Japanese	3	205		40	165		
Cannery employés, women	3	112		102	10		
Fruit buyers	3	5		3	2		
Totals		376		197	179		
7. Cigar and Tobacco Workers.							
Cigarmakers	3	21	21				
Cigarmakers, apprentices	3	3	3				
Tobacco strippers	3	12	12				
Totals		36	36				
8. Clothing, Shoes, Etc.							
Seamstresses	2	3		3			
Tailors	1	14			14		
Tent and awning makers	1	3			3		
Totals		20		3	17		

Individual Wages Paid in Stores and Factories in the CITY OF SAC
September 1. (Tabulated by Industries)

INDUSTRY AND OCCUPATION.	Number of Establishments.	Number of Employes Considered.	HOURS PER DAY.				
			8	9	10	11	12
9. <i>Dairy Employes.</i>							
Buttermakers	1	2				2	
10. <i>Electrical Workers.</i> No employes considered.							
11. <i>Glassblowers, Etc.</i> No employes considered.							
12. <i>Laborers—General.</i>							
Laborers	10	130	8	115	2	5	
13. <i>Laundry Workers, Dyers, Etc.</i>							
Laundry workers	3	142		142			
14. <i>Machine and Repair Shops, Iron and Steel Mills.</i>							
Blacksmiths	7	10	2	8			
Blacksmiths, apprentices	1	1		1			
Blacksmiths, helpers	2	5	4	1			
Coremakers	1	1		1			
Coremakers, helpers	1	6		6			
Foundry helpers	1	2		2			
Horseshoers	1	2		2			
Horseshoers, apprentices	1	1		1			
Machine hands	2	7		6	1		
Machinists	4	14	2	12			
Machinists, apprentices	2	2		2			
Machinists, helpers	1	1		1			
Molders	2	10		10			
Molders, apprentices	1	1		1			
Oilers	1	2	2				
Pipemakers	1	12		12			
Toolmakers	1	6			6		
Totals		83	10	66	7		
15. <i>Metal Workers, Excluding Iron, Steel and Sheet Metal.</i> No employes considered.							
16. <i>Plumbers, Pipefitters, Etc.</i>							
Plumbers	1	3	3				
Plumbers, apprentices	1	2	2				
Totals		5	5				
17. <i>Printing Trades.</i>							
Bindery girls	1	12	12				
Bookbinders	2	12	12				
Bookbinders, apprentices	1	5	5				
Compositors	3	27	27				
Editors	2	4	4				
Engravers	1	3	3				
Engravers, apprentices	2	4	4				
Engravers, helpers	1	1	1				
Papercarriers	1	26	26				
Press feeders	3	4	4				
Pressmen	3	7	7				
Reporters	2	5	5				
Stereotypers	1	2	2				
Stereotypers, helpers	1	1	1				
Totals		113	113				
18. <i>Sheet Metal Workers.</i> No employes considered.							
19. <i>Ship Builders, Riggers, Etc.</i> No employes considered.							
20. <i>Soap and Candle Workers.</i> No employes considered.							

Individual Wages Paid in Stores and Factories in the CITY OF SAC
September 1. (Tabulated by Industries)

INDUSTRY AND OCCUPATION.	Number of Establishments.	Number of Employés Considered.	HOURS PER DAY.				
			8	9	10	11	12
21. Store Employés.							
Bookkeepers	12	27	3	15	7	2	
Cash and errand boys	8	47	4	42	1		
Cashiers	4	7	2	2	3		
Clerks, office	10	50		30	20		
Drivers	10	56	21	19	12	4	
Druggists	1	11		11			
Forewomen	3	14		2	12		
Janitors	1	1	1				
Labelers	3	13	6	3	4		
Porters and packers	10	63		23	40		
Salesmen	6	57		45	12		
Saleswomen	3	55		52		3	
Stenographers	7	19	1	4	14		
Wrappers	1	2		2			
Totals		422	38	250	125	9	
22. Structural Ironworkers. No employés considered.							
23. Tannery Employés. No employés considered.							
24. Textile workers. No employés considered.							
25. Teamsters, Hostlers, Etc.							
Hostlers	1	3	3				
Stablemen	3	11			2		9
Totals		14	3		2		9
26. Trunks, Harness, Etc.							
Harnessmakers	1	53		53			
Harnessmakers, apprentices	1	2		2			
Saddlemakers	1	25		25			
Totals		80		80			
27. Upholsterers, Carpet Layers, Etc.							
Mattressmakers	1	4		4			
Upholsterers	1	1		1			
Totals		5		5			
28. Woodworkers.							
Box factory employés	1	7			7		
Boxmakers	1	10			10		
Coopers	1	3	3				
Lumber pilers	1	4			4		
Patternmakers	2	4		4			
Patternmakers, apprentices	1	1		1			
Planemen	1	2			2		
Sawyers	1	2		2			
Woodworkers	3	5	5				
Totals		38	8	7	23		
29. Miscellaneous Employés.							
Broommakers	1	12	12				
Engineers	9	14	5	3	4	2	
Firemen	2	6	6				
Foremen	5	6	1	4	1		
Ice pullers	1	3	3				
Managers and superintendents	10	30	5	20	4	1	
Telephone operators	3	3		2	1		
Watchmen	1	1		1			
Totals		75	32	30	10	3	

RAMENTO During the Year 1906, Subsequent to April 18 and Prior to and Occupations.)—*Continued.*

WAGES PER WEEK.

Under \$3	\$3 to \$6	Over \$6 to \$9	Over \$9 to \$12	Over \$12 to \$15	Over \$15 to \$18	Over \$18 to \$21	Over \$21 to \$25	Over \$25 to \$30	Over \$30 to \$35	Over \$35 to \$40	Over \$40 to \$45	Over \$45 to \$50	Over \$50 to \$55	Over \$55 to \$60	Over \$60 to \$70	Over \$70 to \$80	Over \$80 to \$100
5	11	27	4	3	7	5	2	3		1	1						
	5	15	2	1		1			2	1							
		3	8	5	11	3	7	4									
		8		1	3	2	15	20	1								
		2	9	3													
	6	7	1														
	18	9	3	27	2	4											
	13	30	2	12	4	13	17	1	2	5		1					
		1	5	7													
	1	1	1	12		1			1	1	1			1			
5	55	109	42	88	17	43	44	4	5	7	1	1		1			
					3												
				11													
				11	3												
				18	25	10											
2				25													
2				18	50	10											
				2	2												
					1												
				2	2	1											
		6	1					3									
			1	9													
			3			1		4									
		1				1											
			1			1											
						3		1									
							2										
		7	6	9	5	3	5										
2			1	1	5	3											
			1	2	5		4	2									
					6		1	5									
					3												
					3	4	12	5	3	1	1			1			
1			2														
			1														
3				3	22	8	21	7	3	1	1			1			

**Individual Wages Paid in Stores and Factories in the CITY OF
September 1. (Tabulated by**

INDUSTRY AND OCCUPATION.	Number of Es- tablishments	Number of Em- ployés Con- sidered	HOURS PER DAY.				
			8	9	10	11	12
1. Bakery and Restaurant Employés.							
Cooks	1	2					2
2. Brewery and Bottling Works. No employés considered.							
3. Building Trades.							
Carpenters	2	19		19			
Carpenters, helpers	1	7		7			
Painters	2	7		7			
Painters, apprentices	1	1		1			
Totals		34		34			
4. Butcher Shop and Slaughter-house Employés.							
Killers and dressers	2	5					5
Meat cutters	2	9					9
Sausagemakers	2	3					3
Stock buyers	1	1					1
Stock tenders	2	4					4
Vaqueros	2	5					5
Totals		27					27
5. Candy, Confectionery, and Sugar Workers.							
Candymakers	2	4			4		
Candymakers, helpers	1	1			1		
Totals		5			5		
6. Cannery Employés.							
Cannery workers	1	39			39		
Cannery boys	1	28		28			
Totals		67		28	39		
7. Cigars and Tobacco Workers. No employés considered.							
8. Clothing, Shoes, Etc.							
Tailors	2	13		13			
Tailors, cutters	1	1		1			
Tailors, finishers	3	5		5			
Totals		19		19			
9. Dairy Employés. No employés considered.							
10. Electrical Workers.							
Electricians	1	2	2				
Electricians, helpers	1	1	1				
Totals		3	3				
11. Glassblowers. No employés considered.							
12. Laborers—General.							
Laborers	10	94	2	44	48		
13. Laundry Workers, Dyers, Etc.							
Laundry workers	2	89		89			

Individual Wages Paid in Stores and Factories in the CITY OF September 1. (Tabulated by Industries)

INDUSTRY AND OCCUPATION.	Number of Establishments.	Number of Employés Considered.	HOURS PER DAY.				
			8	9	10	11	12
14. Machine and Repair Shops, Iron and Steel Mills.							
Blacksmiths	6	23		13	10		
Blacksmiths, apprentices	2	5		5			
Blacksmiths, helpers	5	23		19	4		
Boilermakers	1	9		9			
Boilermakers, helpers	2	11		11			
Casting chippers	3	14		14			
Coremakers	3	8		8			
Coremakers, apprentices	1	2		2			
Cupola men	3	4		4			
Draughtsmen	2	2		2			
Draughtsmen, apprentices	3	4		4			
Machine hands	7	42		41	1		
Machinists	9	67		67			
Machinists, apprentices	6	33		33			
Machinists, helpers	3	10		10			
Molders	3	36		36			
Molders, apprentices	2	6		6			
Oilers	2	4			4		
Totals		303		284	19		
15. Metal Workers, Excluding Iron, Steel, and Sheet Metal. No employés considered.							
16. Plumbers, Pipefitters, Etc.							
Plumbers	2	13	13				
Plumbers, apprentices	2	7	7				
Plumbers, helpers	1	1	1				
Totals		21	21				
17. Printing Trades.							
Bookbinders	1	3	3				
Compositors	4	26	26				
Compositors, apprentices	1	2	2				
Editors	2	7	7				
Linotype operators	2	7	7				
Paper carriers	1	12	12				
Press feeders	2	5	5				
Pressmen	4	19	19				
Pressmen, apprentices	2	2	2				
Proofreaders	2	2	2				
Reporters	2	7	7				
Totals		92	92				
18. Sheet Metal Workers. No employés considered.							
19. Ship Builders, Riggers, Etc. No employés considered.							
20. Soap and Candle Workers. No employés considered.							
21. Store Employés.							
Alteration hands	3	17		17			
Bookkeepers	28	32	4	19	6		3
Cash and errand boys	12	23	1	22			
Cashiers	7	7		4	3		
Clerks	13	53	3	25	25		
Drivers	15	37	2	11	11	1	12

Individual Wages Paid in Stores and Factories in the CITY OF September 1. (Tabulated by Industries)

INDUSTRY AND OCCUPATION.	Number of Es- tablishments.	Number of Em- ployés Con- sidered.	HOURS PER DAY.				
			8	9	10	11	12
21. <i>Store Employés.—Continued.</i>							
Janitors	1	1		1			
Porters and packers	6	22			22		
Salesmen	17	76		58	18		
Saleswomen	5	51		51			
Stenographers	8	13	1	8	4		
Wrappers	5	6		6			
Totals		338	11	222	89	1	15
22. <i>Structural Iron Workers.</i> No employés considered.							
23. <i>Tannery Employés.</i> No employés considered.							
24. <i>Textile Workers.</i>							
Woolen-mill employés	1	72		72			
25. <i>Teamsters, Hostlers, Etc.</i>							
Stablemen	1	1		1			
26. <i>Trunks, Harness, Etc.</i>							
Harnessmakers	2	8		3	5		
Harnessmakers, apprentices	1	1		1			
Totals		9		4	5		
27. <i>Upholsterers, Carpet Layers, Etc.</i>							
Carpet layers	2	5		5			
Carpet layers, apprentices	1	1		1			
Carpet sewers	1	3		3			
Totals		9		9			
28. <i>Woodworkers.</i>							
Mill hands	4	44	35	9			
Mill helpers	4	16		16			
Millwrights	2	11		11			
Millwrights, helpers	1	1		1			
Patternmakers	2	2		2			
Patternmakers, apprentices	3	5		5			
Woodworkers	3	8		7	1		
Totals		87	35	51	1		
29. <i>Miscellaneous Employés.</i>							
Collectors	2	3	2		1		
Engineers	10	11		7	4		
Firemen	1	1			1		
Flour-mill hands	2	49			49		
Foremen	18	58	12	26	20		
Managers and superintendents	10	16	2	11	3		
Messenger boys	2	6		6			
Millers	3	12			12		
Millers, helpers	3	53			53		
Photographers	1	1		1			
Storekeepers	1	14		14			
Telegraphers	6	8	2	6			
Watchmen	7	8		5	3		
Wireworkers	1	7		7			
Totals		247	18	83	146		

STOCKTON During the Year 1906, Subsequent to April 18 and Prior to and Occupations.)—*Continued.*

WAGES PER WEEK.

Under \$3.	\$3 to \$6.	Over \$6 to \$9.	Over \$9 to \$12.	Over \$12 to \$15.	Over \$15 to \$18.	Over \$18 to \$21.	Over \$21 to \$25.	Over \$25 to \$30.	Over \$30 to \$35.	Over \$35 to \$40.	Over \$40 to \$45.	Over \$45 to \$50.	Over \$50 to \$55.	Over \$55 to \$60.	Over \$60 to \$65.	Over \$65 to \$70.	Over \$70 to \$80.	Over \$80 to \$100.
		8	1	6	5	13	22		6	2								
	7	4	3	18	1	1	1											
	5	19	18	6														
	1	5	2	5														
2	41	61	51	63	27	32	40	1	12	4	3	1						
15	32	24	1															
				1														
				8	4	1												
	1																	
	1			3	4	1												
							5											
		1																
		2	1															
		3	1				5											
					19	17	4	4										
		1	3	12	3	4												
				4	1													
						1	1											
	2	2	1															
				1	7													
	2	3	4	17	30	22	5	4										
					1	1												
				2	5	1	1			2								
				1														
	5	9	3	1	30	1												
			3	13	5	5	17	6	8	1								
	6					1	3	3	2	1	2	2			2			
				1	6		4	1										
			5	1	46	1												
	1	1	5	1	1	4		1										
				3	1			1										
		1	7															
		1	6															
	12	12	29	25	98	10	29	11	11	4	2	2			2			

**Individual Wages Paid in Stores and Factories in the CITY OF
September 1. (Tabulated by**

INDUSTRY AND OCCUPATION.	Number of Es- tablishments.	Number of Em- ployés Con- sidered.	HOURS PER DAY.				
			8	9	10	11	12
1. Bakery and Restaurant Employés.							
Bakers	4	11			6	5	
Bakers, apprentices	1	2				2	
Bakers, helpers	2	4			1	3	
Cooks	1	1					1
Waitresses	1	4					4
Totals		22			7	10	5
2. Breweries and Bottling Works.							
Beer bottlers	3	9	5	3	1		
Brewery workmen	1	9	9				
Totals		18	14	3	1		
3. Building Trades.							
Carpenters	2	21	21				
Painters	1	1		1			
Stonecutters	1	3		3			
Totals		25	21	4			
4. Butcher Shop and Slaughter-house Employés.	No employés considered.						
5. Candy, Confectionery, and Sugar Workers.							
Candymakers	1	1		1			
Candymakers, helpers	1	1		1			
Totals		2		2			
6. Cannery Employés.							
Cannery boys	2	42		42			
Cannery girls	1	6		6			
Cannery men	2	204			204		
Cannery women	1	9			9		
Fruit buyers	1	3			3		
Raisin packers	1	94	14	20	60		
Totals		358	14	68	276		
7. Cigar and Tobacco Workers.							
Cigar banders	1	2	2				
Cigarmakers	1	7	7				
Cigar packers	1	2	2				
Tobacco strippers	1	1	1				
Totals		12	12				
8. Clothing, Shoes, Etc.							
Dressmakers	1	3		3			
Milliners	1	4		4			
Totals		7		7			
9. Dairy Employés.							
Buttermakers	1	3			3		
Cream buyers	1	1	1				
Cream gatherers	1	4			4		
Totals		8	1		7		

FRESNO During the Year 1906, Subsequent to April 18 and Prior to Industries and Occupations.)

WAGES PER WEEK.

Under \$3.	\$3 to \$6.	Over \$6 to \$9.	Over \$9 to \$12.	Over \$12 to \$15.	Over \$15 to \$18.	Over \$18 to \$21.	Over \$21 to \$25.	Over \$25 to \$30.	Over \$30 to \$35.	Over \$35 to \$40.	Over \$40 to \$45.	Over \$45 to \$50.	Over \$50 to \$55.	Over \$55 to \$60.	Over \$60 to \$65.	Over \$65 to \$70.	Over \$70 to \$80.	Over \$80 to \$100.
		2			1	4	6											
		1	1	2														
		4		1														
		7	1	3	1	4	6											
				7	2	9												
				7	2	9												
					9	10	2											
						1		3										
					9	11	2	3										
						1												
				1														
				1		1												
15	27																	
3	3																	
		10	150	31		7		6										
		4	4	1														
		6	8	31	29	20	2	1										
18	30	20	162	63	29	27	2	6	1									
	2			3	3	1												
	1			2	2													
	3			3	5	1												
		2		1														
1	2						1											
1	2	2		1			1											
				2					1									
						4				1								
				2		4			1	1								

**Individual Wages Paid in Stores and Factories in the CITY OF
September 1. (Tabulated by Industries)**

INDUSTRY AND OCCUPATION.	Number of Es- tablishments.	Number of Em- ployés Con- sidered.	HOURS PER DAY.				
			8	9	10	11	12
10. <i>Electrical Workers.</i> No employés considered.							
11. <i>Glassblowers.</i> No employés considered.							
12. <i>Laborers—General.</i>							
Laborers	9	79	50	13	4	12	.....
13. <i>Laundry Workers, Dyers, Cleaners, Etc.</i>							
Laundry workers	2	39			39		.....
14. <i>Machine and Repair Shops, Iron and Steel Mills.</i>							
Blacksmiths	3	6		6			
Blacksmiths, helpers	1	1		1			
Machinists	5	34	1	33			
Machinists, apprentices	2	7		7			
Molders	2	11	1	10			
Oilers	1	1				1	
Totals		60	2	57		1	
15. <i>Metal Workers, Excluding Iron, Steel, and Sheet Metal.</i> No employés considered.							
16. <i>Plumbers, Pipefitters, Etc.</i>							
Plumbers	2	14	4		10		
Plumbers, helpers	2	5	5				
Totals		19	9		10		
17. <i>Printing Trades.</i>							
Bindery girls	2	3	3				
Bookbinders	1	1	1				
Bookbinders, apprentices	1	1	1				
Compositors	2	18	18				
Compositors, apprentices	2	3	3				
Press feeders	1	4	4				
Pressmen	3	8	8				
Pressmen, apprentices	1	3	3				
Totals		41	41				
18. <i>Sheet Metal Workers.</i> No employés considered.							
19. <i>Ship Builders, Riggers, Etc.</i> No employés considered.							
20. <i>Soap and Candle Workers.</i> No employés considered.							
21. <i>Store Employés.</i>							
Bookkeepers	11	25	2	4	19		
Cash boys	4	17		15	2		
Cash girls	1	8		8			
Cashiers	3	6		6			
Clerks (office)	11	19	1	4	12	2	
Forewomen	2	18			18		
Janitors	1	1				1	
Porters and packers	1	1		1			
Salesmen	6	115		66	49		
Saleswomen	4	58		36	22		
Stenographers	5	5	1	2	2		
Wrappers	2	11		6	5		
Totals		284	4	158	119	3	

**Individual Wages Paid in Stores and Factories in the CITY OF
September 1. (Tabulated by Industries)**

INDUSTRY AND OCCUPATION.	Number of Es- tablishments.	Number of Em- ployés Con- sidered.	HOURS PER DAY.				
			8	9	10	11	12
22. <i>Structural Iron Workers.</i> No employés considere d.							
23. <i>Tannery Employés.</i> No employés considered.							
24. <i>Textile Workers.</i> No employés considered.							
25. <i>Teamsters, Hostlers, Etc.</i>							
Stablemen	3	3			3		
Teamsters	13	58	5	3	37		13
Totals		61	5	3	40		13
26. <i>Trunks, Harness, Etc.</i> No employés considere d.							
27. <i>Upholsterers, Carpet Layers, Etc.</i> No employés cons idere d.							
28. <i>Woodworkers.</i>							
Coopers	1	14				14	
Coopers, helpers	1	8				8	
Lumber handlers	2	21	21				
Millboys	1	31	31				
Millmen	1	9	9				
Millmen, apprentices	1	5	5				
Millwrights	1	1				1	
Millwrights, helpers	1	2				2	
Sawyers	2	12	12				
Wheelwrights	1	1		1			
Woodworkers	1	2		2			
Totals		106	78	3		25	
29. <i>Miscellaneous Employés.</i>							
Engineers	4	7	2		5		
Firemen	1	2			2		
Foremen	11	16	6	1	9		
Icemakers	2	9			9		
Managers and superintendents	4	5	1	2	1	1	
Millers	1	2				2	
Warehouse-men	2	20			20		
Watchmen	3	5	2	1	2		
Totals		66	11	4	48	3	

FRESNO During the Year 1906, Subsequent to April 18 and Prior to and Occupations.)—Continued.

WAGES PER WEEK.

Under \$3.	\$3 to \$6.	Over \$6 to \$9.	Over \$9 to \$12.	Over \$12 to \$15.	Over \$15 to \$18.	Over \$18 to \$21.	Over \$21 to \$25.	Over \$25 to \$30.	Over \$30 to \$35.	Over \$35 to \$40.	Over \$40 to \$45.	Over \$45 to \$50.	Over \$50 to \$55.	Over \$55 to \$60.	Over \$60 to \$70.	Over \$70 to \$80.	Over \$80 to \$100.
		5	19	3 27	1	6											
		5	19	30	1	6											
							14										
		31	2	10	8 6	1	2										
			3		3	2	1										
			4	1		1											
				1	1												
			6	4	3												
			1		1	1											
		31	15	16	22	5	3	14									
					1		3	1	2								
				2													
				5	7	1	2		1								
		1	6	2													
				1			2		1	1							
			19		1												
		1	3	1													
		2	28	11	9	2	7	1	5	1							

Individual Wages Paid in Stores and Factories in the CITY OF BAK
September 1. (Tabulated by Industries)

INDUSTRY AND OCCUPATION.	Number of Es- tablishments.	Number of Em- ployés Con- sidered.	HOURS PER DAY.				
			8	9	10	11	12
1. <i>Bakery and Restaurant Employés.</i> No employés considered.							
2. <i>Breweries and Bottling Works.</i> Beer bottlers.....	2	7		4	3		
3. <i>Building Trades.</i> Carpenters.....	1	1		1			
4. <i>Butcher Shop and Slaughter-house Employés.</i> Packers.....	1	1		1			
Packing-house hands.....	1	13			13		
Stockmen.....	1	1		1			
Totals.....		15		2	13		
5. <i>Candy, Confectionery, and Sugar Workers.</i> No employés considered.							
6. <i>Cannery Employés.</i> No employés considered.							
7. <i>Cigar and Tobacco Workers.</i> No employés considered.							
8. <i>Clothing, Shoes, Etc.</i> Operators on sewing-machines.....	1	2	2				
9. <i>Dairy Employés.</i> No employés considered.							
10. <i>Electrical Workers.</i> Linemen.....	1	1	1				
11. <i>Glassblowers.</i> No employés considered.							
12. <i>Laborers—General.</i> Laborers.....	6	23		19	4		
13. <i>Laundry Workers, Dyers, Cleaners, Etc.</i> Laundry workers.....	1	26	26				
14. <i>Machine and Repair Shops, Iron and Steel Mills.</i> Blacksmiths.....	2	6		6			
Blacksmiths, helpers.....	2	6		6			
Boilermakers.....	1	1		1			
Machinists.....	2	15		15			
Machinists, apprentices.....	1	5		5			
Molders.....	1	1		1			
Molders, apprentices.....	1	2		2			
Totals.....		36		36			
15. <i>Metal Workers, Excluding Iron, Steel, and Sheet Metal.</i> No employés considered.							
16. <i>Plumbers, Pipefitters, Etc.</i> Plumbers.....	1	2		2			
17. <i>Printing Trades.</i> Compositors.....	1	4	4				
Reporters.....	1	3	3				
Totals.....		7	7				

Individual Wages Paid in Stores and Factories in the CITY OF BAK
September 1. (Tabulated by Industries)

INDUSTRY AND OCCUPATION.	Number of Es- tablishments.	Number of Em- ployés Con- sidered.	HOURS PER DAY.				
			8	9	10	11	12
18. <i>Sheet Metal Workers.</i> No employés consid red.							
19. <i>Ship Builders, Riggers, Etc.</i> No employés considere d.							
20. <i>Soap and Candle Workers.</i> No employés considere d.							
21. <i>Store Employés.</i>							
Bookkeepers	2	3	2		1		
Cashiers	1	1	1				
Clerks office	7	9	3		6		
Drivers	8	17		3	14		
Janitors	1	1	1				
Salesmen	4	55	3	52			
Saleswomen	3	60	35	25			
Stenographers	2	3	3				
Totals		149	48	80	21		
22. <i>Structural Iron Workers.</i> No employés considere d.							
23. <i>Tannery Employés.</i> No employés considere d.							
24. <i>Textile Workers.</i> No employés considered.							
25. <i>Teamsters, Hostlers, Etc.</i>							
Stablemen	2	5			5		
26. <i>Trunks, Harness, Etc.</i> No employés considered.							
27. <i>Upholsterers, Carpet Layers, Etc.</i> No employés considere d.							
28. <i>Woodworkers.</i>							
Carriagemakers	1	1		1			
Lumber pilers	1	2	2				
Millmen	1	1	1				
Patternmakers	1	1		1			
Totals		5	3	2			
29. <i>Miscellaneous Employés.</i>							
Brickmakers	1	31			31		
Civil engineers	1	4	4				
Collectors	2	2	2				
Engineers	4	6	2	2	2		
Foremen	7	8	1	4	3		
Managers and superintendents	6	6	1	3	2		
Millers	2	4		4			
Pumpmen	3	3	2	1			
Telephone operators	1	2	2				
Watchmen	3	3	1		2		
Totals		69	15	14	40		

ERSFIELD During the Year 1906, Subsequent to April 18 and Prior to and Occupations.)—*Continued.*

WAGES PER WEEK.

Under \$3.	\$3 to \$6...	Over \$6 to \$9...	Over \$9 to \$12...	Over \$12 to \$15...	Over \$15 to \$18...	Over \$18 to \$21...	Over \$21 to \$25...	Over \$25 to \$30...	Over \$30 to \$35...	Over \$35 to \$40...	Over \$40 to \$45...	Over \$45 to \$50...	Over \$50 to \$55...	Over \$55 to \$60...	Over \$60 to \$65...	Over \$65 to \$70...	Over \$70 to \$80...	Over \$80 to \$100...
				1		2				1								
		1		1	1	4	2	1										
	1	4	3	10	7	13	10	4	2									
	13	32	5	5		1	3		1									
			1			2												
	14	37	9	28	11	23	17	2	4	4								
			4	1														
				2		1												
						1	1											
				2		2	1											
			6	10	14	1				2		1						
						2												
				2	4													
						4		2		2								
						1	3	1				1						
						1		1										
				2			1											
			2		1													
			1															
			9	15	19	10	5	4		4		2				1		

Individual Wages Paid in Stores and Factories in the TOWN OF September 1. (Tabulated by

INDUSTRY AND OCCUPATION.	Number of Es- tablishments	Number of Em- ployés Con- sidered	HOURS PER DAY.				
			8	9	10	11	12
1. <i>Bakery and Restaurant Employés.</i> No employés considered.							
2. <i>Breweries and Bottling Works.</i> No employés considered.							
3. <i>Building Trades.</i>							
Carpenters	3	32	23	9			
Carpenters, apprentices	1	4	4				
Carpenters, helpers	1	2	2				
Totals		38	29	9			
4. <i>Butcher Shop and Slaughter-house Em- ployés.</i> No employés considered.							
5. <i>Candy, Confectionery, and Sugar Workers.</i>							
Candy dippers	1	13		13			
Candymakers	1	6		6			
Candymakers, helpers	1	16		16			
Candy packers	1	17		17			
Totals		52		52			
6. <i>Cannery Employés.</i> No employés considered.							
7. <i>Cigar and Tobacco Workers.</i> No employés considered.							
8. <i>Clothing, Shoes, Etc.</i> No employés considered.							
9. <i>Dairy Employés.</i> No employés considered.							
10. <i>Electrical Workers.</i> No employés considered.							
11. <i>Glassblowers.</i> No employés considered.							
12. <i>Laborers—General.</i>							
Laborers, Chinese	3	19		5	3		11
Laborers, white	11	75		40	30		5
Totals		94		45	33		16
13. <i>Laundry Workers, Dyers, Cleaners, Etc.</i>							
Laundry workers	1	35		35			
14. <i>Machine and Repair Shops, Iron and Steel Mills.</i>							
Boilermakers	1	4		4			
Boilermakers, helpers	1	3		3			
Machinists	3	3		3			
Totals		10		10			
15. <i>Metal Workers, Excluding Iron, Steel, and Sheet Metal.</i> No employés considered.							
16. <i>Plumbers, Pipefitters, Etc.</i>							
Plumbers	1	2			2		
17. <i>Printing Trades.</i>							
Bindery girls	2	14	14				
Compositors	3	42	42				
Compositors, apprentices	1	1	1				
Editors	1	1	1				
Linotype operators	2	12	12				
Paper carriers	2	49	49				
Press feeders	3	14	14				
Pressmen	3	17	17				
Proofreaders	1	2	2				
Reporters	2	11	11				
Totals		163	163				
18. <i>Sheet Metal Workers.</i> No employés considered.							
19. <i>Ship Builders, Riggers, Etc.</i> No employés considered.							

**Individual Wages Paid in Stores and Factories in the TOWN OF
September 1. (Tabulated by Industries)**

INDUSTRY AND OCCUPATION.	Number of Es- tablishments.	Number of Em- ployés Con- sidered.	HOURS PER DAY.				
			8	9	10	11	12
20. Soap and Candle Workers.							
Soapmakers	1	2		2			
Soap factory employés, boys	1	8		8			
Soap wrappers	1	10		10			
Totals		20		20			
21. Store Employés.							
Bookkeepers	9	10	5	4	1		
Cashiers	1	1	1				
Clerks	8	13		11	2		
Salesmen	2	5		4	1		
Stenographers	5	5	1	3	1		
Totals		34	7	22	5		
22. Structural Iron Workers. No employés	considered.						
23. Tannery Employés.							
Tannery employés	1	6		6			
24. Textile Workers. No employés considered							
25. Teamsters, Hostlers, Etc.							
Teamsters	9	32	2	27	1		2
26. Trunks, Harness, Etc. No employés considered.							
27. Upholsterers, Carpet Layers, Etc. No employés considered.							
28. Woodworkers.							
Bench hands	6	10	10				
Bench hands, apprentices	3	4	1	3			
Bench hands, helpers	1	2	2				
Boxmakers	1	1		1			
Cabinetmakers	1	26		26			
Coopers	3	4		1	3		
Coopers, helpers	2	2			2		
Furniture-makers	1	5		5			
Furniture packers	1	8		8			
Lumber handlers	3	21		21			
Millhands	2	23	1	22			
Millhands, apprentices	1	7		7			
Mill helpers	5	14	14				
Planers	4	4	4				
Sawyers	5	7	7				
Stickermen	6	7	7				
Stock cutters	1	2	2				
Tallymen	3	9		9			
Woodturners	3	3	3				
Totals		159	51	103	5		
29. Miscellaneous Employés.							
Chemical-makers	1	15			10		6
Chemists	2	3		2	1		
Engineers	12	16	2	7	5		2
Firemen	1	1		1			
Foremen	9	11		8	3		
Inkmakers	1	6		6			
Managers and superintendents	9	13	5	5	2		1
Oil refiners	1	11			11		
Watchmen	4	4		3	1		
Yardmen	1	3		3			
Totals		83	7	35	33		8

BERKELEY During the Year 1906, Subsequent to April 18 and Prior to
and Occupations.)—Continued.

WAGES PER WEEK.

Under \$3	\$3 to \$6	Over \$6 to \$9	Over \$9 to \$12	Over \$12 to \$15	Over \$15 to \$18	Over \$18 to \$21	Over \$21 to \$25	Over \$25 to \$30	Over \$30 to \$35	Over \$35 to \$40	Over \$40 to \$45	Over \$45 to \$50	Over \$50 to \$55	Over \$55 to \$60	Over \$60 to \$65	Over \$65 to \$70	Over \$70 to \$80	Over \$80 to \$100
	3	5			1		1											
	6	4																
	9	9			1		1											
		2	1	4		1	1		1									
		2	2	3	2	2	2											
	1	1	1	2		4	1											
	1	5	5	9	2	7	4		1									
		1	4	1														
			2	3	22	3	1	1										
						2	5	3										
			1	3														
			1	1														
				3		1												
				3		14	9											
				3		1												
				2														
		1	1		1		1		1									
	3		3			1	1											
					10	10	3											
	7																	
	3	6	4	1		4	4	2										
					1	1	7											
		1				1	1											
				2	1	5	1											
						3												
	13	8	10	25	54	25	20	3	1									
				12	3													
				5	2	2	4	1										
				1	1													
	1		1	1	3	3	4	1	1									
						1	5	1	1	5								
			4	3	4													
			1	2	1													
			2	1														
	1		9	24	19	7	13	3	2	5								

Individual Wages Paid in Stores and Factories in the CITY OF September 1. (Tabulated by

INDUSTRY AND OCCUPATION.	Number of Es- tablishments.	Number of Em- ployés Con- sidered.	HOURS PER DAY.				
			8	9	10	11	12
1. <i>Bakery and Restaurant Employés.</i> No employés considered.							
2. <i>Breweries and Bottling Works.</i> No employés considered.							
3. <i>Building Trades Employés.</i> Carpenters	1	2		2			
4. <i>Butcher Shop and Slaughter-house Employés.</i> Meat cutters	1	5				5	
Sausage-makers	1	3				3	
Totals		8				8	
5. <i>Candy, Confectionery, and Sugar Workers.</i> No employés considered.							
6. <i>Cannery Employés.</i> No employés considered.							
7. <i>Cigar and Tobacco Workers.</i> No employés considered.							
8. <i>Clothing, Shoes, Etc.</i> No employés considered.							
9. <i>Dairy Employés.</i> No employés considered.							
10. <i>Electrical Workers.</i> No employés considered.							
11. <i>Glassblowers.</i> No employés considered.							
12. <i>Laborers—General.</i> Laborers	4	25		5	20		
13. <i>Laundry Workers, Dyers, Cleaners, Etc.</i> Laundry workers	2	48		27	21		
14. <i>Machine and Repair Shops, Iron and Steel Mills.</i> Blacksmiths	1	1		1			
Blacksmiths, helpers	1	1		1			
Draughtsmen	2	4		2	2		
Draughtsmen, apprentices	1	1		1			
Machine hands	1	6		6			
Machinists	1	24		24			
Machinists, apprentices	1	10		10			
Totals		47		45	2		
15. <i>Metal Workers, Excluding Iron, Steel, and Sheet Metal.</i> Platers and polishers	1	2		2			
16. <i>Plumbers, Pipefitters, Etc.</i> No employés considered.							
17. <i>Printing Trades.</i> Compositors	2	11	11				
Compositors, apprentices	1	2	2				
Copyholders	1	1	1				
Editors	2	2	2				
Linotype operators	2	7	7				
Mailers	1	2	2				
Paper carriers	2	22	22				
Press feeders	2	3	3				
Pressmen	3	5	5				
Pressmen, apprentices	1	4	4				
Totals		59	59				

**Individual Wages Paid in Stores and Factories in the CITY OF
September 1. (Tabulated by Industries**

INDUSTRY AND OCCUPATION.	Number of Es- tablishments.	Number of Em- ployés Con- sidered.	HOURS PER DAY.				
			8	9	10	11	12
18. <i>Sheet Metal Workers.</i> No employés considered.							
19. <i>Ship Builders, Riggers, Etc.</i> No employés considered.							
20. <i>Soap and Candle Workers.</i> No employés considered.							
21. <i>Store Employés.</i>							
Bookkeepers	9	10	4	3	3		
Cash and errand boys	4	8	4	4			
Cashiers	1	1			1		
Clerks, office	3	3	2	1			
Drivers	4	15	7	6	2		
Porters and packers	1	1		1			
Salesmen	2	2		2			
Saleswomen	4	17		17			
Totals		57	17	34	6		
22. <i>Structural Iron Workers.</i> No employés considered.							
23. <i>Tannery Employés.</i> No employés considered.							
24. <i>Textile Employés.</i> No employés considered.							
25. <i>Teamsters, Hostlers, Etc.</i> No employés considered.							
26. <i>Trunks, Harness, Etc.</i> No employés considered.							
27. <i>Upholsterers, Carpet Layers, Etc.</i>							
Carpet layers	1	1	1				
Upholsterers	1	1	1				
Totals		2	2				
28. <i>Woodworkers.</i>							
Patternmakers	1	4		4			
Patternmakers, apprentices	1	1		1			
Totals		5		5			
29. <i>Miscellaneous Employés.</i>							
Brick workers	1	19			15		4
Engineers	1	1			1		
Firemen	1	1			1		
Foremen	3	4	3		1		
Managers and superintendents	2	3	3				
Terra cotta workers	1	60			60		
Watchmen	2	2		1	1		
Totals		90	6	1	79		4

ALAMEDA During the Year 1906, Subsequent to April 18 and Prior to and Occupations.)—*Continued.*

WAGES PER WEEK.

Under \$3.	\$3 to \$6	Over \$6 to \$9	Over \$9 to \$12	Over \$12 to \$15	Over \$15 to \$18	Over \$18 to \$21	Over \$21 to \$25	Over \$25 to \$30	Over \$30 to \$35	Over \$35 to \$40	Over \$40 to \$45	Over \$45 to \$50	Over \$50 to \$55	Over \$55 to \$60	Over \$60 to \$65	Over \$65 to \$70	Over \$70 to \$80	Over \$80 to \$100
	3	3		2	1	1	3											
	1	1	1															
	1	2	1	9	2													
		1																
	10	6	1	1					1									
	15	19	3	12	3	1	3		1									
							1											
						1												
	1						3	1										
	1						3	1										
				8	8	2			1									
					1	1												
			1		1	2				1								
			30	30		1												
				1														
			31	39	10	5	3			1	1							

**Individual Wages Paid in Stores and Factories in a NUMBER OF
to April 18 and Prior to September 1.**

INDUSTRY AND OCCUPATION.	Number of Es- tablishments.	Number of Em- ployés Con- sidered.....	HOURS PER DAY.				
			8	9	10	11	12
1. Bakery and Restaurant Employés.							
Cooks.....	6	12	4	2	6		
Waitresses.....	2	7	5		2		
Totals.....		19	9	2	8		
2. Breweries and Bottling Works. No employés considered.							
3. Building Trades.							
Bricklayers.....	3	7	5		2		
Carpenters.....	5	84	14	1	69		
Carpenters, apprentices.....	2	10		10			
Carpenters, helpers.....	1	1			1		
Hodcarriers.....	1	5	5				
Painters.....	3	56	48		8		
Wharf builders.....	1	17	17				
Totals.....		180	89	11	80		
4. Butcher Shop and Slaughter-house Employés.							
Butchers.....	5	24	1	23			
Butchers, helpers.....	1	4		4			
Casing cleaners.....	1	2			2		
Coolermen.....	1	4		4			
Meat weighers.....	1	1		1			
Totals.....		35	1	32	2		
5. Candy, Confectionery, and Sugar Workers.		No employés considered.					
6. Cannery Employés.							
Canners, Chinese.....	2	77		77			
Canners, Japanese.....	3	165			165		
Canners, whites.....	6	802			802		
Cannery, boys.....	4	87		87			
Cannery, girls.....	3	51		51			
Cannery, women.....	6	2317			2317		
Fruit buyers.....	2	3			3		
Totals.....		3502		215	3287		
7. Cigar and Tobacco Workers. No employés considered.							
8. Clothing, Shoes, Etc.							
Flagmakers.....	1	18	18				
Glove cutters.....	1	39		39			
Glove cutters, apprentices.....	1	18		18			
Glove factory employés, boys.....	1	14		14			
Glove graders.....	1	3		3			
Glove layers-off.....	1	14		14			
Glove packers.....	1	3		3			
Glove stringers.....	1	3		3			
Glove trimmers.....	1	5		5			
Glove turners.....	1	3		3			
Sewing-machine operators.....	3	201		199	2		
Shirt cutters.....	1	2		2			
Shirt pressers.....	1	4		4			
Shoe bottomers.....	1	29			29		
Shoe cutters.....	1	6			6		
Shoe cutters, apprentices.....	1	8		8			
Shoe factory employés, boys.....	1	3		3			
Shoe fitters.....	1	27			27		

**Individual Wages Paid in Stores and Factories in a NUMBER OF
to April 18 and Prior to September 1. (Tabulated**

INDUSTRY AND OCCUPATION.	Number of Es- tablishments.	Number of Em- ployés Con- sidered.	HOURS PER DAY.				
			8	9	10	11	12
8. <i>Clothing, Shoes, Etc.—Continued.</i>							
Shoe labelers.....	1	1			1		
Sole leather men.....	1	14			14		
Wax threaders.....	1	11		11			
Wax threaders, apprentices.....	1	4		4			
Totals.....		430	18	333	79		
9. <i>Dairy Employés.</i> No employés considered.							
10. <i>Electrical Workers.</i>							
Electricians.....	2	5	1		4		
Electricians, apprentices.....	2	2	2				
Electricians, helpers.....	1	4	4				
Linemen.....	1	23	23				
Totals.....		34	30		4		
11. <i>Glassblowers, Etc.</i> No employés considered.							
12. <i>Laborers—General.</i>							
Laborers.....	18	972	163	439	328	41	1
13. <i>Laundry Workers, Dyers, Etc.</i>							
Laundry workers.....	3	65		65			
14. <i>Machine and Repair Shop, Iron and Steel Mills.</i>							
Blacksmiths.....	3	22	11		11		
Blacksmiths, helpers.....	2	23	13		10		
Boilermakers.....	2	52	31		21		
Boilermakers, apprentices.....	1	3	3				
Boilermakers, helpers.....	1	27	27				
Car repairers.....	1	6			6		
Casting chippers.....	1	3			3		
Draughtsmen.....	3	33	31	1	1		
Drillers.....	1	11	11				
Flange turners.....	1	4	4				
Forgers.....	1	6	6				
Foundry helpers.....	2	26	14		12		
Furnacemen.....	1	4	4				
Machine hands.....	4	36	5		8	23	
Machinists.....	6	266	250	1	15		
Machinists, apprentices.....	2	28	28				
Machinists, helpers.....	4	106	101		5		
Molders.....	1	19	19				
Molders, apprentices.....	2	5	5				
Oilers.....	3	3		1	1	1	
Riveters.....	1	5	5				
Rivet heaters.....	1	7	7				
Rolling mill employés.....	1	208			208		
Rolling mill boys.....	1	11		11			
Toolmakers.....	1	8	8				
Totals.....		922	583	14	301	24	
15. <i>Metal Workers, excluding Iron, Steel and Sheet Metal.</i>							
Brass finishers.....	1	6	6				
Coppersmiths.....	1	14	14				
Coppersmiths, helpers.....	1	7	7				
Totals.....		27	27				

**Individual Wages Paid in Stores and Factories in a NUMBER OF
to April 18 and Prior to September 1. (Tabulated**

INDUSTRY AND OCCUPATION.	Number of Es- tablishments.	Number of Em- ployés Con- sidered.	HOURS PER DAY.				
			8	9	10	11	12
16. Plumbers, Pipefitters, Etc.							
Pipefitters	4	39	12	2	25		
Pipefitters, apprentices	2	3	1	2			
Plumbers	1	2	2				
Steamfitters	1	1		1			
Steamfitters, helpers	1	1		1			
Totals		46	15	6	25		
17. Printing Trades.							
Compositors	3	4		1	2	1	
Pressmen	1	2			2		
Totals		6		1	4	1	
18. Sheet Metal Workers.							
Sheet metal workers	1	10	10				
Sheet metal workers, apprentices	1	2	2				
Sheet metal workers, helpers	1	4	4				
Tinners	1	4	4				
Tinners, helpers	1	8	8				
Totals		28	28				
19. Ship Builders, Riggers, Etc.							
Boatbuilders	1	16	16				
Boatbuilders, apprentices	1	4	4				
Boatbuilders, helpers	1	6	6				
Riggers	1	38	38				
Riggers, apprentices	1	2	2				
Sailmakers	1	20	20				
Sailmakers, apprentices	1	2	2				
Ship caulkers	1	9	9				
Ship caulkers, apprentices	1	4	4				
Ship fitters	1	20	20				
Ship fitters, apprentices	1	6	6				
Ship fitters, helpers	1	33	33				
Ship joiners	1	28	28				
Ship joiners, apprentices	1	6	6				
Ship joiners, helpers	1	7	7				
Shipkeepers	1	43	43				
Shipsmiths	1	1	1				
Shipsmiths, apprentices	1	4	4				
Shipsmiths, helpers	1	14	14				
Shipwrights	1	10	10				
Shipwrights, apprentices	1	9	9				
Shipwrights, helpers	1	5	5				
Sparmakers	1	2	2				
Totals		289	289				
20. Soap and Candle Workers. No employés		considered.					
21. Store Employés.							
Alteration hands	1	3			3		
Bookkeepers	20	30	4	11	12	1	2
Cash and office boys	3	7		7			
Cashiers	4	10			9		1
Clerks, office	20	92	66	13	13		
Drivers	14	52	12	26	12	2	
Forewomen	11	49			40	9	
Janitors	4	8	4	3	1		
Porters and packers	1	25			25		
Salesmen	5	45		1	44		
Saleswomen	4	27			27		
Stenographers	11	16	4	2	9	1	
Wrappers	2	3			3		

**Individual Wages Paid in Stores and Factories in a NUMBER OF
to April 18 and Prior to September 1. (Tabulated**

INDUSTRY AND OCCUPATION.	Number of Es- tablishments.	Number of Em- ployés Con- sidered.	HOURS PER DAY.				
			8	9	10	11	12
22. <i>Structural Iron Workers.</i> No employés considered.							
23. <i>Tannery Employés.</i>							
Fertilizer workers	2	17		11	6		
Hide preparers	1	2		2			
Wool pullers	1	4		4			
Totals		23		17	6		
24. <i>Textile Workers.</i> No employés considered.							
25. <i>Teamsters, Hostlers, Etc.</i>							
Stablemen	6	10	4	3	3		
26. <i>Trunks, Harness, Etc.</i> No employés considered.							
27. <i>Upholsterers, Carpet Layers, Etc.</i>							
Mattressmakers	1	10			10		
28. <i>Woodworkers.</i>							
Bench hands	1	8		8			
Box factory hands	1	15			15		
Box factory hands, boys	1	5		5			
Boxmakers	1	2		2			
Coopers	2	5	4	1			
Mill apprentices	1	2		2			
Millwrights	1	1			1		
Patternmakers	2	23	21		2		
Patternmakers, apprentices	1	2	2				
Planemen	3	5		1	2	2	
Sawfilers	4	4	1		1	2	
Sawyers	3	16	2		12	2	
Stickermen	1	1		1			
Tallymen	1	1				1	
Woodturners	1	1		1			
Yardmen	2	6		5		1	
Totals		97	30	26	33	8	
29. <i>Miscellaneous Employés.</i>							
Beatermen in felt mills	1	2				2	
Beatermen helpers in felt mills	1	6				6	
Bench tenders in felt mills	1	2				2	
Brickmakers	1	125		125			
Engineers	17	51	9	11	24	7	
Errand boys	1	20	20				
Firemen	9	39	19	4	12	3	1
Foremen	19	98	16	8	65	9	
Lead burners	2	11			11		
Managers and superintendents	17	26	2	11	10	1	2
Oil-still men	3	6				2	4
Oil treaters	1	2		2			
Paint mixers	1	16					16
Paint labelers	1	10					10
Powder workers	2	105			105		
Powder makers, apprentices	1	15		15			
Pulp mill workers	1	6			6		
Rag cutters in felt mills	1	2		2			
Rag cutters helpers in felt mills	1	4		4			
Reel tenders in felt mills	1	2				2	
Telephone operators	2	2		2			
Timekeepers	5	6		1	5		
Warehousemen	9	41		1	36	3	1
Watchmen	9	12		3	8		1
Totals		609	66	189	282	37	35

SMALLER TOWNS OF THE STATE During the Year 1906, Subsequent by Industries and Occupations.)—*Continued.*

WAGES PER WEEK.

Under \$3.	\$3 to \$6.	Over \$6 to \$9.	Over \$9 to \$12.	Over \$12 to \$15.	Over \$15 to \$18.	Over \$18 to \$21.	Over \$21 to \$25.	Over \$25 to \$30.	Over \$30 to \$35.	Over \$35 to \$40.	Over \$40 to \$45.	Over \$45 to \$50.	Over \$50 to \$55.	Over \$55 to \$60.	Over \$60 to \$65.	Over \$65 to \$70.	Over \$70 to \$80.	Over \$80 to \$100.
			8	9			1											
			4	1														
			12	10		1												
				7	2	1												
4	2	4																
						7	1											
		5	4	8	2		1											
		1			1			1										
		1	1			3	18	2										
1				3	2		1	3										
				5	9		1	1										
				1			1											
			2	4			1											
1	8	7	21	14	13	25	8											
					2													
			6															
			12	107	4	2												
			1	2	14	17	9	2	4									
5	15																	
		3	11	20	3	2												
		4	1	11	11	19	11	18	11	1								
			5	2	1	4	3	6	4	5	3							
					1													
				2		4	2											
			11	5														
3	6		1															
	28	14	37	5	7	11	2	1										
		2	3	9	1													
			6															
			2															
			4															
			2															
		1		1														
			1	1	1	1	2											
		12	18	7	1	2												
			1	7	2													
8	66	82	206	69	54	51	18	29	15	6	5							

Any detailed analysis of these wage statistics is impossible, since the date for filing this report has already passed. It was hoped to make this work exhaustive, but having only a few months for collection and compilation, on account of destruction of records, further elucidation is impossible. It will serve to show the wage conditions existing in the State at this time and will be invaluable for comparative purposes in future reports. No such work has ever been attempted by this Bureau, and the entire subject had to be taken up from the beginning.

GOLD MINES.

The information contained in the accompanying table has been obtained from the records of fifty gold mines, embracing a territory reaching from Shasta to Mojave. In many instances the mines were visited and the figures were copied directly from the payrolls. Superintendents, foremen, and miners were interviewed, the official records being verified to such an extent that, while this report is in no sense to be considered as a census of gold mining in this State, it can be accepted as conclusive evidence of the hours and wages prevailing in this industry. While gold mines only are considered, in several instances silver and copper are included with the more precious metal.

There is considerable difference in the manner of designating the several vocations in the different mines. For instance: The larger properties will enumerate amalgamators and concentrators, while smaller plants will use one term or the other only. Miners, machinemmen, and compressormen are all to be found on the rolls of the larger mines; others will show miners only; muckers and carmen will appear separately, and in the next instance are coupled together; the same holds good with timbermen and mine carpenters. So that many of these branches of this industry might be merged together in this report, but it has been thought best to tabulate the information exactly in the form in which it was obtained.

A notable feature of this industry is the absence of women, children, and Orientals. No other field of labor is so completely in the hands of adult white males.

LUMBER WOODS AND SAWMILLS.

The information contained in the accompanying table has been obtained from thirty-nine separate establishments in the lumber industry. In several instances a personal visit was made to lumber camps and sawmills, and a general knowledge of actual conditions obtained, after which a circular letter, accompanied by a blank form, requesting figures from official records, was sent out, with excellent results.

The establishments included in this table are very representative, and are spread all over a territory reaching from the Siskiyou Mountains, on the Oregon border, to the southern line of the great sugar-pine belt of the Sierras, together with the great redwood territory included in Humboldt, Mendocino, and Santa Cruz counties.

As in the gold mines investigation, there appears great diversity of occupation, and so far as possible the tabulation is in exact accord with the information obtained—the larger establishments classifying their help under all divisions of labor; smaller plants apparently condensing several similar skilled occupations together, and using the term "laborer" for much of the infinite variety of the unskilled.

The wages are generally quoted on a monthly basis. In some instances, however, they are given by the hour. Great care has been taken to work out uniform results without affecting the individual accuracy. In some cases the wages paid include board. The general method, however, is to quote regular wage rates and state amount charged for board, when provided.

Twenty-eight camps quote rates charged for board, as follows: One \$25 per month, one \$22.50 per month, eight \$20 per month, five \$18 per month, ten \$15 per month, three \$12 per month. With some exceptions, it may be accepted as a general rule that the higher rates are charged in the more distant camps, where supplies are scarce and high and where better wages are paid.

In some of the camps a regular village system is maintained, the lumber companies' building houses, providing a water system and electric light plant, and all other essentials of similar character. One of the most complete equipments visited has 300 cottages rented to families, rents running from \$4 to \$15 per month, the majority being \$8 to \$10; in every house a bathtub, all of porcelain, excepting the \$4 cottages, where enameled zinc is substituted. Electric lights and plenty of mountain water piped in house and yard are included for the rent. An excellent club house has been constructed for the use of the employés, and the company donated the club's members \$500 last year toward a Fourth of July entertainment. While a splendidly equipped general store is maintained, it is positively understood that every one is at perfect liberty to trade elsewhere. This particular establishment is mentioned at this length as representative of those firms that take an active interest in the comfort and well-being of their employés, and evidence is abundant that such methods are becoming more the rule and not the exception.

There is another type of lumber camps, however, where but little attention is paid to either comfort or health.

Wages and Hours of Employees in Lumber Woods and Sawmills, California, 1906.

Occupation.	Number of Es- tablishments.	Number of Em- ployees	HOURS PER DAY, WITH NUMBER OF EM- PLOYEES UNDER EACH DIVISION.				WAGES PER MONTH																			
			8 to 9	9 to 10	10 to 11	11 to 12	\$30 and Under	\$35	\$40	\$45	\$50	\$55	\$60	\$65	\$70	\$75	\$80	\$90	\$100	\$110	\$120	\$130	\$140	\$150	\$170 and Over.	
Foremen	39	118		80	38										1	11	7	5	12	16	10	33	8	9	1	5
Millwrights	18	32		24	7	1									1	3	4	2	2	13	2	4				
Sawyers	30	143		127	15	1									59	5	13	7	3	4	1	21	3	3	5	3
Settlers	25	42		23	18	1									5	3	1	17	12							
Diggers	20	54		38	16										24	1			2							
Offbearers	24	64		42	22										7	2			3							
Edgemen	28	47		31	13	3									4	3	8		12	5	2					
Mill helpers	21	459		272	186	1		107	85	34	88	32	42	40	21	21	10									
Oilers	12	21		18	3			1		3	2	1	3	3	2	6	1	1	8	7						
Blacksmiths	24	37		23	14										3	1	1	1	1	10			1			
Engineers	32	138		58	79	1					5	7	19	12	15	18	12	12	20	16	8		4	2		
Firemen	24	92		52	40				3	3	7	15	7	14	16	8	16	2	2	1						
Trainmen	17	68		24	44				1		7	3	3	3	9	2	11	23	2		7					
Laborers	37	1,820		1,278	518	24		37	38	243	670	352	306	111	43	3	3	5		12						
Donkeymen	19	138		84	54				1	2	11	22	2	2	2	2	1	2	7	3	1	1	1	1	9	9
Filers	19	45		36	9							2	2	2	2	3		5	3	1	1	1	1	1		
Tallymen	15	34		28	6					1	1	2	1	5	1	4	6	6								
Timekeepers	18	25		19	6																					
Teamsters	30	178		108	60	10		1	2	15	12	11	13	3	12	2	1	20	18				1			
Carpenters	14	97		56	41					4					12	2		36	5							
Swampers	30	409		232	151	26		20		2	33	53	103	101	54	9	17	33	33	5	3					
Fallers	26	187		107	70	10		7		7		15	16	14	56	32	36	4								
Bucksawyers	16	169		105	64				6		1	22	22	21	28	18	1									
Loaders	16	78		41	37			3	2			9	12	2	9	6	17	14								
Spooltenders	14	52		31	21				1			6	21			3	12	1								
Barnmen	11	33		28	5							7	12			7										
Cooks	30	95		69	34	1				5		16	12	13	19	5	2	4	3							
Waiters	15	48		30	18				14	1	9			5	1											
Hooktenders	13	60		46	14					1		1	11	3	5	2	18		3	4	3	8				
Graders	17	89		77	12				3		5	5	35	1	3	4	24	6		1	1	1	1			
Clerks	16	59		48	10	1					2	4	5	6	8	12	4		2	2		4	1			
Mis'laneous help	16	171		102	69			1				14	61	20	24	7	19	10		3	7	1		1		
Totals		5,102		3,328	1,694	80		20	190	166	309	925	634	754	589	435	210	375	182	124	45	75	20	17	15	17

* 3 Chinese. † 2 Chinese—cooks and waiters boarded in addition.

FACTORY INSPECTION.

In addition to the wage investigation, a parallel inquiry was prosecuted into sanitary condition of stores and factories, juvenile and female employés, etc. Under this the establishments from which wage statistics have been secured are included, as well as a number of additional concerns. The tables on factory inspection will not, therefore, correspond exactly to the wage tables, as regards number of employés and establishments, and no attempt has been made to adhere to the twenty-nine divisions followed in the other tables.

In San Francisco the employés are listed under two divisions—"Store employés" and "Factory employés."

Age and Sex of Employees and Sanitary Condition of Workrooms in Factories in San Francisco.

Industry.	Number of Estab-lishments	Number of Em-ployés	ADULTS.		MINORS UNDER 16 YRS.		MINORS 16 TO 18 YEARS		PERCENTAGE.		SANITATION.		
			Males	Females	Males	Females	Males	Females	Adult Fe-males	Minors	Good	Fair	Bad
Bakeries	9	273	257	16					5.8	0.0	8	1	
Barbers	3	20	20						0.0	0.0	3		
Boatbuilders	4	54	52				2		0.0	3.7	4		
Boots and shoes	2	302	176	68	15	9	15	19	22.5	19.2	2		
Boxes, wood	2	179	158	1			20		0.5	11.1	2		
Breweries, etc.	8	323	314	2			7		0.6	2.1	8		
Butchers and packers	9	166	164				2		0.0	1.2	7	2	
Can factories	3	544	305	102	50	16	32	39	18.6	25.1	3		
Canneries	4	1086	337	612	9	53	16	59	56.3	12.6	3		1
Clothing	7	437	43	379	1	1	1	12	86.7	3.4	6	1	
Confectioners	10	128	42	72	1		5	8	56.2	10.9	8	1	1
Coopers	5	322	256	36	3		27		11.1	9.3	5		
Dairy produce	3	173	163	10					5.8	0.0	2	1	
Drugs and chemicals	4	84	82	1			1		1.2	1.2	4		
Dyers and cleaners	2	214	87	120				7	56.0	3.2	2		
Fertilizers	3	115	115						0.0	0.0	2	1	
Furniture and fixtures	8	340	303	18	5		12	2	5.2	5.5	7		1
Furriers	3	36	13	20	1		2		5.5	8.3	2		1
Glass manufacturing	2	941	789	66	9	1	45	31	7.0	9.1	2		
Hardw're and plumbing	7	896	758	119	12		7		13.2	2.1	7		
Laundries	21	744	333	400	1		1	9	53.7	1.4	20		1
Lumber and milling	21	881	854	19		1	7		2.2	0.9	21		
Machinery and iron	25	4545	4380	37	11		117		0.8	2.8	24	1	
Millinery	15	124	1	104	1		1	17	83.8	15.3	13	1	1
Printers	12	350	235	85	3	3	13	11	24.2	8.6	9	1	2
Restaurants	9	221	175	44			2		19.9	0.9	5	3	1
Sheet met'l and cornices	9	348	336	3			9		0.8	2.5	9		
Soap	6	83	63	19			1		22.9	1.2	3	1	2
Stone and granite	3	173	170				3		0.0	1.7	3		
Tailors	7	70	45	14	6	1	3	1	20.0	15.7	3	2	2
Tanneries	12	467	460	2	2		3		0.4	1.1	8	4	
Trunks and bags	3	128	82	23	4	2	15	2	17.9	17.9	3		
Miscellaneous	13	600	466	64	11	11	27	21	10.6	11.6	13		
Totals	254	15367	12034	2456	145	98	396	238	15.9	5.7	221	20	13

Age and Sex of Employes and Sanitary Condition of Stores in San Francisco.

Establishment.	Number of Stores.	Number of Em- ployés.....	ADULTS.		MINORS UNDER 16 YRS.		MINORS 16 TO 18 YEARS.		PERCENTAGE.		SANITATION.		
			Males.....	Females.....	Males.....	Females.....	Males.....	Females.....	Adult Fe- males.....	Minors.....	Good.....	Fair.....	Bad.....
Clothing stores	43	751	259	416	30	10	25	11	55.4	10.1	33	4	6
Dry goods and depart- ment stores	10	1,880	602	949	38	124	34	133	50.4	17.4	10	-----	-----
Shoe stores	6	100	85	9	3	-----	3	-----	9.0	6.0	4	-----	2
Totals	59	2,731	946	1,374	71	134	62	144	50.3	15.1	47	4	8

Fifty-nine stores with 2,731 employés are considered, of which number 946, or 34.6 per cent, are adult males, 1,374, or 50.3 per cent, adult females, and 411, or 15.1 per cent, minors of both sexes under 18 years of age.

In the 254 factories inspected there were 15,367 employés, about 80 per cent of whom are adult males, 15.9 per cent adult females, and 5.7 per cent minors under 18.

The sanitation of a factory is considered bad when it is dangerous to health or some sanitary law is violated. One of the commonest omissions on the part of employers is failure to furnish toilets in sufficient number when both sexes are employed. The law requires, in such cases, that the toilets be separate and distinct and plainly labeled.

Of the 59 stores inspected, 47 were in good sanitary condition, 4 fair, and 8, or 13.5 per cent, bad. In the factories, 221 were good, 20 fair, and 13 bad, representing 5.1 per cent.

Age and Sex of Employes and Sanitary Condition of Workrooms in Stores and Factories in Oakland.

Industry.	Number of Establishments.	Number of Employes.	ADULTS.		MINORS UNDER 16 YRS.		MINORS 16 to 18 YEARS.		PERCENTAGE.		SANITATION.		
			Males	Females	Males	Females	Males	Females	Adult Females	Minors	Good	Fair	Bad
Bakers and confectioners	13	265	159	104	1		1		39.2	0.7	11		2
Breweries and bottling	6	77	75	1			1		1.3	1.3	6		
Boatbuilders	2	195	188	1			6		0.5	0.3	2		
Canners and can factory	6	1202	553	559	22	46	22		45.6	7.4	3	1	2
Carriages and wagons	2	38	38						0.0	0.0	2		
Cigars and tobacco	2	11	9	2					1.8	0.0	2		
Clothing man'facturing	11	195	135	46	6	1	7		23.5	7.1	7	4	
Dairies	5	66	53	13					19.8	0.0	5		
Dry goods stores	7	899	249	449	101	13	35	52	50.0	22.3	5	1	1
Flour mills	3	43	26	17					39.5	0.0	3		
Hardw're and plumbers	10	228	217	11					4.8	0.0	9		1
Harnessmakers	3	13	13						0.0	0.0	3		
Ice manufacturing	2	13	12	1					7.7	0.0	2		
Laundries	9	507	187	311	1		1	7	61.3	1.7	7	1	1
Machine shops	9	351	336	7	1		7		2.0	2.2	9		
Mantels and tiles	3	26	24	2					7.6	0.0	3		
Mattress manufact'g	2	26	24	1			1		3.9	3.9	1	1	
Meat retailers	8	177	151	7	15		4		3.9	10.7	8		
Millinery stores	8	88		84			1	3	95.4	4.6	7	1	
Paint shops	5	115	111	3			1		2.6	0.8	3	2	
Planing mills	18	1137	993	7	37		100		0.6	12.0	17	1	
Potteries	2	51	51						0.0	0.0	2		
Printers	8	313	212	85			11	5	27.1	5.1	6	1	1
Shoe stores	4	51	49	1			1		1.9	1.9	3	1	
Tents and awnings	2	66	29	22	6	9			33.3	22.7	2		
Miscellaneous	12	893	369	319	64	75	24	42	35.7	22.9	11	1	
Totals	162	7046	4263	2053	254	144	223	109	29.1	10.3	139	15	8

The table shows 162 establishments inspected in Oakland, employing 7,046 people, of whom 2,053, or 29.1 per cent, are women, and 730, or 10.3 per cent, are minors under 18 years of age. Of the 899 employes in stores, 449, or 50 per cent, are adult females, and 201, or 22.3 per cent, minors under 18.

The sanitation was good in 139 instances, fair in 15, and bad in 8, or 4.9 per cent.

Age and Sex of Employes and Sanitary Condition of Workrooms in Stores and Factories in Los Angeles.

Industry.	Number of Establishments	Number of Employes	ADULTS.		MINORS UNDER 16 YRS.		MINORS 16 TO 18 YEARS.		PERCENTAGE.		SANITATION.		
			Males	Females	Males	Females	Males	Females	Adult Females	Minors	Good	Fair	Bad
Bakers and confectioners	8	472	279	176			6	11	37.3	3.6	7		1
Breweries	4	235	231	2			2		0.8	0.8	4		
Canners and packers	2	648	270	302	25	45	3	3	46.3	11.7	2		
Carriage manufacturing	1	5	5								1		
Cigar manufacturing	3	107	68	20	3	6	6	4	18.7	17.8	3		
Clothing	5	238	43	179	1		1	14	75.2	6.5	5		
Cooperage	1	22	17	1	2		2		4.5	18.1	1		
Cornices	3	21	21								3		
Dry goods and department stores	6	2458	856	1268	80	118	50	86	51.6	13.6	6		
Fixtures, gas and electric	1	46	40	2	1		3		4.3	8.7	1		
Glove manufacturing	1	15	6	9					60.0		1		
Grocery	1	192	131	44	2		12	3	22.6	8.8	1		
Harness manufacturing	4	84	72	4	1		7		4.7	9.5	4		
Laundries	7	852	318	503	6	8	2	15	59.0	3.8	6	1	
Machine shops	8	728	705	9	1		12	1	1.2	1.9	8		
Planing mills	3	170	164	4			2		2.3	1.2	3		
Printers	7	152	94	32	3		13	10	21.0	17.1	7		
Restaurants	3	106	84	21	1				19.8	0.9	1	1	1
Sash and door manufacturing	3	75	71	4					5.3		3		
Tents and awnings	2	151	91	58			2		38.0	1.3	2		
Miscellaneous	5	75	48	19			5	3	25.3	10.6	3		2
Totals	78	6852	3614	2657	126	177	128	150	38.7	8.6	72	2	4

Seventy-eight stores and factories were inspected in Los Angeles with 3,852 employes. Of these, 2,657, or 38.7 per cent, are women, and 581, or 8.6 per cent, minors under 18 years of age. Of the 2,458 store employes, 1,268, or 51.6 per cent, are women, and 334, or 13.6 per cent, are minors under 18.

This shows a higher per cent of women, both in stores and factories, than in San Francisco, and the per cent of minors is lower than in Oakland, both in stores and factories, and is higher than in San Francisco, for factories and stores alike.

As regards sanitation, 72 of the 78 establishments are good, 2 fair, and only 4, representing 5.1 per cent, bad.

Age and Sex of Employes and Sanitary Condition of Workrooms in Stores and Factories in San Jose.

Industry.	Number of Establishments	Number of Employes	ADULTS.		MINORS UNDER 16 YRS.		MINORS 16 TO 18 YEARS.		PERCENTAGE.		SANITATION.		
			Males	Females	Males	Females	Males	Females	Adult Females	Minors	Good	Fair	Bad
Bakeries and confectioneries	6	103	67	30			5	1	29.1	5.8	5	1	
Barbers	3	16	16						0.0	0.0	3		
Breweries	3	106	106						0.0	0.0	3		
Butchers	3	33	27	3	1		2		9.1	9.1	1	2	
Canneries	3	1369	216	996	9	62	19	67	71.3	9.1	2	1	
Cigar manufacturing	3	18	14	3			1		16.6	5.5	2	1	
Cloaks and suits	2	23		22	1				95.7	4.3			
Dry goods stores	4	192	85	99	4		4		51.5	4.1	3		1
Furniture stores	2	34	32	2					5.8	0.0	2		
Granite and marble works	2	21	20				1		0.0	5.1	2		
Hardware	3	68	65	1			2		1.4	2.9	2		1
Laundries	7	158	66	92					58.2	0.0	5	1	1
Machine shops	4	92	86	1	1		4		1.1	4.3	4		
Millinery stores	2	12		12					100.0	0.0	2		
Painters and paperhangers	2	123	117	2			4		1.6	3.2	1		1
Planing mills	4	220	199	3	1		17		1.3	8.1	4		
Printers	3	18	8	6	2		2		33.3	22.2	2	1	
Restaurants	2	20	16	4					25.0	0.0	1		1
Shoe stores	2	10	8		2				0.0	20.0	2		
Miscellaneous	8	152	80	60			5	7	39.4	7.8	5	2	1
Totals	68	2788	1228	1336	21	62	66	75	47.9	8.0	53	9	6

The table shows data on 68 establishments, employing 2,788 people, of which number 1,336, or 47.9 per cent, are adult females, and 224, or 8 per cent, minors under 18. The four stores considered employ 192 persons, and 99 of these, representing 51.5 per cent, are women, and 8, or 4.1 per cent, minors under 18.

The sanitation is good in 53 instances, fair in 9, and bad in 6, or 8.8 per cent.

Age and Sex of Employes and Sanitary Condition of Workrooms in Stores and Factories in Sacramento.

Industry.	Number of Establishments	Number of Employes	ADULTS.		MINORS UNDER 16 YRS.		MINORS 16 TO 18 YEARS.		PERCENTAGE.		SANITATION.		
			Males	Females	Males	Females	Males	Females	Adult Females	Minors	Good	Fair	Bad
Bakeries and confectioneries	4	85	36	44	1		2	2	51.7	5.8	2		2
Blacksmiths	2	6	6						0.0	0.0	2		
Breweries	2	184	178				6		0.0	3.2	2		
Canners and packers	3	985	381	443	31	49	20	61	44.9	16.3	3		
Carriage and wagon makers	3	14	14						0.0	0.0	3		
Cigarmakers	4	54	41	13					24.0	0.0	2	1	1
Foundries	4	107	103		1		3		0.0	3.7	3	1	
Garmentmakers	4	42	35	6			1		14.2	2.3	3	1	
Laundries	3	183	65	117			1		63.9	0.5	3		
Livery stables	2	11	11						0.0	0.0	2		
Printers	5	130	107	14	2		3	4	10.7	6.9	4	1	
Retail stores	4	211	86	109	4	5	1	6	53.9	7.9	3	1	
Wholesale jobbers	2	75	55	18			2		24.0	2.6	2		
Miscellaneous	5	174	161	7	1		5		4.0	3.5	5		
Totals	47	2,261	1,279	771	40	54	43	74	34.1	9.3	39	5	3

The Sacramento inspection covers 47 establishments, employing 2,261 people, and 771 of these are women and 202 minors under 18, representing 34.1 per cent and 9.3 per cent respectively. In the stores 53.9 per cent are women, and about 8 per cent minors under 18 years.

The sanitation is fair in 5 instances, and bad in 3, representing 6.4 per cent.

Age and Sex of Employes and Sanitary Condition of Workrooms in Stores and Factories in Stockton.

Industry.	Number of Establishments	Number of Employes	ADULTS.		MINORS UNDER 16 YRS.		MINORS 16 TO 18 YEARS.		PERCENTAGE.		SANITATION.		
			Males	Females	Males	Females	Males	Females	Adult Females	Minors	Good	Fair	Bad
Butchers	2	47	47								2		
Candy stores	2	12	8	3	1				25.0	8.3	1		1
Canneries	1	282	85	90	14	52	8	33	31.9	37.9		1	
Clothing stores	5	118	43	58	7		10		49.0	8.4	4		1
Drug stores	2	20	14	1			5		5.0	25.0	2		
Dry goods stores	3	164	79	66	4		12	3	40.2	11.6	3		
Flour mills	3	160	138	22					13.7		3		
Furniture stores	2	31	26	4			1		12.9	9.7	2		
Hardware	3	64	59	2	1		2		3.1	4.7	3		
Harness	2	11	10				1			9.0	2		
Laundries	2	99	33	62			4		62.6	4.0	2		
Lumber mills	4	77	74	2			1		2.5	1.2	4		
Printers	4	116	109	5			2		4.3	1.7	4		
Tailors	2	22	15	5	2				22.8	9.0	2		
Telegraph offices	2	10	4	1	1		4		10.0	50.0	2		
Machine shops	10	503	474	9	3		17		1.8	3.9	10		
Miscellaneous	7	136	122	13		1			9.5	0.7	6	1	
Totals	56	1,872	1,340	343	33	53	63	40	18.3	10.1	52	2	2

Fifty-six concerns, employing 1,872 people, were investigated in Stockton. Of these employes, 343, or 18.3 per cent, are women, and 189, or 10.1 per cent, are minors.

But 2 of the factories were in bad sanitary condition, 2 were fair, and 52 good.

Age and Sex of Employes and Sanitary Condition of Workrooms in Stores and Factories in Fresno.

Industry.	Number of Establishments	Number of Employes	ADULTS.		MINORS UNDER 16 YRS.		MINORS 16 TO 18 YEARS.		PERCENTAGE.		SANITATION.		
			Males	Females	Males	Females	Males	Females	Adult Females	Minors	Good	Fair	Bad
Bakeries	5	40	35	5					12.5	0.0	4	1	
Breweries and bottling	3	39	39						0.0	0.0	3		
Blacksmiths	12	6	6						0.0	0.0	12		
Canneries	3	1,029	255	617	25	51	20	61	59.9	15.2	2	1	
Ice manufacturing	2	39	39						0.0	0.0	2		
Laundries	2	55	27	28					50.9	0.0	2		
Machine shops	4	69	66	1			2		1.4	2.9	4		
Planing mills	2	157	137	1	19				0.6	12.1	2		
Printing	2	73	70	3					4.1	0.0	2		
Retail stores	6	274	163	79	16	9	3	4	25.2	11.7	4	2	
Miscellaneous	6	75	74	1					1.3	0.0	6		
Totals	37	1,856	911	735	60	60	25	65	39.6	11.3	33	4	

In Fresno, 1,856 employes, representing 37 establishments, are considered. Of these, 735 are women and 210 minors under 18 years of age, representing 39.6 and 11.3 per cent respectively.

No concerns were unsanitary and 4 were in fair condition.

Age and Sex of Employes and Sanitary Condition of Workrooms in Stores and Factories in Eleven Smaller Cities and Towns of the State, for Selected Industries.

Industry.	Number of Establishments	Number of Employes	ADULTS.		MINORS UNDER 16 YRS.		MINORS 16 TO 18 YEARS.		PERCENTAGE.		SANITATION.		
			Males	Females	Males	Females	Males	Females	Adult Females	Minors	Good	Fair	Bad
Brickyards	3	205	205						0.0	0.0	3		
Clothing and shoe manufacturing	4	440	164	192	18	10	20	36	43.6	19.0	2	2	
Fruit canneries	14	4022	991	2282	145	238	121	245	56.7	18.6	11	3	
General merchandise	5	110	65	35	4		5	1	31.8	9.0	5		
Machine shops	3	1848	1757	19	20		52		1.0	3.8	3		
Meats	7	100	97	1			2		1.0	2.0	5	2	
Oils and paints	3	150	141	1	2		6		0.6	5.3	2	1	
Planing mills	4	202	189		3		10		0.0	6.4	4		
Powder works	12	875	792	48			30	5	5.6	4.0	2		
Steam laundries	3	78	22	49			4	3	62.8	0.9	2	1	
Tanneries	2	23	21	2					8.7	0.0	1	1	
Totals	50	8053	4444	2629	192	248	250	290	32.6	12.1	40	10	

This table represents several localities throughout the State, no one of which furnishes data sufficient for separate tabulation. The fruit canneries constitute a large percentage of the employes, totaling a little less than 50 per cent of the entire number. Of these, 56.7 per cent are women and 18.6 per cent are children. In this group as a whole 32.6 per cent are women and 12.1 per cent children.

**Age and Sex of Employes and Sanitary Condition of Workrooms in Stores and Factories,
Summarized for Different Localities of the State.**

City.	Number of Estab- lishments.	Number of Em- ployes.	ADULTS.		MINORS UNDER 16 YRS.		MINORS 16 TO 18 YRS.		PERCENTAGE.		SANITATION.		
			Males	Females	Males	Females	Males	Females	Adult Em- ployes.	Minors	Good	Fair	Bad
San Francisco	313	18098	12980	3830	216	232	458	382	21.1	7.1	268	24	21
Oakland	162	7046	4263	2053	254	144	223	109	29.1	10.3	139	15	8
Los Angeles	78	6852	3614	2657	126	177	128	150	38.7	8.6	72	2	4
San José	68	2788	1228	1336	21	62	66	75	47.9	8.0	53	9	6
Sacramento	47	2261	1279	771	40	54	43	74	34.1	9.3	39	5	3
Stockton	56	1872	1340	343	33	53	63	40	18.3	10.1	52	2	2
Fresno	37	1856	911	735	25	65	60	60	39.6	11.3	33	4	---
Miscellaneous	50	8053	4444	2629	192	248	250	290	32.6	12.1	40	10	---
Totals	811	48826	30059	14354	907	1035	1291	1180	29.4	9.0	696	71	44

The total number of establishments from which this data is collected is 811, employing 48,826 persons. Men employes represent 30,059, or about 62 per cent; women, 14,354, or 29.4 per cent; and minors under 18, 4,413, or 9 per cent. San Francisco has the smallest percentage of women employes with the exception of Stockton, and the smallest percentage of children employes of any locality considered. We shall deal with this point more fully when discussing child labor in general.

Of the 811 establishments inspected, the sanitation was satisfactory in 696 instances, fair in 71, and bad in 44, representing 5.4 per cent of the entire number.

CHILD LABOR.

At the 1905 session of the Legislature the present Child Labor Law was passed. A copy of the enactment is printed elsewhere in this report. It provides that no child under 14 years of age shall be employed except under two circumstances: the one during the regular vacation of the public schools, and the other during the sickness of the parent on a certificate of the Judge of the Juvenile Court allowing the exemption. It also provides that no minor under 18 years shall be employed more than nine hours a day. All minors between 14 and 16 years must be provided with age and schooling certificates, which must be kept on file by the employer. The general enforcement of this law is put upon the Bureau of Labor Statistics.

Immediately upon the passage of the enactment, this office communicated with every county and city superintendent of schools in the State, apprising them of the requirements of the law, and soliciting their aid in bringing the matter to the attention of the different school principals in their several jurisdictions. With one or two exceptions this aid was cheerfully given. A like coöperation was had from the parochial schools. The newspapers throughout the State were likewise ready to assist, in the neighborhood of fifty of them publishing the law, and many commenting favorably upon it. Nine thousand copies of the law were widely distributed.

At the expiration of sixty days—the time between the passage of the law and its going into effect—its provisions were well known from one end of the State to the other, and the necessary blanks were in the hands of the proper officers for its enforcement. The different school principals have been careful, in the main, that no certificates were issued except to children rightly entitled to them, and the Juvenile Courts have used extreme care in issuing the permits for children between 12 and 14 years of age to work during the illness of their parents.

As vacations approached, blank forms for the vacation permits were prepared and sent throughout the State, and, as far as possible, employers notified of the vacation exemption so that they might avail themselves of the numerous school children between the ages of 12 and 14, who were eligible, under the law, for employment. Employers have ordinarily observed the law's requirements. The restriction of the number of hours minors under 18 years may work, to nine hours per day, has met with the most opposition, and this provision has been hardest to enforce.

For the first five months after the law went into effect no arrests were made for its violation. In September, 1905, the first arrest was made. This was followed by others, and altogether eight people have been brought before the court in San Francisco, two in Oakland, and six in Los Angeles. Most of these resulted in convictions, but appeals followed, based on the unconstitutionality of the law. Habeas corpus proceedings in San Francisco led to a decision in the Superior Court upholding the law. Thence the case was taken to the Supreme Court, and that tribunal, on July 9th of the present year, in *Ex parte Spencer*, declared the enactment constitutional in every particular. All the work of prosecuting these cases was performed by this Bureau, even to the brief for the Supreme Court.

In enforcing this enactment, the agents of this Bureau have visited more than 2,000 different establishments, employing 100,000 people. Of this total employment, more than 11,000 are minors under 18 years of age, and of these minors over 2,500 are boys and nearly 3,000 are girls between the ages of 14 and 16 years.

These results were obtained from data collected prior to April 18th, and were incorporated in an article written before that date. Since then a large amount of additional information on child labor has been secured in the regular factory inspection, and the tables under that head show the results.

In the 811 establishments from which this data was collected, there were 907 male and 1,035 female employés under 16 years of age, and 1,291 male and 1,180 female employés between the ages of 16 and 18 years, making a total of 4,413, representing a little over 9 per cent of the total employés of all ages.

Number and Percentage of Minors in Six Leading Industries in Different Sections of the State.

Locality.	STORES.				CANNERIES.				LAUNDRIES.			
	Total Num- ber Em- ployés	14 to 16 Years	16 to 18 Years	Per cent Minors	Total Num- ber Em- ployés	14 to 16 Years	16 to 18 Years	Per cent Minors	Total Num- ber Em- ployés	14 to 16 Years	16 to 18 Years	Per cent Minors
San Francisco	2731	205	206	15.1	1086	62	75	12.4	744	1	10	1.4
Oakland	899	114	87	22.2	1202	68	22	7.4	507	1	8	1.7
Los Angeles	2458	198	136	13.6	648	70	6	11.7	852	14	17	3.6
San José	192	4	4	4.1	1369	71	87	11.4	158			0.0
Sacramento	202	9	7	7.9	985	80	61	14.3	183		1	0.5
Stockton	164	4	15	11.5	282	66	41	37.9	99		4	4.0
Fresno	274	7	25	11.7	1029	81	76	15.2	55			0.0
Miscellaneous localities	110	4	6	9.0	4022	383	366	18.6	78		7	8.9

Locality.	CAN AND GLASS FACTORIES.				CLOTHING AND SHOES.				IRON TRADES.			
	Total Num- ber Em- ployés	14 to 16 Years	16 to 18 Years	Per cent Minors	Total Num- ber Em- ployés	14 to 16 Years	16 to 18 Years	Per cent Minors	Total Num- ber Em- ployés	14 to 16 Years	16 to 18 Years	Per cent Minors
San Francisco	1485	76	147	15.0	739	26	47	9.9	4545	11	141	3.3
Oakland	208	11	19	14.4	195	7	7	7.1	351	1	7	2.2
Los Angeles	None	con	sid	ered.	238	2	14	6.5	728	1	13	1.9
San José	None	con	sid	ered.	23	1		4.3	92	1	4	5.4
Sacramento	None	con	sid	ered.	42		1	2.3	107	1	3	3.7
Stockton	None	con	sid	ered.	138	9	10	13.7	503	3	17	3.9
Fresno	None	con	sid	ered.	None	con	sid	ered.	69	2	1	4.3
Miscellaneous localities	None	con	sid	ered.	440	28	56	19.0	1848	20	52	3.8

This table deals with six important industries represented in the investigation. In stores the percentage of employés who are minors under 18 years of age varies from 4.1 per cent in San José to 22.2 per cent in Oakland. San Francisco and Los Angeles have practically the same, the former having 12.4 per cent and the latter 11.7 per cent.

Canneries show the greatest percentage of youthful employés, the average per cent being about 15. A great many of these are vacation employés. Laundries show very little child labor, and the iron trades employ mostly boys between 16 and 18 years of age when minor help is used, and many of these are apprentices. Data from can and glass factories is presented from San Francisco and Oakland only, and show approximately 15 per cent minor help.

Unfortunately no data had been collected by this Bureau prior to the present investigation, dealing with child labor. The Eleventh Report, page 88, deals with Federal census figures on child labor for this State as compared to the nation as a whole. There it is shown that child labor is on the increase in California as in the rest of the United States. In 1905 the Federal census of manufactories was made, and in the introduction to that report mention is made of the fact that during the years from 1900 to 1905 there had been a decrease of 14.1 per cent in the number of children employed. This decrease, in the face of the uniform increase in the years previous, is unquestionably due to the enforcement of the present Child Labor Law.

EMPLOYMENT AGENCIES.

The Legislature of 1903 passed a law putting certain restrictions on employment agencies, parts of which were declared unconstitutional in *Ex parte Dickey*. To remedy these defects, at the last session the law was reenacted and the faulty sections either amended or stricken out. This law makes it the duty of the Labor Commissioner to exercise certain jurisdiction over all employment agencies. During the past year the most important agencies throughout the State have been required to submit their books for inspection, and the following tables are compiled from a part of the data obtained:

Wages and Occupations of Female Persons Sent Out at Various Times From Employment Agencies in San Francisco in 1906, in Selected Occupations.

Occupation.	Number Hired	WAGES PER MONTH.						
		\$15.00	\$20.00	\$25.00	\$30.00	\$35.00	\$40.00	\$55.00
Chambermaids	8			4	3			1
Cooks	10			1	5	1	2	1
Housegirls	3		1		2			
Housework, general	7	1	3	1	2			
Ironers	2					2		
Laundry workers	2				1	1		
Linen girls	1			1				
Nurse	1					1		
Waitress	14			14				

Number Hired.

Occupation.	Number Hired.	\$1.00...	\$1.125...	\$1.50...	\$1.60...	\$1.70...	\$2.00	\$2.25	\$2.50	\$2.75	\$3.00	\$3.25	\$3.50	\$3.75	\$4.00	\$4.50	\$7.00...	\$15.00...	\$20.00...	\$25.00	\$30.00...	\$35.00	\$40.00...	\$45.00...	\$50.00...	\$55.00...	\$60.00...	\$65.00...
Bakers	2																							1				
Bedmakers	1																											
Blacksmiths	7										2	4								1				1				
Blacksmiths' helpers	4						1	2															1					
Boilermakers	3								2			3																
Boxmakers	2																											
Brickmasons	5															4	1											
Bushelman	1										1																	
Carloader	1																									1		
Carpenters	74						2		2		2	3	37	25	3							1	2				10	
Cooks	21						8																					
Distributors	2								21																			
Drillers, rock	21																											
Engineer	1																											
Factory hands	11			9			2																					
Farm help	62	2	35	22																			2				1	
Foremen	2													1	1													
Foundry help	4						4																					
Harnessmaker	1									1																		
Horseshoers	2												2															
Kitchen help	12																											
Laborers, general	483						131	333	10																			
Laborers, railroad	277						23	217	11																			
Machinists	7										1	4	2															
Miners	15								6	5	4																	
Painters	1										1																	
Sawmill help	27						6	3																	1	6		
Stablemen	5																		1									
Teamsters	84			1			4	24	53	5													1					
Tunnelmen	5																											
Waiters	36																											
Woodmen	2								2																			

Wages and Occupations of Persons Sent Out at Various Times from Employment Agencies in Los Angeles in 1906, in Selected Occupations.

Occupation.	Number Hired ...	WAGES PER DAY.										WAGES PER MONTH.									
		\$1.25...	\$1.50...	\$2.00...	\$2.20...	\$2.25...	\$2.50...	\$3.00...	\$3.50...	\$3.75...	\$4.50...	\$5.00...	\$15.00...	\$20.00...	\$25.00...	\$30.00...	\$35.00...	\$40.00...	\$45.00...	\$50.00...	\$80.00...
Baker	1							1										1			
Beeman	1																			1	
Blacksmiths	6							2													
Brickmasons	3																				
Carpenters	41							16	24	1											
Cleaners (dye works)	4						4														
Cooks	11															3	2	2	1	3	
Concrete finishers	5																				
Concrete turners	5						5														
Corral boss	1																				
Cowherder	1																			1	
Dishwasher	1															1		1			
Engineers	1							1													
Farm help	2																				
Gravedigger	26	1	4																		
Laborers, general	1			1																	
Laborers, railroad	265		203		17	45										13	6	2			
Lumber pilers	55		14	41		2															
Milkers	9			7																	
Miners	3																				
Painters	15						7	8								1	1	1			
Plasterers	6			1			2	2													
Sack sewer	1							1													
Sander	1																				
Sash and door cutter	1									1											
Stablemen	1																				
Teamsters	4			1											2						
Tinner	16	3	6					5								1	1	1			
Tinner	1																				
Waiters	2																	1			
Watchman	1																				1

Occupation.	Number Hired	WAGES PER DAY.					WAGES PER MONTH.		
		\$1.25	\$1.50	\$2.00	\$2.25	\$2.50	\$4.00	\$30.00	\$40.00
Carpenter	1						1		
Laborers	24				24				
Miners	29		8	5		16			
Ranch hands	3	2	1						
Teamsters	2	1							
Wages and Occupations of Persons Sent Out at Various Times from Employment Agencies in Fresno in 1906, in Selected Occupations.									
Ranch hands	32							17	10
									5

Data from Six Japanese Employment Agency Records in San Francisco from September 1 to 15, 1906.

Occupation.	Number Hired	WAGES PER WEEK.										WAGES PER MONTH.													
		\$1.00	\$2.00	\$2.50	\$3.00	\$5.00	\$6.00	\$7.00	\$8.00	\$9.00	\$10.00	\$11.00	\$12.00	\$14.00	\$15.00	\$18.00	\$20.00	\$25.00	\$30.00	\$35.00	\$40.00	\$45.00	\$50.00	\$60.00	\$65.00
Bedmaker	1																	1	2	9	6	3	3	2	1
Cooks*	45									6	3					2		1	4						
Cooks' helpers	9							3		1								1							
Cook and servant (man and wife).	4																								
Dishwashers	17									9	3							3	1	1					
Gardeners	1																								
House servants.	16					1	2		2	2							1	1	6	1					
Janitors	1																								
Laundry help	3																								
Pantrymen	3											1													
Porters	14								1	2	3	1	1	1					2	2	1				
Schoolboy servants	10	1	2	5	2																				
Waiters	18						2	2											9	5					

*4 Chinese.

Thirty of the above were sent to the interior and 112 to positions in San Francisco. Japanese employment agents charge a uniform rate of 10 per cent of the first month's wages. All agree that help is very scarce and that Japanese returning from the fisheries and the interior will not go to work until their money is spent. Sixty per cent of Japanese sent out to places work two or three days and quit.

These tables are submitted merely to show the tendencies in wages paid the class of unorganized labor securing positions from employment agencies.

As close a supervision has been kept over these institutions as has been possible, and considerable money has been returned to employés who have been imposed upon by unscrupulous agents, in accordance with the amendment to the employment agency law requiring the return of fees and expenses to persons sent out to work under misrepresentation of conditions.

The "registration system" was formerly in use among many agencies. Under this scheme people were persuaded to pay a fee for the privilege of having their name registered for a future position which most often never came. This Bureau has fought against that practice and it is no longer so prevalent. A great number of employment agencies, however, are corrupt, and take advantage of workmen on every occasion possible. A more rigid supervision is certainly desirable, and it is believed many abuses could be corrected were the license committees of the municipalities more stringent in requiring honesty in the agencies under their several jurisdictions.

Cases in abundance have been brought to the attention of this office where innocent workmen have been sent even as far as Arizona and Nevada in search of jobs that never existed, and it seems to be the rule in many agencies to exaggerate the desirability of positions, in order the more readily to get the fee.

STRIKES AND LOCKOUTS.

The twelfth division of section three of the Act creating this Bureau provides that all information in relation to labor which the Commissioner may deem essential to further the object sought to be obtained by this statute, shall be collected and submitted in the biennial report. Strikes and industrial disturbances are of very great importance, and an investigation was begun into this subject immediately after the present administration took charge of this Bureau. A great deal of data had been collected prior to April 18, when our records were all destroyed by fire. Fortunately, the National Bureau of Labor was prosecuting an inquiry along the same line, and this Bureau had been working in conjunction with the agents of the Federal Bureau to a considerable degree. Through the courtesy of Commissioner Neill, the information collected on strikes and lockouts in California from January 1, 1901, to December 31, 1905, was put at our disposal, and the table following is compiled from this data:

Strikes Occurring in California During the Five Years Ending **Number of Peo**

Year and Occupation.	Locality.	Cause or Object.	Ordered by Labor Organizations.	ESTABLISHMENTS AFFECTED.		
				Total	Closed	Not Closed
1901.						
Hop pickers	Sacramento	For increase of wages	No ..	1		1
Bakers	San Francisco	Sympathy with striking waiters.	Yes ..	20	20	
Bakers	Fresno	Reduction of hours and increase of wages.	Yes ..	1		1
Bakers	San Diego	Increase of wages	Yes ..	4		4
Carpenters	San Francisco	Against use of material from non-union establishments.	Yes ..	1		1
Painters	San José	For adoption of union-shop system.	Yes ..	6	6	
Plumbers	San Diego	Demand that no apprentices be employed in any establishments.	Yes ..	10		10
Plasterers	San Francisco	For discharge of non-union hodcarriers.	Yes ..	1		1
All employés of building trades.	Fresno	For 8-hour day instead of 9-hour, and increase of wages.	Yes ..	5		5
Plumbers	Stockton	Against order of employers that plumbers must furnish fire-pots, sticks, and dies.	Yes ..	7		7
All employés of building trades.	Los Angeles ..	Increase in pay for laborers from \$2.00 to \$2.50 per day.	No ..	1	1	
Painters	Oakland	For increase of wages	Yes ..	42		42
Painters	San Francisco	For increase of wages	Yes ..	133	133	
Steam fitters	Pasadena	Against rule of employers that workmen living in Los Angeles must be in Pasadena before 8 A. M. and leave after 5 P. M.	Yes ..	1		1
Packers (raisin)	Fresno	For increase of wages	Yes ..	1		1
Carriage and wagon workers.	San Francisco ..	For increase of wages, decrease of hours, and union shop.	Yes ..	24	24	
Garment workers	Los Angeles ..	Difference of opinion concerning terms of agreement.	Yes ..	2	2	
Dressmakers	Santa Barbara ..	For reinstatement of discharged employés.	Yes ..	1		1
Cooks and waiters	San Francisco ..	For increase of wages, reduction of hours from 13 to 10 per day, and union shop.	Yes ..	184	184	
Boilermakers	San Francisco ..	For reduction of hours from 9 to 8.	No ..	1		1
Boilermakers	S. Bernardino ..	For reinstatement of discharged employés.	No ..	1		1
Longshoremen	Oakland	Against reduction, wages	No ..	1		1
Teamsters	San Francisco ..	For increase of wages, reduction of hours, and against boarding-house system.	Yes ..	35	35	
Stevedores	Stockton	For increase of wages and adoption of union rules.	Yes ..	6		6

December 31, 1905, Showing Cause, Duration, Outcome, and
ple Involved.

Date of Beginning	Date of Ending	DAYS' DURATION.		Number on Whose Account Under-taken	NUMBER OF EMPLOYEES STRIKING.			NO. OF EMPLOYEES THROWN OUT OF EMPLOYMENT.			Violation of Agreement	Successful
		Aggregate	Average		Males	Females	Total	Males	Females	Total		
Aug. 29	Aug. 31	2	---	600	30	---	30	30	---	30	No	No
May 8	July 10	1,260	63	1,550	118	---	118	118	---	118	No	No
Aug. 31	Sept. 7	7	---	2	2	---	2	2	---	2	No	No
Nov. 20	Dec. 3	52	13	19	19	---	19	19	---	19	No	Yes
Jan. 10	Jan. 12	2	---	14	14	---	14	14	---	14	No	Yes
Feb. 16	Feb. 25	54	9	106	92	---	92	106	---	106	No	Yes
May 27	June 24	280	28	30	30	---	30	30	---	30	No	Yes
May 30	June 3	4	---	5	5	---	5	18	---	18	No	Partly
June 24	July 29	154	30	15	15	---	15	15	---	15	No	Yes
June 29	Aug. 12	308	44	34	34	---	34	34	---	34	No	Yes
July 1	July 2	1	---	22	64	---	64	64	---	64	No	Yes
Aug. 5	Aug. 26	882	21	520	450	---	450	450	---	450	No	Yes
Aug. 5	Aug. 26	2,793	21	880	880	---	880	880	---	880	No	Yes
Aug. 28	Sept. 4	7	---	6	6	---	6	6	---	6	No	No
Aug. 17	Aug. 20	3	---	85	85	---	85	85	---	85	No	Yes
May 8	May 24	384	16	450	450	---	450	450	---	450	No	Partly
Jan. 21	Jan. 26	10	5	190	19	171	190	19	171	190	No	Yes
Apr. 8	Apr. 15	7	---	8	8	---	8	8	---	8	No	No
May 1	Sept. 2	22,816	124	1,550	1,070	480	1,550	1,070	480	1,550	No	No
May 7	May 8	1	---	20	20	---	20	20	---	20	No	No
Sept. 17	Nov. 18	62	---	2	30	---	30	30	---	30	No	No
Jan. 22	Jan. 29	7	---	15	15	---	15	15	---	15	No	No
Feb. 18	Mar. 11	735	21	650	650	---	650	650	---	650	No	Yes
July 6	July 13	42	7	100	100	---	100	100	---	100	No	Partly

Strikes Occurring in California During the Five Years Ending Number of People

Year and Occupation.	Locality.	Cause or Object.	Ordered by Labor Organizations.....	ESTABLISH- MENTS AFFECTED.		
				Total	Closed.....	Not Closed.
1901.—Continued.						
Teamsters	San Francisco, Oakland and Port Costa.	Sympathy with locked-out teamsters, and to defend right to organize.	Yes.	210	210	---
Grain handlers	Oakland	For pay for overtime	No..	1	---	1
Machinists	S. F., Oakland, and vicinity.	For reduction of hours—10 to 9.	Yes.	106	---	106
Harnessmakers	San Francisco	Against rule requiring men to be in shop ten minutes before starting time.	No..	1	---	1
Laundry workers	Los Angeles...	For union shop and time and a half for overtime.	Yes.	6	---	6
Laundry workers	San Francisco	For reduction of hours ..	Yes.	1	1	---
Laundry workers	San José	For adoption of union-shop system.	Yes.	3	3	---
Tanners	San Francisco	Against receiving hides from non-union teamsters.	No..	1	1	---
Tanners	San Francisco	For unionizing of shop..	Yes.	1	1	---
Engravers	San Francisco	For discharge of non-union engraver.	No..	1	1	---
Metal polish's and buffers	San Francisco	For reduction of hours ..	Yes.	9	---	9
Woodworkers	Los Angeles...	For reduction of hours and recognition of union.	Yes.	2	---	2
Piledrivers	San Francisco	For discharge of two non-union employés.	No..	1	---	1
Laborers, cordage works.	San Francisco	For increase of wages ..	No..	1	---	1
Coppersmiths	San Francisco	Against working with imported foreigners at lower wages, and for regulation of apprentice's.	No..	1	---	1
Iron ship fitters	San Francisco	Against the introduction of piecework system.	Yes.	1	---	1
Ship painters	San Francisco	For increase of wages ..	Yes.	1	1	---
Butchers	San Francisco and Oakland.	To compel employers to display union shop card.	Yes.	319	---	319
Stonecutters	San Francisco	For weekly instead of semi-monthly payday.	No..	1	1	---
Cement workers	Los Angeles...	For increase of wages ..	Yes.	4	4	---
Totals for year 1901.....				1,160	629	531
1902.						
Bakery employés	San Francisco	For adoption of union shop system and against being compelled to board with employers.	Yes.	1	1	---
Bakers	San Diego	Reduction of hours	Yes.	4	---	4
Boot and shoe workers ..	San Francisco	For reinstatement of discharged employés and increase in wages.	Yes.	1	1	---
Carpenters and painters.	Los Angeles ..	Against use of material from establishment where strike was pending.	No..	1	---	1

December 31, 1905, Showing Cause, Duration, Outcome, and Involved.—Continued.

Date of Beginning	Date of Ending	DAYS' DURATION.		Number on Whose Account Under-taken	NUMBER OF EMPLOYEES STRIKING.			NO. OF EMPLOYEES THROWN OUT OF EMPLOYMENT.			Violation of Agreement	Successful
		Aggregate	Average		Males	Females	Total	Males	Females	Total		
July 30	Oct. 3	13,650	65	1,600	9,500	---	9,500	12,000	---	12,000	No	No
Sept. 2	Sept. 5	3	---	20	20	---	20	20	---	20	No	Yes
May 20	Mar. 6, '02	30,740	290	4,322	4,322	---	4,322	4,322	---	4,322	No	Partly
Jan. 21	Jan. 25	4	---	15	15	---	15	15	---	15	No	Yes
July 1	Dec. 30	456	76	345	97	248	345	97	248	345	No	No
Jan. 10	Jan. 17	7	---	11	4	7	11	4	7	11	No	Yes
June 24	Aug. 5	126	42	136	52	84	136	52	84	136	No	Yes
Aug. 12	Aug. 13	1	---	25	25	---	25	25	---	25	No	No
Nov. 15	Nov. 22	7	---	150	150	---	150	175	---	175	No	No
June 17	June 24	7	---	7	7	---	7	8	---	8	No	Yes
Apr. 1	July 11	909	101	52	52	---	52	52	---	52	No	No
Nov. 1	Feb. 3, '02	131	65	106	106	---	106	106	---	106	No	No
Nov. 26	Nov. 27	1	---	8	8	---	8	8	---	8	No	No
Apr. 18	Apr. 19	1	---	92	92	---	92	92	---	92	No	No
Mar. 13	Apr. 3	21	---	8	15	---	15	15	---	15	No	No
Mar. 23	Apr. 5	13	---	160	160	---	160	225	---	225	No	No
May 13	May 27	14	---	76	76	---	76	76	---	76	No	Yes
June 12	June 17	1,595	5	1,100	1,100	---	1,100	1,100	---	1,100	No	No
June 1	June 5	4	---	72	72	---	72	72	---	72	No	Yes
July 1	July 5	16	4	50	50	---	50	50	---	50	No	Yes
-----	-----	77,579	694	15,228	20,036	1083	21,119	22,654	1083	23,737	-----	-----
July 13	July 14	1	---	12	8	4	12	8	4	12	No	Yes
Sept. 10	Sept. 13	12	3	19	19	---	19	19	---	19	No	Yes
Nov. 1	Nov. 15	14	---	31	125	75	200	125	75	200	No	Yes
Jan. 16	Jan. 17	1	---	14	14	---	14	14	---	14	No	No

Strikes Occurring in California During the Five Years Ending Number of People

Year and Occupation.	Locality.	Cause or Object.	Ordered by Labor Organizations.....	ESTABLISHMENTS AFFECTED.		
				Total	Closed	Not Closed
1902.—Continued.						
Carpenters	Fresno	Against working with non-union men.	Yes ..	1		1
Carpenters	Los Angeles ..	Against use of material from non-union establishment.	Yes ..	1		1
Carpenters and painters ..	Sacramento ..	Against agreement to work for members of Employers' Association only.	Yes ..	28		28
Carpenters	Vallejo	For minimum wage of \$4.00 per day.	Yes ..	2	2	
Carpenters	Los Angeles ..	For discharge of non-union employé.	No ..	1		1
Plumbers	Santa Barbara ..	For increase of wages.	Yes ..	3	1	2
Carp'nters and br'klay'rs ..	Bakersfield ..	Against working with non-union carpenter.	Yes ..	1	1	
Plasterers	San Francisco ..	Against agreement which prevents materialmen from furnishing material to establishments not members of Masters' Association.	Yes ..	28	28	
Carpenters	Los Angeles ..	For discharge of non-union employés.	Yes ..	1		1
Hodcarriers	Los Angeles ..	For increase of wages.	Yes ..	1		1
Hodcarriers	Stanford University.	For increase of wages.	Yes ..	1		1
Plumbers	Petaluma	For adoption of union-shop system.	Yes ..	1		1
Packing-house laborers and packers.	Fresno	For increase in wages.	Yes ..	1		1
Cooks and waiters	Sacramento ..	For union-shop system; against employment of Chinese; for increase of wages and reduction of hours.	Yes ..	15		15
Waiters and dishwashers ..	Oakland	Increase of wages and union shop.	Yes ..	1		1
Electrical workers	Los Angeles ..	For discharge of non-union employés.	Yes ..	1		1
Boilermakers	S. Bernardino ..	For reinstatement of discharged employés.	Yes ..	1		1
Boilermakers	S. Bernardino ..	For reinstatement of discharged employés.	Yes ..	2		2
Boilermakers	S. Bernardino ..	For increase in wages and reinstatement of discharged employés.	Yes ..	2		2
Molders	Los Angeles ..	For reduction of hours and extra pay for overtime.	Yes ..	12		12
Patternmakers	Los Angeles ..	For increase in wages.	No ..	1		1
Stevedores	San Francisco ..	For increase in wages.	No ..	1	1	
Delivery drivers	San Francisco ..	For adoption of union-shop rules.	Yes ..	1		1
Upholsterers	Los Angeles ..	For reduction of hours.	Yes ..	3		3
Glassblowers' helpers ..	San Francisco ..	For reinstatement of discharged employés.	No ..	1		1

December 31, 1905, Showing Cause, Duration, Outcome, and Involved.—Continued.

Date of Beginning	Date of Ending	DAYS' DURATION.		Number on Whose Account Under-taken	NUMBER OF EMPLOYEES STRIKING.			NO. OF EMPLOYEES THROWN OUT OF EMPLOYMENT.			Violation of Agreement	Successful
		Aggregate	Average		Males	Females	Total	Males	Females	Total		
April 18	May 9	21	----	25	25	----	25	25	----	25	No..	No
May 2	May 3	1	----	35	35	----	35	35	----	35	No..	Yes
May 15	June 9	700	25	350	250	----	250	250	----	250	No..	Yes
June 3	June 23	23	11	25	18	----	18	38	----	38	No..	Yes
June 17	June 19	2	----	12	12	----	12	12	----	12	No..	No
July 1	July 3	6	2	20	20	----	20	20	----	20	No..	Yes
July 14	July 21	7	----	25	25	----	25	40	----	40	No..	Yes
Aug. 19	Aug. 21	56	2	248	248	----	248	248	----	248	No..	Yes
Aug. 20	Nov. 24	96	----	18	18	----	18	18	----	18	No..	No
Sept. 8	Sept. 9	1	----	8	16	----	16	16	----	16	No..	No
Sept. 26	Sept. 27	1	----	15	15	----	15	30	----	30	No..	Yes
Oct. 27	Dec. 1	35	----	6	2	----	2	3	----	3	No..	Yes
Oct. 10	Oct. 16	6	----	150	150	200	350	150	200	350	No..	Partly
June 2	Aug. 4	943	63	210	52	----	52	52	----	52	No..	No
June 3	June 4	1	----	18	15	----	15	15	----	15	No..	Partly
Dec. 5	Dec. 12	7	----	10	10	----	10	10	----	10	No..	Partly
Jan. 6	Feb. 17	42	----	2	25	----	25	25	----	25	No..	No
May 6	May 29	6	3	80	80	----	80	80	----	80	No..	Yes
May 29	Aug. 5	136	68	62	62	----	62	62	----	62	No..	Partly
Sept. 1	Sept. 10	108	9	104	104	----	104	104	----	104	No..	Partly
July 7	July 28	21	----	6	6	----	6	6	----	6	No..	No
Nov. 11	Nov. 13	2	----	21	21	----	21	34	----	34	No..	Yes
Dec. 12	Dec. 13	1	----	66	66	----	66	66	----	66	No..	No
Nov. 26	Jan. 2, '03	73	24	68	68	----	68	68	----	68	No..	No
Oct. 17	Oct. 18	1	----	3	25	----	25	25	----	25	No..	No

Strikes Occurring in California' During the Five Years Ending **Number of People**

Year and Occupation.	Locality.	Cause or Object.	Ordered by Labor Organizations	ESTABLISHMENTS AFFECTED.		
				Total.	Closed.	Not Closed.
1902.—Continued.						
Harness and saddle workers.	San Francisco	Increase in wages and reduction in hours.	Yes	4	4	
Capmakers	San Francisco	For increase in wages ...	Yes	1		1
Laundry workers	San José and Santa Clara.	For increase of wages and abolition of boarding.	Yes	4	4	
Laundry workers	Fresno	To compel employers to sign union contract.	Yes	4	3	1
Tannery employés	San Francisco	For increase of wages ...	Yes	1	1	
Tanners	San Francisco	For reduction of hours, limitation of amount of work done, and union-shop system.	Yes	17	16	1
Miners and smelters	Keswick	For adoption of union-shop system.	Yes	1	1	
Paper bag and box m'k'rs	San Francisco	For increase of wages ...	Yes	4	4	
Planing mill employés ..	San Francisco	For increase of wages, abolition of piecework, and union shop.	Yes	5	5	
Woodworkers	Los Angeles ..	For discharge of non-union employés.	Yes	1		1
Bookbinders	San Francisco	For increase of wages ...	Yes	6		6
Railroad laborers	Alameda	For increase of wages ...	No	1		
Railroad laborers	Fresno	For reduction of hours ...	No	1	1	
Ditch and cement w'k'rs	Orange	For increase of wages ...	No	1	1	
Section hands	Stockton	For reduction of hours ...	No	1		1
Stonecutters	San Francisco	For increase of wages ...	Yes	6	6	
Molders (iron)	Newark	For increase of wages ...	Yes	1	1	
Conductors and motor-men.	San Francisco	For reinstatement of discharged employé.	Yes	1	1	
Conductors and gripmen	San Francisco	In sympathy with strike elsewhere.	No	1	1	
Messengerboys	San Francisco	For increase of wages and uniform hours.	No	1		1
Messengerboys	Oakland	For increase of wages ...	No	1		1
Messengerboys	San José	For increase of wages ...	No	1		1
Messengerboys	Oakland	For increase of wages ...	No	1		
Boilermaker riveters ..	Bakersfield ..	For increase of wages and board.	No	1	1	
Cigarmakers	Alameda	To compel employer to pay fine to union.	Yes	1	1	
Sailors	San Francisco	For increase of wages for overtime.	No	1	1	
Sugar workers	San Francisco	For reinstatement of discharged union employés and to forestall action against the union.	No	1	1	
Packing-house laborers and packers.	Fresno	For reinstatement of employés involved in former strike.	Yes	1		1
Totals for year 1902				188	88	100
1903.						
Blacksmiths, etc.	Stockton	For reduction of hours, limitation of number of apprentices, and against employment of non-union men.	Yes	2		2

December 31, 1905, Showing Cause, Duration, Outcome, and Involved.—*Continued.*

Date of Beginning	Date of Ending	DAYS' DURATION		Number on Whose Account Under-taken	NUMBER OF EMPLOYEES STRIKING			NO. OF EMPLOYEES THROWN OUT OF EMPLOYMENT			Violation of Agreement	Successful
		Aggregate	Average		Males	Females	Total	Males	Females	Total		
April 11	April 28	68	17	137	137	....	137	137	....	137	No..	Yes
Oct. 15	Nov. 5	21	...	53	33	20	53	33	20	53	No..	Yes
June 2	June 3	4	1	170	68	102	170	68	102	170	No..	Yes
Aug. 5	Sept. 15	164	41	45	19	26	45	39	33	72	No..	Yes
May 9	May 19	10	...	48	48	....	48	48	....	48	No..	Yes
Aug. 1	Jan. 15, '03	2,255	132	690	690	....	690	710	....	710	No..	Partly
Nov. 21	Feb. 2, '03	73	....	600	600	...	600	600	....	600	No..	No
Nov. 25	Dec. 9	56	14	229	51	178	229	51	178	229	No..	Yes
Apr. 21	Apr. 28	35	7	474	474	....	474	474	....	474	No..	Yes
Apr. 2	Apr. 25	3	....	12	12	....	12	12	..	12	No..	No
Dec. 22	Dec. 24	12	2	228	228	....	228	228	....	228	No..	Yes
Apr. 15	Apr. 16	1	....	100	75	....	75	75	....	75	No..	No
May 30	June 2	3	....	100	100	....	100	125	....	125	No..	No
July 30	July 31	1	....	25	25	....	25	25	....	25	No..	Yes
Apr. 21	Apr. 22	1	....	20	20	....	20	21	....	21	No..	Yes
Aug. 26	Sept. 8	33	5	165	165	....	165	165	....	165	No..	Yes
July 10	Aug. 15	36	....	35	35	....	35	68	....	68	No..	Partly
Apr. 19	Apr. 27	8	....	6	1,420	....	1,420	1,968	....	1,968	No..	Yes
Apr. 20	Apr. 25	5	....	6	65	....	65	90	....	90	No..	Yes
Aug. 8	Aug. 13	5	....	105	105	....	105	105	...	105	No..	Partly
Aug. 14	Aug. 18	4	...	6	6	....	6	6	....	6	No..	No
Aug. 21	Aug. 27	6	...	4	4	...	4	4	...	4	No..	No
Sept. 6	Sept. 8	2	...	6	6	...	6	6	...	6	No..	No
May 30	June 3	4	....	30	30	....	30	30	....	30	No..	Partly
Apr. 15	May 8	23	....	6	6	...	6	7	...	7	No..	Yes
June 26	June 27	1	....	16	16	....	16	35	....	35	No..	Yes
Dec. 9	Dec. 10	1	....	8	420	...	420	450	....	450	No..	Yes
Oct. 18	Oct. 23	5	....	50	150	90	240	150	90	240	No..	No
.....	.....	5,173	429	5,037	6,542	695	7,237	7,328	702	8,030		
Feb. 25	Mar. 4	14	7	130	130	....	130	170	....	170	No..	Partly

Strikes Occurring in California During the Five Years Ending **Number of People**

Year and Occupation.	Locality.	Cause or Object.	Organized by Labor Organizations.	ESTABLISHMENTS AFFECTED.		
				Total.	Closed.	Not Closed.
1903.—Continued.						
Bakers	San Francisco	For increase of wages and abolition of night-work	Yes.	3	3	—
Bakery employés	San Francisco	Against working seven days per week.	Yes.	20	20	—
Shoe cutters	San Francisco	For discharge of employés not in good standing with union.	No..	1	—	1
Shoe stitchers	San Francisco	For reinstatement of discharged employés.	No..	1	—	1
Shoemakers	Napa	For adoption of union-shop system and discharge of non-union employés.	Yes.	1	1	—
Bricklayers and hodcar's	San Francisco	For increase of wages	Yes.	23	23	—
Plumbers, painters, etc.	San Diego	To compel employers to join union in order to work and for discharge of non-union employés.	Yes.	39	—	39
Carpenters	Riverside	For increase of wages from \$3.00 to \$3.50.	Yes.	1	—	1
Cornice workers	Los Angeles ..	Against rule requiring employés to report ten minutes early and to furnish certain tools.	Yes.	8	—	8
Plumbers and carpenters	San José	For discharge of non-union employé.	Yes.	1	1	—
Pipe fitters	Oakland	Against working with non-union men.	No..	1	—	1
Carpenters	Los Angeles ..	For minimum rate of \$3.50 per day.	Yes.	1	—	1
Structural iron workers	Los Angeles ..	For increase of wages and discharge of non-union men.	Yes.	1	—	1
Cornicemakers	San Francisco	For increase of wages	Yes.	10	—	10
Tile setters' helpers	San Francisco	For increase of wages	Yes.	7	—	7
Plumbers	Fresno	To compel employers to join employés' union.	Yes.	5	—	5
Painters	Santa Barb'ra.	Against working with employés of another establishment in which strike was pending.	Yes.	1	—	1
Plumbers	Santa Barb'ra.	Against use of material from non-union establishment.	Yes.	1	1	—
Carpenters	Santa Barb'ra.	Against working with men employed by firm having a strike.	Yes.	1	1	—
Bricklayers	Pomona	For increase of wages	No..	1	—	1
Building laborers	San Francisco	For increase of wages	No..	1	—	1
Carpenters	Los Angeles ..	Against discharge of employé.	Yes.	1	—	1
Fishermen	Bl'k Diamond, Vallejo and Benicia.	For increase of wages	Yes.	4	4	—
Fishermen	Benicia	Against reduction of wages.	Yes.	4	4	—
Carshop employés	San Francisco	For reinstatement of discharged employé.	Yes.	1	—	1

December 31, 1905, Showing Cause, Duration, Outcome, and Involved.—*Continued.*

Date of Beginning	Date of Ending	DAYS' DURATION.		Number on Whose Account taken	NUMBER OF EMPLOYEES STRIKING.			NO. OF EMPLOYEES THROWN OUT OF EMPLOYMENT.			Violation of Agreement	Successful
		Aggregate	Average		Males	Females	Total	Males	Females	Total		
Oct. 31	Nov. 7	21	7	24	24	—	24	40	—	40	No	Yes
Nov. 16	Nov. 18	40	2	142	142	—	142	142	—	142	No	No
Mar. 9	Mar. 10	1	—	35	35	—	35	35	—	35	No	No
Aug. 18	Sept. 1	14	—	2	—	15	15	—	15	15	Yes	No
Oct. 5	Oct. 26	21	—	74	60	—	60	75	—	75	No	No
Jan. 5	Feb. 23	1,127	49	350	350	—	350	350	—	350	No	Yes
Jan. 2	May 1	4,251	109	216	216	—	216	216	—	216	No	Partly
Jan. 16	Jan. 23	7	—	25	25	—	25	25	—	25	No	No
Feb. 26	Apr. 6	207	—	59	59	—	59	59	—	59	No	No
Aug. 15	Aug. 17	2	—	30	30	—	30	40	—	40	No	Yes
Mar. 23	Mar. 25	2	—	4	4	—	4	4	—	4	No	No
Apr. 10	Apr. 14	4	—	10	10	—	10	10	—	10	No	No
Apr. 22	July 1	70	—	10	10	—	10	10	—	10	No	No
Aug. 3	Sept. 14	420	42	90	90	—	90	90	—	90	No	Yes
Aug. 14	Aug. 19	35	5	70	70	—	70	70	—	70	No	Yes
Aug. 20	Sept. 3	70	14	20	20	—	20	20	—	20	No	Yes
Aug. 29	Sept. 28	30	—	12	12	—	12	12	—	12	No	No
Aug. 29	Oct. 15	47	—	15	15	—	15	15	—	15	No	No
Sept. 15	Nov. 16	62	—	20	20	—	20	20	—	20	No	No
Sept. 24	Sept. 25	1	—	3	3	—	3	12	—	12	No	No
Nov. 25	Nov. 26	1	—	9	9	—	9	9	—	9	No	No
Nov. 26	Nov. 27	1	—	15	15	—	15	15	—	15	No	No
Apr. 30	May 4	16	4	1,000	1,000	—	1,000	1,250	—	1,250	No	Yes
Aug. 1	Aug. 31	120	30	1,000	1,000	—	1,000	1,250	—	1,250	No	No
Sept. 17	Oct. 1	14	—	1	200	—	200	200	—	200	No	No

Strikes Occurring in California During the Five Years Ending Number of People

Year and Occupation.	Locality.	Cause or Object.	Ordered by Labor Organizations.....	ESTABLISHMENTS AFFECTED.		
				Total	Closed	Not Closed
1903.—Continued.						
Tailors	Stockton	For increase of wages and recognition of union.	Yes ..	10	10	....
Tailors	Los Angeles ..	For increase of wages	Yes ..	1	1	....
Cloakmakers	San Francisco ..	For reduction of hours	Yes ..	8	6	2
Coal mine laborers	Elsinore	For increase of wages	No ..	1	....	1
Waitresses	Redding	For discharge of objectionable employé.	No ..	1	....	1
Bartenders	Bakersfield ..	For a uniform day of ten hours.	Yes ..	30	....	30
Cooks and waiters	Stockton	Against use of material from boycotted establishment.	Yes ..	11	....	11
Dishwashers, cooks, waiters and bartenders.	San Francisco ..	For increase of wages and against working seven days per week.	No ..	1	....	1
Electrical workers	Los Angeles ..	Against discharge of union employés.	No ..	1	....	1
Electrical workers	Los Angeles ..	For increase in wages, limitation of number of apprentices, and recognition of union.	Yes ..	5	....	5
Linemen	Los Angeles ..	For increase in wages, recognition of union, and against employment of non-union men.	Yes ..	5	....	5
Boilermakers	Los Angeles ..	For double pay for holiday work.	Yes ..	1	....	1
Molders	Los Angeles ..	For enforcement of union apprentice rules.	Yes ..	1	....	1
Boilermakers	Bakersfield ..	In sympathy with strike elsewhere.	No ..	1	....	1
Rolling mill hands	Emeryville ..	Against reduction of wages.	Yes ..	1	....	1
Molders	Los Angeles ..	For increase of wages, recognition of union, and limitation of apprentices.	Yes ..	13	....	13
Foundry and machine shop employés.	Bakersfield ..	For payment of wages overdue.	No ..	1	1	....
Milkwagon drivers	San Francisco ..	For enforcement of union-shop system.	Yes ..	83	83	....
Teamsters	San José	For increase of wages and reduction of hours.	Yes ..	28	28	....
Lumber handlers	Oakland Long-wharf.	For increase of wages	No ..	1	....	....
Glove employés	San Francisco ..	For increase in wages, reduction of hours, limitation of apprentices, and against employment of non-union men.	Yes ..	8	8	....
Glovemakers	Napa	For adoption of union shop and reinstatement of union employés.	Yes ..	1	1	....
Harnessmakers	Los Angeles ..	For reinstatement of discharged employés.	Yes ..	1	....	1
Leather workers	San Francisco ..	For increase of wages and three months back pay.	Yes ..	1	1	....

December 31, 1905, Showing Cause, Duration, Outcome, and Involved.—Continued.

Date of Beginning	Date of Ending	DAYS' DURATION.		Number on Whose Account Under-taken	NUMBER OF EMPLOYEES STRIKING.			NO. OF EMPLOYEES THROWN OUT OF EMPLOYMENT.			Violation of Agreement	Successful
		Aggregate	Average		Males	Females	Total	Males	Females	Total		
Oct. 1	Nov. 19	490	49	40	40	—	40	40	6	46	No..	Partly
Nov. 19	Dec. 14	25	—	28	25	3	28	25	3	28	No..	Partly
Nov. 23	Mar. 23, '04	968	121	431	135	144	279	135	144	279	No..	No
May 4	May 7	3	—	11	11	—	11	11	—	11	No..	No
Jan. 8	Jan. 9	1	—	3	—	3	3	—	3	3	No..	No
Feb. 24	Mar. 6	300	10	91	91	—	91	91	—	91	No..	Yes
June 1	June 8	24	2	100	100	—	100	100	—	100	No..	No
June 14	June 16	2	—	45	25	—	25	25	—	25	No..	Yes
Apr. 24	Apr. 25	1	—	1	6	—	6	6	—	6	No..	No
Mar. 26	June 8	265	53	64	64	—	64	64	—	64	No..	No
May 5	Aug. 3	138	28	427	427	—	427	427	—	427	No..	No
Feb. 23	Mar. 5	10	—	55	55	—	55	55	—	55	No..	No
Mar. 23	Apr. 6	14	—	10	10	—	10	10	—	10	No..	No
May 11	May 13	2	—	Not reported	55	—	55	55	—	55	No..	No
Aug. 6	Aug. 27	21	—	140	140	—	140	140	—	140	No..	Partly
Oct. 3	Dec. 7	977	75	135	135	—	135	135	—	135	No..	No
Dec. 23	Jan. 4, '04	12	—	320	320	—	320	320	—	320	No..	Yes
Feb. 26	Feb. 27	83	1	300	300	—	300	300	—	300	Yes..	Yes
Apr. 6	Apr. 8	56	2	75	75	—	75	75	—	75	No..	Yes
June 15	June 16	1	—	160	46	—	46	46	—	46	No..	No
Mar. 16	May 11	448	56	473	148	325	473	148	325	473	Yes	Partly
May 4	June 3	30	—	115	54	60	114	60	65	125	No..	No
Mar. 20	Nov. 2	227	—	1	25	—	25	25	—	25	No..	No
Nov. 26	Dec. 3	7	—	1	12	—	12	12	—	12	No..	No

Strikes Occurring in California During the Five Years Ending **Number of People**

Year and Occupation.	Locality.	Cause or Object.	Ordered by Labor Organizations.	ESTABLISHMENTS AFFECTED.		
				Total.	Closed.	Not Closed.
1903.—Continued.						
Laundry workers.....	San José and Santa Clara.	For reduction of hours ..	Yes ..	4	4	.....
Tannery employés.....	San Francisco	For discharge of non-union men.	No ..	1	.....	1
Cement laborers.....	Santa Cruz....	For increase of wages....	No ..	1	.....	1
Loggers and millmen ..	Fort Bragg....	For reinstatement of discharged employé and union shop.	Yes ..	1	.....	1
Lumber mill employés ..	Crescent City ..	For increase of wages....	Yes ..	2	2	.....
Lumber mill employés ..	San Pedro	Against use of material from non-union establishment.	Yes ..	1	1	.....
Millmen.....	Santa Barbara	Against firm supplying material to non-union establishment.	Yes ..	1	.....	1
Longshoremen	San Pedro	Against use of material from non-union establishment.	Yes ..	1	1	.....
Miners	Keswick	Claimed discrimination against union men.	Yes ..	1	.....	1
Mine employés	Amador Co.	Reduction of hours, reinstatement of discharged employés, and recognition of union.	Yes ..	10	10	.....
Miners	Randsburg	For increase of wages....	Yes ..	1	.....	1
Mine workers	Stent	For increase of wages and discharge of non-union employés.	Yes ..	1	1	.....
Mine employés	French Gulch ..	For increase of wages and union-shop system.	Yes ..	1	1	.....
Miners	Sutter Creek ..	For reinstatement of discharged employés.	Yes ..	1	1	.....
Miners	Hodson	For reinstatement of discharged employés and recognition of union.	Yes ..	1	1	.....
Mine employés	Quartz	For reduction of hours and union-shopsystem.	Yes ..	1	1	.....
Miners	Vanderbilt	For discharge of non-union employé.	Yes ..	1	1	.....
Paper box and bag workers.	San Francisco	For increase of wages, reduction of hours, and a year's contract.	Yes ..	8	8	.....
Woodworkers	Los Angeles ..	For discharge of employé not in good standing in union.	Yes ..	1	.....	1
Carpenters and joiners ..	Oakland	For increase of wages and to compel employés to sign agreement.	Yes ..	18	18	.....
All building trades	San Francisco	For increase of wages....	Yes ..	5	5	.....
Machine woodworkers ..	Watsonville ..	For employment of union men only.	Yes ..	1	.....	1
Glaziers	Los Angeles ..	For enforcement of union apprentice rules.	Yes ..	1	.....	1
Electrical workers.....	Stockton	For increase of wages and union apprentice rules.	Yes ..	3	3	.....
Printing pressmen	Los Angeles ..	For increase of wages....	Yes ..	4	2	2
Book folders and sewers.	San Francisco.	For increase in wages and union rules.	Yes ..	15	.....	15

December 31, 1905, Showing Cause, Duration, Outcome, and Involved.—*Continued.*

Date of Beginning	Date of Ending	DAYS' DURATION.		Number on Whose Account Taken	NUMBER OF EMPLOYEES STRIKING.			NO. OF EMPLOYEES THROWN OUT OF EMPLOYMENT.			Violation of Agreement	Successful
		Aggregate	Average		Males	Females	Total	Males	Females	Total		
June 2	July 20	192	48	180	58	122	180	58	122	180	No	Yes
July 15	July 16	1	—	6	6	—	6	6	—	6	No	No
July 12	July 14	2	—	20	20	—	20	20	—	20	No	No
Mar. 19	June 1	74	—	475	284	—	284	284	—	284	No	No
Apr. 16	May 13	54	27	560	560	—	560	560	—	560	No	Partly
Apr. 28	May 1	3	—	90	90	—	90	90	—	90	No	Yes
May 15	May 22	7	—	8	8	—	8	8	—	8	No	Partly
May 19	May 21	2	—	70	70	—	70	70	—	70	No	No
Feb. 23	June 1	98	—	70	320	—	320	320	—	320	No	No
Apr. 13	Apr. 25	108	11	1,400	1,400	—	1,400	1,400	—	1,400	No	Partly
June 9	Oct. 2	115	—	184	184	—	184	200	—	200	No	No
July 3	July 20	17	—	118	118	—	118	120	—	120	No	Yes
Aug. 12	Jan. 11, '04	152	—	90	90	—	90	90	—	90	No	No
Nov. 17	Dec. 15	28	—	3	40	—	40	62	—	62	No	No
Nov. 18	Oct 3, '04	320	—	110	110	—	110	140	—	140	No	No
Dec. 10	Mar. 21, '04	102	—	104	104	—	104	104	—	104	No	No
Jan. 15	Jan. 19	4	—	25	25	—	25	30	—	30	No	No
Nov. 19	Dec. 2	104	13	321	71	250	321	71	250	321	No	No
Apr. 22	May 25	33	—	13	13	—	13	13	—	13	No	No
June 11	July 7	468	26	458	397	—	397	458	—	458	No	Yes
Sept. 18	Sept. 23	25	5	456	456	—	456	456	—	456	No	Yes
Sept. 25	Oct. 2	7	—	17	9	8	17	9	8	17	No	No
Nov. 27	Nov. 28	1	—	10	10	—	10	10	—	10	No	No
Nov. 5	Nov. 16	33	11	10	40	—	40	40	—	40	No	Partly
Apr. 13	Ap. 13, '04	588	147	24	24	—	24	46	—	46	No	No
June 1	June 29	420	28	220	—	220	220	—	220	220	No	Partly

Strikes Occurring in California During the Five Years Ending Number of People

Year and Occupation.	Locality.	Cause or Object.	Ordered by Labor Organizations.	ESTABLISHMENTS AFFECTED.		
				Total	Closed	Not Closed
1903.—Continued.						
Quarrymen, etc.	San Francisco.	For increase of wages, reduction of hours, and union shop.	Yes	3	3	
Construction laborers	Los Angeles	For increase in wages and reduction of hours.	Yes	1		1
Construction laborers	Riverside	For increase of wages	No	1		1
Bag workers	San Francisco.	For increase of wages and recognition of union.	Yes	3	3	
Rivet heater boys	San Francisco.	For increase of wages	Yes	1		1
Shipwrights and c'k'ers	Oakland	For adoption of union-shop system.	Yes	1		1
Butcher employés	Los Angeles	For reinstatement of discharged employé.	Yes	1		1
Butchers	Los Angeles	For reduction of hours and discharge of employé not in good standing with union.	Yes	3		3
Butchers	San Francisco.	For reinstatement of discharged employé and union shop.	Yes	1		1
Stonecutters	San Francisco.	For increase of wages	Yes	6	6	
Stonecutters	San Francisco.	Against planer hands doing stonecutters' work.	Yes	3		3
Motormen and cond'tors	Los Angeles	For employment of union men only.	Yes	1		1
Linemen	San Francisco.	For discharge of non-union men and union shop.	Yes	1		1
Linemen	San Diego.	For increase of wages and one foreman to three linemen.	No	1		1
Linemen	San Francisco.	For increase of wages and union shop.	Yes	9		9
Linemen	San José	For increase of wages and union shop.	Yes	1		1
Sheet metal workers	San Francisco.	For increase of wages and reduction of hours.	Yes	2	2	
Pipe and tank makers	Los Angeles	For reduction of hours	Yes	5		5
Tinners	San Francisco	For discharge of non-union men and union shop.	Yes	1		1
Wool carders	San Francisco.	Against working with Chinese employés.	No	1		1
Cemetery employés	San José	For reduction of hours	No	1	1	
Soap factory employés	San Francisco	For increase of wages	Yes	4	4	
Cemetery employés	San Francisco.	To compel employés to join union.	Yes	1		1
Delivery wagon drivers	San José	For union shop and against handling non-union goods.	Yes	30		30
Fishermen	Sacramento	In sympathy with strike elsewhere.	Yes	3		3
Stablemen	San Francisco	Against employer having work done by establishment not belonging to Masters' Association.	No	1	1	

December 31, 1905, Showing Cause, Duration, Outcome, and Involved.—Continued.

Date o. Beg.ning	Date of Ending	DAYS' DURATION.		Number on Whose Account Under-taken	NUMBER OF EMPLOYÉS STRIKING.			NO. OF EMPLOYÉS THROWN OUT OF EMPLOYMENT.			Violation of Agree-ment	Successful
		Aggregate	Average		Males	Females	Total	Males	Females	Total		
June 8	Aug. 19	193	64	460	460	---	460	460	---	460	No..	Yes
Apr. 25	Apr. 29	4	---	500	500	---	500	500	---	500	No..	No
Aug. 31	Sept. 2	2	---	40	40	---	40	40	---	40	No..	No
June 8	Aug. 19	193	64	196	75	121	196	87	133	220	No..	No
Feb. 2	Feb. 10	8	---	65	65	---	65	65	---	65	No..	Yes
May 12	July 2	51	---	210	84	---	84	126	---	126	No..	Yes
Oct. 7	Oct. 12	5	---	1	35	---	35	35	---	35	No..	No
Oct. 20	Apr. 8, '04	265	88	315	315	---	315	315	---	315	No..	No
Dec. 2	Dec. 31	29	---	11	11	---	11	11	---	11	No..	No
May 1	May 6	30	5	184	184	---	184	184	---	184	No..	No
July 16	Aug. 24	117	39	169	169	---	169	169	---	169	No..	Yes
Apr. 29	Apr. 30	1	---	13	13	---	13	13	---	13	No..	No
May 1	May 31	30	---	4	4	---	4	4	---	4	No..	Yes
May 8	June 1	24	---	13	13	---	13	13	---	13	No..	No
June 23	July 21	196	22	980	620	---	620	620	---	620	No..	No
June 23	Aug. 17	55	---	45	40	---	40	40	---	40	No..	No
June 1	June 23	44	22	1,348	1,036	312	1,348	1,036	312	1,348	No..	Partly
June 15	Aug. 17	135	27	232	232	---	232	232	---	232	No..	No
Aug. 3	Aug. 17	14	---	10	4	---	4	4	---	4	No..	No
Nov. 16	Nov. 23	7	---	6	---	6	6	---	6	6	No..	No
Mar. 24	Mar. 26	2	---	8	8	---	8	8	---	8	No..	Partly
Apr. 6	Apr. 13	28	7	80	44	36	80	44	36	80	No..	Yes
June 6	June 16	10	---	41	41	---	41	41	---	41	No..	Yes
July 6	July 9	90	3	60	60	---	60	60	---	60	No..	No
Aug. 5	Aug. 19	42	14	200	98	---	98	98	---	98	No..	No
Aug. 23	Aug. 27	4	---	15	15	---	15	15	---	15	No..	Yes

Strikes Occurring in California During the Five Years Ending Number of People

Year and Occupation.	Locality.	Cause or Object.	Ordered by Labor Organizations.....	ESTABLISHMENTS AFFECTED.		
				Total	Closed	Not Closed
1903.—Continued.						
Shoe clerks	San Francisco	For longer time for dinner.	Yes	1		1
Wool sorters and graders	San Francisco	For increase of wages	Yes	5	5	
Totals for year 1903				533	282	251
1904.						
Machinists	Stockton	Against open shop	Yes	2		2
Bakers	San Francisco	Against being compelled to board with employer.	Yes	1		1
Bakers	San Diego	Against night work	Yes	4		4
Bakers	San Francisco	Against introduction of machinery and for discharge of non-union employés.	Yes	1	1	
Horseshoers	San Francisco	In sympathy with strike elsewhere.	Yes	7	7	
Boot and shoe workers ..	San Francisco	Against introduction of machinery.	Yes	1	1	
Brewery workers	San Francisco, Oakland and San José.	For increase of wages and extra rate for overtime.	Yes	36		36
Employés' Building Trades.	Palo Alto	For adoption of union-shop system.	Yes	13	13	
Carpenters	Riverside	Against reduction of wages and employment of non-union men.	Yes	1		1
Hodcarriers	Sacramento	For increase of wages	Yes	1		1
Plumbers	Sacramento	For increase of wages and union scale.	Yes	16		16
Paper hangers	Los Angeles	For increase of wages	Yes	7		7
Sheet metal workers ..	San Francisco	For increase of wages	Yes	7		7
Plumbers	Pasadena	For limitation of number of apprentices.	Yes	6		6
Painters	Los Angeles ..	For increase of wages and union shop.	Yes	4		4
Carpenters	Los Angeles ..	For enforcement of uniform rate of \$3.50 per day.	Yes	5		5
Tin roofers	San José	For increase of wages	Yes	4		4
Bricklayers	Riverside	For discharge of foremen	Yes	1		1
Orange packers	Redlands	For increase of wages	No	1		1
Garment workers	San Francisco	To enforce payment of delinquent dues by member, or his discharge.	No	1		1
Cooks and waiters	San José	For adoption of union-shop system.	Yes	4		4
Barbers	Los Angeles ..	Against employment of non-union barber and removal of union card from shop.	Yes	1		1
Waiters	Fresno	Increase of wages, reduction of hours, and six days' work per week	Yes	1		1

December 31, 1905, Showing Cause, Duration, Outcome, and Involved.—Continued.

Date of Beginning	Date of Ending	DAYS' DURATION.		Number on Whose Account Under-taken	NUMBER OF EMPLOYEES STRIKING.			NO. OF EMPLOYEES THROWN OUT OF EMPLOYMENT.			Violation of Agreement	Successful
		Aggregate	Average		Males	Females	Total	Males	Females	Total		
Sept. 1	Sept. 15	14	---	7	7	---	7	7	---	7	No..	No
Sept. 1	Sept. 30	145	29	218	136	82	218	136	82	218	No..	Partly
-----	-----	15,399	1366	16,865	14,664	1707	16,371	15,472	1730	17,202		
Mar. 8	Mar. 28	22	11	190	190	---	190	190	---	190	No..	No
Sept. 5	Sept. 19	14	---	7	7	---	7	7	---	7	No..	No
Oct. 15	Nov. 26	168	42	19	19	---	19	19	---	19	No..	Yes
Nov. 28	Nov. 29	1	---	8	8	---	8	11	---	11	No..	No
Apr. 27	May 16	133	19	75	75	---	75	75	---	75	No..	No
Apr. 28	June 9	42	---	80	48	32	80	48	32	80	Yes..	No
July 19	July 21	72	2	1,160	1,160	---	1,160	1,160	---	1,160	No..	Partly
Feb. 13	Apr. 11	764	58	225	73	---	73	225	---	225	No..	No
Feb. 26	Mar. 8	11	---	35	35	---	35	35	---	35	No..	No
Mar. 1	Mar. 7	6	---	6	6	---	6	12	---	12	No..	Yes
Mar. 1	Dec. 1, '05	10,240	640	57	30	---	30	30	---	30	No..	Yes
Apr. 1	Apr. 18	72	10	45	45	---	45	45	---	45	No..	No
May 2	May 9	49	7	58	58	---	58	58	---	58	No..	No
May 14	July 10	160	27	45	45	---	45	45	---	45	No..	No
May 24	June 6	36	9	70	70	---	70	70	---	70	No..	No
June 1	June 20	45	9	300	300	---	300	300	---	300	No..	No
June 13	June 20	28	7	16	16	---	16	16	---	16	No..	No
Dec. 15	Dec. 19	4	---	5	5	---	5	5	---	5	No..	No
May 10	May 11	1	---	8	---	8	8	---	8	8	No..	No
Sept. 7	Sept. 9	2	---	12	12	---	12	12	---	12	No..	Yes
Jan. 8	Jan. 25	54	13	38	20	---	20	20	---	20	No..	No
Jan. 19	Jan. 20	1	---	5	5	---	5	5	---	5	No..	No
May 2	May 5	3	---	8	7	1	8	7	1	8	No..	No

Strikes Occurring in California During the Five Years Ending **Number of People**

Year and Occupation.	Locality.	Cause or Object.	Ordered by Labor Organizations.	ESTABLISHMENTS AFFECTED.		
				Total	Closed	Not Closed
1904.—Continued.						
Bartenders	Bakersfield	For recognition of union and against employment of non-union men.	Yes	45		45
Gas fixture workers	Los Angeles	Against apprentices doing journeymen work.	Yes	1		1
Gas fixture workers	Los Angeles	Against performing work for establishment on strike.	Yes	1		1
Blacksmiths.....	Stockton	Against performing work for establishment on strike.	Yes	1		1
Molders	Stockton.....	Against performing work for establishment on strike.	Yes	1		1
Machinists	Stockton	Against working with non-union men.	Yes	1		1
Boilermakers' helpers	Kern	For increase of force.....	Yes	1		1
Machinists, etc.	Various points	For reduction of hours from 10 to 9.	Yes	7		7
Machinists	San José	To compel employes doing journeymen's work to join the union.	Yes	1		1
Teamsters	Stockton	Against performing work for establishment on strike.	Yes	1		1
Freight handlers and teamsters.	San Pedro	Against use of material from non-union establishment.	Yes	1	1	
Freight handlers	San Francisco.	For increase of wages ...	Yes	1	1	
Teamsters	Santa Rosa	For adoption of union-shop system.	Yes	1		1
Gas workers	San Francisco.	Against employment of man belonging to another organization.	Yes	1		1
Glassblowers	San Francisco.	For privilege of leaving building during run period.	Yes	1	1	
Harnessmakers.....	San Francisco.	For union shop rules....	Yes	1	1	
Leather workers.....	San Francisco.	For union shop rules....	Yes	4	3	1
Harnessmakers	Sacramento	For increase of wages and signed union agreement.	Yes	1	1	
Capmakers	San Francisco.	Against change from day to piecework.	Yes	2	1	1
Coopers	Santa Cruz	For increase of wages and against being compelled to board with employer.	Yes	2		2
Pressmen and press feeders.	San Francisco	Increase of wages and reduction of hours.	No..	1	1	
Lithographers.....	San Francisco	For reduction of hours ..	Yes	23		23
Lumber laborers	McCloud	For increase of wages or reduction of hours.	No..	1	1	
Lumber laborers	Lamoine	For increase of wages or reduction of hours.	No..	1		1
Mine employés	Jamestown	For reduction of hours and union shop.	Yes	1	1	

December 31, 1905, Showing Cause, Duration, Outcome, and Involved.—Continued.

Date of Beginning	Date of Ending	DAYS' DURATION.		Number on Whose Account Under-taken	NUMBER OF EMPLOYEES STRIKING.			NO. OF EMPLOYEES THROWN OUT OF EMPLOYMENT.			Violation of Agreement	Successful
		Aggregate	Average		Males	Females	Total	Males	Females	Total		
Sept. 19	Feb. 1, '05	6,075	135	102	102	---	102	102	---	102	No	Yes
May 21	July 25	65	---	15	15	---	15	15	---	15	No	No
June 7	June 21	14	---	30	30	---	30	30	---	30	No	No
Feb. 6	Feb. 8	2	---	6	6	---	6	6	---	6	No	No
Mar. 16	Apr. 15	30	---	7	7	---	7	7	---	7	No	No
Mar. 21	Mar. 23	2	---	14	14	---	14	14	---	14	No	No
Mar. 31	Apr. 7	7	---	25	25	---	25	25	---	25	No	No
Apr. 26	Sept. 5	905	129	445	445	---	445	445	---	445	No	No
May 16	May 19	3	---	5	5	---	5	10	---	10	No	No
Feb. 11	Feb. 13	2	---	16	16	---	16	16	---	16	No	No
Feb. 18	Feb. 19	1	---	100	100	---	100	100	---	100	No	Yes
June 4	June 5	1	---	300	300	---	300	300	---	300	No	No
Aug. 15	Sept. 14	30	---	8	8	---	8	8	---	8	No	No
Aug. 16	Aug. 17	1	---	294	294	---	294	294	---	294	No	No
Jan. 15	Jan. 20	5	---	130	130	---	130	902	48	950	No	Yes
Apr. 12	Apr. 13	1	---	15	15	---	15	15	---	15	No	Yes
Apr. 12	Apr. 3, '05	1,272	318	123	120	---	120	120	---	120	No	No
Apr. 18	Oct. 17	182	---	65	62	---	62	65	---	65	No	No
Sept. 11	Oct. 5	168	84	46	26	20	46	26	20	46	No	No
Apr. 7	May 12	49	24	26	26	---	26	26	---	26	No	Partly
July 18	July 23	5	---	42	42	---	42	270	80	350	Yes	Yes
Mar. 18	Apr. 22	805	35	96	96	---	96	96	---	96	No	No
July 18	July 23	5	---	1,200	400	---	400	1,200	---	1,200	No	Yes
Aug. 2	Aug. 3	1	---	30	30	---	30	30	---	30	No	No
Feb. 6	Mar. 21	44	---	98	98	---	98	98	---	98	No	No

Strikes Occurring in California During the Five Years Ending Number of People

Year and Occupation.	Locality.	Cause or Object.	Ordered by Labor Organizations.....	ESTABLISHMENTS AFFECTED.		
				Total	Closed.....	Not Closed.....
1904.—Continued.						
Miners	Drytown	For increase of wages, discharge of employé, union shop, and right to spend money as desired.	Yes ..	1	1	.....
Mine employés	Stent	Against being compelled to remove clothing and go naked from work-room to dressing-room on quitting work.	Yes ..	1	1	.....
Boxmakers	Oakland	For increase of wages	Yes ..	1	1	.....
Compositors	Palo Alto	For discharge of non-union employé.	Yes ..	1	.....	1
Bookbinders	Los Angeles ..	For increase of wages and recognition of union and union rules.	Yes ..	3	.....	3
Pressmen	Los Angeles ..	Against performing work for non-union establishments.	No ..	1	.....	1
Rivet heater boys	San Francisco	For better quality of coal.	Yes ..	1	.....	1
Rivet heater boys	San Francisco	For better quality of coal.	No ..	1	.....	1
Boatbuilders	San Francisco	To compel employés to join union or be discharged.	Yes ..	1	1	.....
Sheep butchers	San Francisco	For adoption of union-shop system.	Yes ..	7	.....	7
Sheet metal workers	San Francisco	For increase of wages.	Yes ..	2	2	.....
Oyster workers	San Francisco	For reinstatement of discharged employés.	Yes ..	1	.....	1
Stablemen	San Francisco	For adoption of union shop and against seven days' work per week.	Yes ..	40	.....	40
Hack drivers	San Francisco	For increase in wages and union shop.	Yes ..	16	16	.....
Fish cleaners	San Francisco	For reduction of hours.	Yes ..	6	.....	6
Stablemen	San José	For increase of wages	Yes ..	18	.....	18
Totals for year 1904				328	56	272
1905.						
Turning lasters	San Francisco	For increase of wages	No ..	1	.....	1
Brewery workers	Various localities.	In sympathy with striking employés.	Yes ..	6	6	.....
Coopers	San Francisco	For increase of wages	Yes ..	20	.....	20
Broommakers	San Francisco	For increase of wages and to compel employers to sign year's contract.	Yes ..	1	1	.....
Tile-setters' helpers	San Francisco and Oakland.	For increase of wages	Yes ..	7	.....	7
Plumbers	San Diego	To compel employer not to do journeymen's work or join the union.	Yes ..	1	.....	1
Sheet metal workers	Los Angeles ..	For increase of wages and reduction of hours on Saturday.	Yes ..	12	.....	12

December 31, 1905, Showing Cause, Duration, Outcome, and Involved.—*Continued.*

Date of Beginning	Date of Ending	DAYS' DURATION.		Number on Whose Account Taken	NUMBER OF EMPLOYÉS STRIKING.			NO. OF EMPLOYÉS THROWN OUT OF EMPLOYMENT.			Violation of Agreement	Successful
		Aggregate	Average		Males	Females	Total	Males	Females	Total		
Apr. 28	Oct. 3	158	---	90	90	---	90	150	---	150	No..	No
July 2	July 14	12	---	115	115	---	115	115	---	115	No..	Yes
Mar. 31	Apr. 16	16	---	36	25	---	25	36	---	36	No..	Partly
Apr. 2	Apr. 18	16	---	4	4	---	4	4	---	4	No..	No
Jan. 22	Apr. 4	146	49	20	20	---	20	20	---	20	No..	No
Apr. 13	Apr. 14	1	---	4	4	---	4	4	---	4	No..	No
Apr. 1	Apr. 5	4	---	65	65	---	65	250	---	250	No..	Yes
Apr. 13	Apr. 14	1	---	30	30	---	30	185	---	185	No..	Yes
May 2	May 9	7	---	40	40	---	40	43	---	43	No..	Yes
Aug. 31	Sept. 3	21	3	35	35	---	35	35	---	35	No..	No
Mar. 19	Apr. 1	26	13	1,389	1,062	327	1,389	1,062	327	1,389	No..	No
Feb. 1	Feb. 4	3	---	2	38	---	38	38	---	38	No..	Yes
Apr. 14	Aug. 27	5,400	135	270	270	---	270	270	---	270	No..	No
Apr. 14	Aug. 27	2,160	135	62	62	---	62	62	---	62	No..	No
Sept. 30	Oct. 1	6	1	70	70	---	70	70	---	70	No..	No
Nov. 28	Dec. 3	90	5	72	60	---	60	60	---	60	No..	No
-----	-----	2,966	1920	8,014	6,636	388	7,024	9,019	516	9,535		
June 19	July 24	35	---	2	2	---	2	2	---	2	Yes.	Yes
May 24	May 27	18	3	600	140	---	140	140	---	140	No..	No
July 15	July 17	40	2	22	22	---	22	22	---	22	No..	Partly
Oct. 31	Nov. 8	8	---	12	12	---	12	12	---	12	No..	Yes
July 3	July 17	98	14	72	72	---	72	72	---	72	No..	No
July 12	July 26	14	---	7	7	---	7	7	---	7	No..	No
July 28	Sept. 25	708	59	98	80	---	80	80	---	80	No..	No

Strikes Occurring in California During the Five Years Ending Number of People

Year and Occupation.	Locality.	Cause or Object.	Ordered by Labor Organizations.....	ESTABLISH- MENTS AFFECTED.		
				Total	Closed	Not Closed
1905.—(Continued.)						
Building Trades' employees.	Los Angeles ..	In sympathy with striking employees.	Yes ..	1	1	----
Carpenters and brick-masons.	Los Angeles ..	Against use of non-union material.	Yes ..	3	3	----
Glass workers	Los Angeles ..	In sympathy with striking employees.	Yes ..	1	----	1
Painters	San Diego	For increase of wages...	Yes ..	14	1	13
Hodcarriers, carpenters, and bricklayers.	Santa Rosa	For adoption of union-shop system.	Yes ..	1	1	----
Tailors	Sacramento....	Against work being sent out of city to be done.	Yes ..	1	1	----
Cooks and waiters.....	Oakland	For adoption of union-shop system.	Yes ..	20	----	20
Waiters	San Francisco	For reduction of hours..	Yes ..	24	----	24
Laundry workers.....	Los Angeles ..	For reduction of hours..	Yes ..	3	----	3
Metal polishers.....	San Francisco	For enforcement of union apprenticeship rules.	Yes ..	1	----	1
Woodworkers	Los Angeles ..	Against increase of hours without increase of pay.	Yes ..	1	----	1
Machine woodworkers ..	Los Angeles ..	For reduction of hours and union shop.	Yes ..	13	----	13
Compositors	Pasadena	For increase of wages, reduction of hours, and union shop.	Yes ..	1	----	1
Printers, pressmen, etc.	San Francisco	For reduction of hours..	Yes ..	25	2	23
Yard switchmen	Los Angeles ..	For increase of wages...	Yes ..	1	----	1
Shipwrights, etc.	San Francisco	Against reduction of wages.	Yes ..	1	----	1
Shipwrights	Oakland	Against employment of non-union men.	Yes ..	1	----	1
Quarrymen engineers ..	Raymond.....	For increase of wages, union shop, and pay for overtime.	Yes ..	1	1	----
Stonecutters	San Francisco	For enforcement of union apprenticeship rules.	Yes ..	1	1	----
Ironmolders	Newark	For better material	Yes ..	1	1	----
Cigarmakers	San Francisco	For increase of wages...	Yes ..	42	42	----
Soapmakers, etc.	San Francisco	For increase of wages...	No ..	1	----	1
Totals for year 1905.....				206	61	145

An endeavor was made to cover every strike that occurred within the State during the years named, and it is believed that all but a comparatively few have been covered. Newspaper files, labor union records, and other available sources of information were consulted to locate the disturbances that had occurred. It is not probable that any strike of importance, or that many unimportant ones, escaped notice.

Each disturbance of which notice was obtained was the subject of a personal investigation. Both employés and employers were consulted wherever possible. In a few instances no information could be secured because of the death or removal of the persons having knowledge of the

December 31, 1905, Showing Cause, Duration, Outcome, and Involved.—*Continued.*

Date of Beginning.	Date of Ending.	DAYS' DURATION.		Number on Whose Account Taken	NUMBER OF EMPLOYÉS STRIKING.			NO. OF EMPLOYÉS THROWN OUT OF EMPLOYMENT.			Violation of Agreement	Successful
		Aggregate.	Average.		Males.	Females.	Total.	Males.	Females.	Total.		
Aug. 1	Aug. 4	3	...	7	12	...	12	12	...	12	No..	No
Aug. 12	Aug. 22	22	7	108	108	...	108	108	...	108	No..	No
Aug. 26	Oct. 2	37	...	580	15	...	15	15	...	15	No..	No
Nov. 4	Nov. 18	105	7	77	75	...	75	75	...	75	No..	No
July 20	July 22	2	...	36	36	...	36	50	...	50	No..	Yes
May 30	Aug. 1	63	...	18	18	...	18	18	...	18	No..	No
June 1	June 8	140	7	210	180	...	180	180	...	180	No..	Partly
June 15	June 21	144	6	28	28	22	50	28	22	50	No..	No
July 1	July 6	13	4	189	87	102	189	87	102	189	No..	Partly
Mar. 20	May 1	42	...	22	22	...	22	22	...	22	No..	No
Jan. 16	Jan. 30	14	...	60	60	...	60	60	...	60	No..	Partly
Aug. 7	Sept. 18	220	17	580	160	...	160	160	...	160	No..	No
Feb. 1	Feb. 11	10	...	11	7	...	7	7	...	7	No..	No
July 5	July 10	1,128	45	530	410	40	450	410	40	450	No..	Yes
July 4	July 7	3	...	12	12	...	12	12	...	12	No..	No
July 17	July 26	9	...	27	27	...	27	27	...	27	No..	Yes
Sept. 11	Sept. 18	7	...	10	10	...	10	10	...	10	No..	No
June 1	Sept. 1	92	...	50	14	...	14	50	...	50	No..	Yes
Aug. 21	Aug. 28	7	...	56	56	...	56	59	...	59	No..	No
Nov. 25	Nov. 27	2	...	52	52	...	52	97	...	97	No..	No
Oct. 20	Nov. 1	504	12	391	391	...	391	391	...	391	No..	Yes
Sept. 10	Sept. 11	1	...	8	1	7	8	1	7	8	No..	No
		3,489	183	3,875	2,116	171	2,287	2,214	171	2,385		

facts. Owing to the fire in San Francisco, a few disturbances for which preliminary data had been obtained could not be investigated further.

In the first column occurs the occupation of the strikers. Then the location, followed by the cause or object. Often several causes or objects are factors leading to the disturbance, but the ruling factors are given under this heading. Next the question whether or not ordered by a labor organization is considered; the establishments affected, and the number of such establishments closed and the number that were able to continue operations during the strike.

The date of beginning is the day on which the disturbance began, and the date of ending is the day on which the employés returned to

work, or the day on which their places were filled by others and the establishment was in running order.

In a general disturbance involving two or more establishments, the dates given are the terminal dates of the disturbance as a whole, *i. e.* the date of beginning in the first establishment involved and the date of ending in the last to resume its normal operations.

The aggregate days' duration is the length of the disturbance involving but one establishment, or the total days' duration in each of the establishments included in a general disturbance. For example: Suppose there are three concerns whose employés are on strike. In one, the disturbance lasts ten days, another twelve days, and the third twenty days. The aggregate days' duration in this case is forty-two days. The average days' duration is the average time the trouble lasts, and in the instance just cited would be thirteen and one third days.

The next three columns require little explanation. The first treats of the number of persons for whose particular interest the strike was undertaken. The grievance of a few or even one may be the cause of many individuals striking.

Special inquiry was made as to whether the strike was undertaken in violation of an agreement not to take such action, and the tabulation gives the result.

The last column shows whether or not the strike was successful.

During the five years under consideration there have been 298 strikes, 44 of which occurred in 1901, 57 in 1902, 104 in 1903, 64 in 1904, and 29 in 1905. In 1901, 20,036 males and 1,083 females struck, making a total of 21,119; and 22,654 males and 1,083 females were thrown out of employment, totaling 23,737. In 1902, 6,542 males and 695 females struck, a total of 7,237; and 7,328 males and 702 females were thrown out of employment, a total of 8,030. In 1903, 16,371 persons struck, 14,664 of whom were males and 1,707 females; and 15,472 males and 1,730 females, a total of 17,202 were thrown out of employment. In 1904, 7,024 people struck, 6,636 being males and 388 females, and 9,535 lost their positions in consequence, 9,019 of whom were males and 516 females. The year 1905 added 2,116 males and 171 females, or 2,287, to the strike total, and 2,214 males and 171 females, a total of 2,385, to the number thrown out of employment.

There were in the five years 49,994 men and 4,044 women, or a total of 54,038, who struck; and during the same time 56,687 men and 4,202 women, making 60,889 in all, were thrown out of employment. This number includes those striking, who are always considered as thrown out of employment. There were, therefore, 6,851 people thrown out of employment in these five years as a direct result of strikes on the part of other people, in addition to the 54,038 strikers thrown out of employment as the result of their own action.

During the year 1901 the aggregate number of days strikes existed

in California was 77,579, which is the same result as though strikes existed for the entire year in 212 different establishments; in 1902, 5,173 days, or 14 establishments for the year; in 1903, 15,399 days, or the same as 42 places continuously; in 1904, 29,662, or 81 the year through; and in 1905, 3,489, or the same result as if 9 establishments had been on strike continuously throughout the year. From these results it is readily seen that the strikes of 1901 were long drawn out and existed in many establishments, since that year, with but 44 strikes recorded, kept an average of 212 concerns engaged during the entire year; while 1902, with 57 strikes, engaged on an average but 14 establishments; 1903 with 104 strikes, but 42; 1904 with 64, but 81; and 1905 kept on an average but 9 places busy with labor troubles. The high result in 1901 is due largely to two great disturbances, the cooks and waiters in San Francisco, in which strike 184 places of business were engaged for almost a year, and the machinists' strike in San Francisco, Oakland, and vicinity, in which 106 machine shops were engaged almost ten months, both carrying over into the next year. The year 1904 comes next in long-continued strikes, for the most part due to a plumbers' dispute in Sacramento, involving 16 establishments and lasting over twenty months, and a bartenders' strike in Bakersfield in 45 saloons, continuing over four months.

The years 1902 and 1903 are shown by these results to be the years of short strikes, the latter especially. During this year, 34.9 per cent of all the strikes in the five years under consideration, occurred, and the average number of establishments kept on strike throughout the year as compared to the total number of strikes is considerably lower than the average.

In the entire 298 strikes occurring since 1900, 2,415 different establishments were involved, and 1,116 of these, representing 46.2 per cent, were closed by the strike, and 1,309 were able to continue operations in spite of the disturbance. In the year 1901, 1,160 establishments were involved, and 629, or 54.2 per cent, were closed. In 1902, 188 different concerns had strikes, and 88, or 46.8 per cent, were closed. The 1903 disturbances involved 533 establishments, and 282, representing 52.9 per cent, were forced to suspend operations. In 1904, of the 328 places having strikes, only 56, or 17 per cent, were closed on such account, and in 1905, with 206 establishments on strike, 61, or 29.6 per cent, were compelled to close their doors pending settlement of the difficulty.

Of the 44 strikes occurring in 1901, 31 were ordered by labor organizations, a percentage of 70.4 per cent. In 1902, 40 of the 57 were ordered by the unions, representing 70.1 per cent. In 1903 the unions ordered 85 strikes out of a total of 104, a percentage of 81.7. The year 1904 saw a still greater per cent of the disturbance due to union action, 57, or 89.1 per cent, of the 64 occurring during this year being ordered by labor organizations. The last year under consideration saw 29

strikes, and 27, or 93.1 per cent of them, were begun with the sanction of a union. There is a constant increase here, pronounced enough to lead to the conclusion that the strike taken on the initiative of a few men and without union sanction is on the wane. Aside from the first two years, there is an increasing percentage ordered after deliberation of all the employés concerned.

An investigation into the agreements broken in strikes in the years under consideration shows that it is a very rare occurrence for such a course to be pursued. In the data compiled from 298 strikes lasting over a period of five years, secured from employés and employers alike, there are found but 6 instances of strikes called by an organization in violation of its agreement. Three of these occurred in 1903, the year of strikes, two in 1904, and one in 1905, and all took place in San Francisco. Three of these were successful, one partly so, and two unsuccessful.

As regards the outcome of a strike, the tabulation gives three divisions: "Successful," where the striking employés secured their demands; "Unsuccessful," where they totally failed of such demands, and "Partly," where only a part of the things asked of the employers were granted.

Of the 298 disturbances considered, 96, or 32.2 per cent, were successful; 168, or 56.4 per cent, unsuccessful; and 34, or 11.4 per cent, partly successful. By years, the results are considerably at variance with this general percentage. In 1901 there were 44 strikes, 20, or 45.4 per cent, being successful; 20, or 45.4 per cent, unsuccessful, and 4, or 9.2 per cent, partly successful. Of the 57 in 1902, 29, or 50.8 per cent, succeeded; 19, or 33.2 per cent, lost, and 9, or 16 per cent, resulted in partial victories for the strikers. The year 1903, with its 104 disturbances, gave victories to the employés in but 25 instances, representing 24 per cent; the employers won 65, or 62.5 per cent, and 14, or 13.5 per cent, were partly successful from the standpoint of those on strike. The next year, with 64 disturbances, gave success to the employés in 15 instances, representing 23.5 per cent; they lost 46, or 71.8 per cent, and 3, or 4.7 per cent, were partial victories. In 1905, 7, or 24.1 per cent, of the 29 strikes resulted successfully to those on strike; 18, or 62.1 per cent, were lost, and 4 were partial victories, representing 13.8 per cent.

The early years of the time we are investigating gave a much higher percentage of successful strikes than the last years. During the entire time 32.2 per cent of all strikes were successful, but since the end of 1902 no year has given more than 24.1 per cent of victories to the strikers.

San Francisco ranks first in the number of strikes, having 111 of the total of 298 for the entire State, representing 37.2 per cent. Of these, 23 happened in 1901, 19 in 1902, 34 in 1903, 24 in 1904, and 11 in 1905, representing more than half (52.2 per cent) of the total number for the State in 1901; about one third in 1902 and 1903 (32.2 per cent and 32.8 per

cent), and three eighths in 1904 and 1905 (37.5 per cent and 37.9 per cent). Of these 111 disturbances, 85 were ordered by labor organizations and 26 were not; and 50 were successful, 49 unsuccessful, and 12 partly so. The percentage of successful strikes in San Francisco is thus seen to be 45, being 13 per cent higher than the percentage for the entire State.

Los Angeles comes second with 51 strikes. Of these, 45 were ordered by labor organizations and 6 were independent of union action. Only 4 were entirely successful in this city, 42 were total failures, and 5 were partially successful. The per cent of successful strikes in Los Angeles for the five years just past is less than 8, and is under the average for the State by more than 24 per cent. In other words, while for the State as a whole, *including Los Angeles*, one strike in three has been successful, yet for this city less than one strike in twelve has resulted successfully.

Oakland had 18 disturbances and occupied third place, San José 15, Stockton 11, Fresno 10, San Diego 8, Sacramento 7, and Santa Barbara 6. The remainder are scattered throughout the State.

The causes leading to strikes in California are varied, but for the most part general lines are followed. In 97 instances a desire for an increased wage was the moving cause. To compel employers to maintain a union shop was the cause in 46 instances; 28 of the disturbances were brought about primarily by a desire for shorter hours; 23 were for increased wages and shorter hours together; 12 were disputes over apprentices; 9 in sympathy with other strikers, and 6 against reduction of pay or increase of hours.

Many other causes are given as the reason for employé's striking, but none in very great numbers. Some that may be noted are against working with Chinese; against piecework system; against Sunday work; against being compelled to trade in company stores, and one strike was caused by an attempt on the part of a gold mine superintendent to compel the miners to remove their clothes and go naked from the work-room to the dressing-room on quitting work. This strike was successful.

In addition to the disturbances recorded here, there were 20 strikes during the five years in question which were settled in less than one day's time. Seven of these succeeded and the remaining 13 were unsuccessful. They are not thought of sufficient importance for tabulation or more detailed consideration.

A parallel investigation to the one on strikes was undertaken covering "lockouts." Whenever an employer, or group of employers, in order to resist demands of employé's, or to enforce demands upon them, takes the initiative and refuses to retain the employé's at work unless they accede to the employers' demands, such a disturbance is termed a "lockout," in distinction to troubles in which employé's are the aggressors, properly denominated "strikes." The following table gives corresponding information concerning lockouts as was given in the previous table on "strikes":

Lockouts Occurring in California during the Five Years Ending of People

Year and Occupation.	Locality.	Cause or Object.	Ordered by Employ- ers' Organization.	ESTABLISH- MENTS AFFECTED.		
				Total	Closed	Not Closed
1901.						
Bottlers	San Francisco	Against refusal of em- ployés to receive beer from non-union team- sters.	No..	30		30
Teamsters	San Francisco	Refusal of union team- sters to deliver baggage to non-union firm.	Yes.	45	45	
Woolen mill employés...	San Francisco	Against demand for re- duction of hours and reinstatement of dis- charged employés.	No..	1	1	
1903.						
Cooks and waiters	San Francisco	Against demand for sig- nature to agreement.	Yes.	24	24	
Rollers and ironworkers.	San Francisco	Against demand for re- duction of hours.	No..	1	1	
Tanners	San Francisco	Against threatened strike for reduction of hours from 10 to 9 per day.	No..	1	1	
Planing mill employés ..	San José	Against demand for re- duction of hours and time and a half for over- time.	No..	1	1	
Carpenters	Santa Barbara	To enforce open-shops sys- tem.	No..	1		1
Boatbuilders	San Francisco	Against demand that joiners should not do boatbuilders' work.	No..	1		1
1904.						
Blacksmiths	Stockton	To compel employés to sign individual agree- ment not to strike or join union that might require him to strike.	No..	2		2
Boot and shoe workers ..	San Francisco	To compel employés on strike to return to work.	Yes.	6	6	
Carpenters and painters.	Sacramento...	For adoption of open- shop system.	Yes.	28		28
Tailors	Los Angeles ..	To enforce open-shops sys- tem and privilege of grading employés.	No..	1	1	
Stevedores	Stockton	To compel employés to perform work for non- union establishments.	Yes.	6	6	
Mine employés	Harris'n Gulch	Against demand that em- ployés join union.	No..	1	1	
1905.						
Plumbers and tinnerns...	Fresno	To compel union men to work with non-union men.	No..	7		7
Gas and steam fitters....	Los Angeles ..	To enforce open-shops sys- tem.	No..	1		1
Plumbers and helpers...	Petaluma	Against adoption of union-shop system.	No..	4	4	
Tailors	Los Angeles ..	To enforce open-shops sys- tem and change rating from first to second class shop.	No..	1		1
Totals for the five years				162	91	71

December 31, 1905, Showing Cause, Duration, Outcome and Number Involved.

Date of Beginning	Date of Ending	Days' Duration.		Number on Whose Account Under-taken	NUMBER OF EMPLOYEES STRIKING.			NO. OF EMPLOYEES THROWN OUT OF EMPLOYMENT.			Violation of Agreement	Successful
		Aggregate	Average		Male	Female	Total	Male	Female	Total		
July 13	July 27	420	14	218	218		218	218		218	No..	Yes
July 16	Oct. 3	3,555	79	1,600	1,600		1,600	1,800		1,800	Not given	Yes
Feb. 18	Mar. 11	21		56	56		56	56		56	No..	Yes
Dec. 1	Dec. 8	168	7	600	450	150	600	450	150	600	No..	No
May 23	July 6	44		128	128		128	128		128	No..	Yes
July 1	July 13	12		48	48		48	48		48	No..	Partly
Aug. 3	Aug. 24	21		51	51		51	51		51	No..	Partly
Dec. 4	June 1'04	180		5	5		5	5		5	No..	Yes
June 20	Mar. 21'04	275		20	20		20	20		20	No..	Yes
Dec. 8	Dec. 22	21	10	20	20		20	20		20	No..	Yes
May 13	May 31	108	18	80	401	187	588	401	187	588	Yes.	Yes
Mar. 15	June 1'06	16,592	593	409	409		409	409		409	No..	No
Mar. 17	Jan. 9'05	298		28	25	3	28	25	3	28	No..	Yes
May 17	May 27	60	10	128	128		128	200		200	No..	Yes
Feb. 20	Apr. 21	61		89	89		89	90		90	No..	Yes
Jan. 5	April 3	616	88	45	45		45	45		45	No..	Yes
Mar. 13	Mar. 20	7		24	24		24	24		24	No..	Yes
Feb. 6	Mar. 6	49	12	16	16		16	16		16	No..	Partly
Mar. 20	June 19	91		16	16		16	16		16	No..	Yes
		22,599	831	3,581	3,749	340	4,089	4,022	340	4,362		

The explanation of the different divisions is the same as for strikes, except in two instances. In place of "Ordered by Labor Organization," we have "Ordered by Employers' Organization," and a successful lock-out is one in which the employers won, while a successful strike is one in which the employés succeeded in enforcing their demands.

During the five years there were 19 lockouts, involving 162 establishments, 91 of which were closed pending settlement and 71 were able to continue operation with other employés. In 1901 there occurred 3 lockouts, involving 76 establishments, 46 of which were closed and 30 not. All these took place in San Francisco. The year 1902 records no lockout, except one in San Francisco, involving 4 establishments and 46 people and lasting less than one day. This is omitted from the tabulation, on account of its comparative unimportance. In 1903, we experienced 6 lockouts, affecting 29 establishments, and 27 of these were closed and 2 continued operations. Of these 4 were in San Francisco, 1 in San José, and 1 in Santa Barbara. In 1904, there were also 6 lockouts, with 44 establishments, 14 of which were closed and 30 not. But 1 of these happened in San Francisco, 2 in Stockton, 1 in Sacramento, 1 in Los Angeles, and 1 in Harrison Gulch, a mining town. The year 1905 gave 4 lockouts, involving 13 establishments, 4 of which were closed and 9 remained open. None happened during this year in San Francisco. Los Angeles had 2, Fresno 1, and Petaluma 1.

The aggregate days' duration for these 162 lockouts was 22,599. This is the same as if 12 establishments had been kept continuously occupied for the entire five years. The longest lockouts occurred in 1901 and 1904. In the former year, the so-called teamsters' "strike" in San Francisco occurred, lasting three months and involving 45 establishments, not one of which was able to continue operations. This was in effect a lockout, and was one of the most hotly contested labor disturbances that has occurred for years. In 1904, the carpenters and painters were locked out in Sacramento, and the trouble lasted till June, 1906, when the employés finally won.

In the entire time, 4,089 employés were locked out, and a total of 4,362 people, including those locked out, were thrown out of employment.

In one instance, employers violated their agreement.

Of the 19 lockouts considered here, the employers won 14, lost 2, and 3 were partly successful.

It is a notable fact that where most strikes and lockouts have occurred, there the tendencies are to saner action. In San Francisco, where 37.2 per cent of the strikes and 42.1 per cent of the lockouts occurred, we find the proportion to the number in the State as a whole rapidly decreasing, notwithstanding the fact that the number of disturbances, especially of strikes, is on the wane in the entire State. In other words, the number of industrial disturbances in the City of San Francisco is rapidly decreasing, even more rapidly than for the entire State. This in spite of the fact that the contrary impression is abroad.

SAN FRANCISCO REHABILITATION.

Soon after the fire of April 18, 19, and 20, at the request of the Mayor of San Francisco and the National Red Cross Society, and on the approval of Governor Pardee, this Bureau undertook the task of conducting a Free Employment Agency, for the benefit of the people thrown out of employment by the catastrophe. Headquarters were secured in the Hearst Grammar School in San Francisco and an attempt made to bring together those able-bodied refugees who needed employment and employers who required help. Many difficulties beset the undertaking. Numerous employers insisted on men and women working at a less rate than that prevailing before the fire, and people in many instances refused employment they were capable of performing. The Bureau met the first difficulty by urging that workers be paid the rate in existence prior to April 18, and the names and locations of the able-bodied men and women who refused work, offered at standard wages, were referred to the relief camp authorities, with the recommendation that their rations be discontinued. These measures proved effective, and it was not long before employers were content to pay the ruling wage and refugees able to work left the relief stations. At the end of May, the labor situation had so far adjusted itself that it was deemed unnecessary to continue the Free Employment Bureau. Work was becoming plentiful and men and women were, individually, finding work. The following report was rendered on May 29 to the Red Cross authorities, and is self-explanatory:

The Free Employment Bureau operated for the National Red Cross during the four weeks ending to-day has registered for employment 3,140 males and 491 females. Of these, we have been able to furnish employment directly to upwards of 1,100 men and 93 women. In addition to this considerably more than 100 skilled mechanics were furnished employment through their respective organizations in this city.

I enclose a list of the registration, male and female, by occupation, followed previous to the fire. In nearly every instance the men who were employed through this office were engaged for ordinary unskilled labor. The ratio of men employed to the number of men registered in the several occupations varies but little. Undoubtedly, a great number of the applicants for work in the earlier period of registration, failing

to receive immediate aid here, secured their employment directly from the contractor.

We have definite information on hand of 1,117 married men supporting 2,740 dependent members of their families, and during the entire time we have given precedence to these men in filling orders for employment.

Since the banks have opened for regular business and money as a consequence has been within the reach of employers, there has been a great falling off in the registration—an indication that men have been able to secure employment for themselves. While there is, without doubt, a large army of unemployed in San Francisco as yet, there is but little demand for any class of labor except the skilled mechanic and the strong, unskilled laborer preceding and accompanying him.

During the time this office has been in operation, it has been the policy to encourage as far as possible the belief that even this great catastrophe should not very materially disturb rates and conditions of labor. A great increase in wages would no doubt invite too great numbers from other states, while a reduction in wages would make the financial recovery of the retail business man practically impossible.

Taking into consideration these facts, it has been decided to close this office and allow the employer and the employé to come together without assistance.

**Total Registration by Occupation, American National Red Cross Employment Bureau,
Hearst Grammar School, Fillmore and Hermann streets.**

From May 2 to May 29, 1906, inclusive.

MALES.

Art glass	1	Engravers	7	Peddlers	1
Artist	3	Factory hands	46	Photographers	5
Actors and authors	4	Firemen	11	Plumbers	60
Barbers	17	Foremen	18	Porters	85
Bartenders	33	Gardeners	26	Potters	1
Basketmakers	1	Gilders	5	Printers	85
Blacksmiths	22	Glovecutters	1	Railroad workers	20
Boys, bell	6	Goldsmiths	5	Ranch hands	9
Boys, general	58	Harnessmakers	8	Salesmen	102
Boys, news	2	Hatters	6	Seamen	9
Brewers	3	Horseshoers	2	Shadehangers	3
Butchers	36	Inkmakers	1	Shoemakers	18
Carpenters	100	Interpreters	1	Solicitors	23
Carriagemakers	5	Janitors	26	Special police	2
Chemists	2	Jewelers	13	Stone and marble workers	9
Cigarmakers	1	Laborers	587	Students	32
Civil engineer	1	Laundry workers	43	Surveyors	1
Cement workers	25	Lathers	2	Tailors	53
Clerical	400	Lawyers	1	Tanners	6
Clockmaker	1	Locksmiths	3	Teachers	4
Cooks and bakers	179	Machinists	143	Teamsters	211
Coopers	6	Merchants	63	Telegraph operators	3
Designers	2	Messengers	6	Upholsterers	16
Dishwashers	25	Musicians	6	Varnishers	9
Doctors and dentists	7	Nothing	29	Waiters	68
Draughtsmen	6	Nurse	3	Watchmen	17
Electricians	41	Ore sampler	1	Wine cellarman	1
Elevatormen	18	Painters	84	Woodworkers	50
Engineers	34	Paperhangers	6		

FEMALES.

Bookkeepers.....	17	Milliners	5	Servants	138
Clerks	21	Music and art	4	Stenographers	16
Companions	1	Nothing	14	Students	1
Compositors	1	Nurses	21	Tailoring	10
Cooks	54	Porters	1	Teachers	3
Factory hands	36	Printers	3	Telegraphers	5
Laundry workers	13	Saleswomen	16	Typewriters	3
Lodging-house	7	Seamstresses	50	Waitresses	15

Additional domestic help sent to Los Angeles, 35.

A great number of those people sent out to work from the Bureau were persons unused to hard labor, as the table shows, almost 13 per cent of the number registered having been employed at clerical occupations. These were among the most cheerful and ready to go out to hard labor and the least particular as to their employment.

The work of securing employment for refugees who crossed the bay into Oakland was taken up by the Chamber of Commerce of that city, who opened a Free Employment Agency on April 20 and continued to June 30. During this time 7,358 males and 2,835 females made application for employment, and positions were found for 4,894 males and 1,283 females.

From the fact that the districts inhabited by the poorer class of San Francisco citizens were completely destroyed by fire and Oakland furnished a ready refuge for those who were most in need of aid and employment, the value this branch of relief work performed by the Oakland Chamber of Commerce can not be overestimated.

On June 10 the wage rates of all the men working for 78 contractors in the burned area were secured, and on August 10 corresponding rates from 65 contractors. The table following shows these rates:

Comparative Table of Daily Wages in Selected Occupations in San Francisco Building Trades, June 10 and August 20, 1906.
(Covering the employés of 78 contractors in June investigation and 65 in August investigation.)

Occupation.	Date.	WAGES AND NUMBER.											
		Number..	Rate	Number..	Rate	Number..	Rate	Number..	Rate	Number..	Rate	Number..	Rate
Carpenters	June 10	705	\$3.50	621	\$4.00	6	\$4.25	34	\$4.50	1	\$4.75	28	\$5.00
	Aug. 20	868	3.50	329	4.00	52	4.25	325	4.50	2	2.75	116	5.00
Carpenters' apprentices	June 10	49	1.50	6	2.00	3	2.25	16	2.50	3	2.75	16	3.00
	Aug. 20	34	1.50	2	2.00			12	2.50	3	2.75	7	3.00
Laborers	June 10	598	1.50	129	2.00	269	2.25	167	2.50	3	2.75	29	3.00
	Aug. 20	857	1.50	30	2.00	242	2.25	573	2.50	8	2.75	1	3.00
Bricklayers	June 10	34	7.00	1	8.00	8	8.50		9.00	1	10.00		3.50
	Aug. 20	152	7.00	38	8.00			4	9.00	3	10.00		
Bricklayers' helpers and apprentices	June 10	1	1.00		2.50								
	Aug. 20	1	1.00										
Hodcarriers	June 10	44	4.00		4.50		5.00		6.00				
	Aug. 20	180	4.00	30	4.50	24	5.00	1	6.00				
Marble setters	June 10	5	4.00		7.00								
	Aug. 20			4	7.00								
Electricians	June 10	8	3.50	2	4.00		5.00		5.50				
	Aug. 20	42				40	5.00	2	5.50				
Plumbers	June 10	41	5.00		6.00		6.50		7.00				
	Aug. 20	98	5.00	81	6.00	13	6.50	2	7.00				
Plumbers' helpers and apprentices	June 10	26	1.00	1	1.25	14	1.50		2.00	1	2.50		3.50
	Aug. 20	70	1.00	1	1.25			56	2.00	12	2.50	1	3.50
Plasterers	June 10	23	6.00	19	7.00	1	7.50		8.00				4.50
	Aug. 20	88	6.00	81	7.00			2	8.00	4	9.00	1	10.00
Plasterers' apprentices	June 10	1	3.00		4.00								
	Aug. 20	2	3.00	1	4.00								
Structural iron workers	June 10	19	3.50	3	4.00	10	4.50		5.00		6.00		
	Aug. 20	67	3.50	28	4.00	11	4.50	27	5.00	1	6.00		
Structural iron workers' apprentices	June 10	1	2.50	1	3.00								
	Aug. 20	10	2.50	3	3.00								
Tile setters	June 10	5	7.00	1	7.50								
	Aug. 20	4	7.00	2	7.50								

Teamsters	June 10	101	97	2.50	4	2.75	73	3.00																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	</
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Laborers, 9 hours per day. Other occupations, usually 8 hours. Carpenters and allied trades, 44 hours per week.

A study of this table will show that between the two dates there was a general increase. Carpenters, for example, received a rate near \$4 per day on June 10, while on August 20 their wages had gone to \$4.50 per day. Laborers went from \$2 and \$2.25 to \$2.25 and \$2.50, bricklayers from \$7 to \$7.50 and \$8.00, electricians from \$3.50 and \$4 to \$5, plumbers from \$5 to \$6, teamsters from \$2.50 to \$3, and other occupations in proportion, representing an increase of from 15 to 20 per cent in the seventy days.

In September, an investigation was undertaken into the change in house rent since April. The table on the following page shows rents before April 18 and rents paid for the same premises in September.

The figures were collected from widely separated sections of the city. There are 175 dwellings considered. Excluding from these, 18 new dwellings at Ellis and Pierce streets, there are 157 on which these figures are based. From these 157 dwellings, there was a total monthly rental of \$3,896 prior to April 18. The same 157 dwellings were renting at the time of this inquiry for \$4,935.50, an increase of \$1,057.50, representing an increase of the latter over the rates prevailing before the fire of 27.1 per cent.

An investigation into the cost of lumber in construction, made by comparing prices current previous to April 18, and those prevailing in September, shows that pine lumber has increased 19.3 per cent, redwood 12.2 per cent, redwood shingles 33.3 per cent, and cedar shingles 23 per cent, according to actual schedule prices. Previous to the fire dealers generally allowed 2 per cent off the list price and 2 per cent for cash payment. Neither of these allowances are now made.

There seems to be little material difference in the cost of living in San Francisco aside from house rent, from that existing a year ago.

Since the fire, more than 6,000 buildings have been erected in the burned district up to October 31. More than \$50,000,000 has been spent in improvements. All of the 35 Class A buildings but one, which withstood the fire, are occupied, at least in part. More than 35,000 men are employed in reconstruction alone, and besides these there are a great many at work on street railway construction. Over 200 carloads of débris are being removed daily. The principal streets are practically cleared and sidewalks are being rapidly repaired. Building permits to the number of 4,486 have been issued, at a total valuation of \$27,020,033, or within a million dollars of the total issued in Baltimore during two years after the fire in that city.

Table Showing Change in Rents in the City of San Francisco from April 18 to the Present Time (September 1).

Locality.	Number of Houses Considered.	Number of Rooms per House.	Rent per Month before April 18.	Present Rent.	Percentage of Increase.
Treat avenue	3	5	\$18 00	\$21 00	16.6
Twentieth street	2	6	25 00	28 00	12.0
Twentieth street	2	6	21 00	24 00	14.2
Capp street	3	7	30 00	30 00	0.0
Capp street	2	9	30 00	30 00	0.0
Capp street	2	7	27 50	30 00	9.0
Capp street	1	7	25 00	25 00	0.0
Capp street	3	6	22 50	22 50	0.0
Capp street	1	7	25 00	35 00	40.0
Capp street	1	7	25 00	30 00	20.0
Capp street	1	5	22 50	27 50	22.2
Capp street	2	7	25 00	27 50	10.0
Capp street	2	6	22 50	25 00	11.1
Sixteenth street	10	4	20 00	25 00	25.0
Sixteenth street	10	4	21 00	26 00	23.8
Sixteenth street	10	4	22 00	27 00	22.7
Sixteenth street	2	5	21 00	25 00	19.0
Sixteenth street	2	5	24 00	27 50	14.5
Sixteenth street	2	5	25 00	28 00	12.0
Sixteenth street	1	5	18 00	26 00	44.4
Sixteenth street	1	5	25 00	30 00	20.0
Sixteenth street	1	5	30 00	35 00	16.6
Sixteenth street	1	5	20 00	26 00	30.0
Sixteenth street	1	5	20 00	27 50	37.5
Howard street	9	6	20 00	25 00	25.0
Howard street	9	7	22 50	30 00	33.3
Howard street	5	6	25 00	30 00	20.0
Howard street	1	7	27 50	32 50	14.5
Howard street	3	5	25 00	30 00	20.0
Howard street	1	4	16 00	25 00	56.2
Howard street	5	9	40 00	45 00	12.5
Folsom street	1	4	14 00	14 00	0.0
Folsom street	1	4	13 50	13 50	0.0
Folsom street	1	4	13 00	13 00	0.0
Folsom street	1	4	16 00	16 00	0.0
McAllister st., near Fillmore	3	5	30 00	76 50	155.0
Valencia street	8	5	25 00	30 00	20.0
Eddy street	1	6	40 00	60 00	50.0
Bartlett street	3	6	25 00	30 00	20.0
Bartlett street	1	7	27 50	32 50	14.5
Twenty-sixth street	1	6	27 50	32 50	14.5
Twenty-sixth street	1	6	30 00	35 00	16.6
Virgin street	4	5	20 00	25 00	25.0
Virgin street	4	6	20 00	25 00	25.0
Pierce street	5	5	22 50	27 50	22.2
Pierce street	2	4	12 50	15 00	20.0
Ellis street, near Pierce	9	4	New	27 50	0.0
Ellis street, near Pierce	9	4	New	30 00	0.0
O'Farrell street	4	6	30 00	40 00	33.3
Turk street	4	7	37 50	75 00	100.0
Linden avenue	4	3	11 00	25 00	127.2
Elm avenue	4	5	20 00	20 00	0.0
Elm avenue	3	5	20 00	30 00	50.0
Elm avenue	1	5	21 00	25 00	19.0
Elm avenue	1	11	45 00	75 00	66.6

WELFARE WORK.

Previous to the San Francisco fire much data had been gathered on social welfare in stores and factories throughout the State. Abundant evidence existed to show that many California employers have spared neither time nor money to provide many conveniences and betterments for their employés, and this was especially in evidence among the large retail stores in the cities of Los Angeles and San Francisco; the fire in the latter city, consuming almost the entire business section, has temporarily swept these improvements largely out of existence, but in Los Angeles, and in lesser degree in Oakland, Sacramento, Stockton, Fresno, San José, and other cities, provisions are made in many stores for supplying meals at cost, rooms for rest for temporarily indisposed employés, facilities for obtaining higher education, medical attendance and hospital privileges, sick benefits, etc., and it is becoming the general custom to allow pay during summer vacation to clerks and office staff in retail and wholesale stores and factories. Recent investigation shows from one to two weeks' vacation under pay to 198 employés in Stockton, 986 in Oakland, and 3,134 in San Francisco. These figures are in no sense exhaustive, but are given simply to show tendencies, and precisely the same conditions maintain in Los Angeles, San Diego, Sacramento, Fresno, San José, and many other cities. In addition, many firms pay wages during sickness.

It is the intention of this Bureau to make a fuller investigation of this phase of industrial life during the coming year.

LAWS AFFECTING LABOR.

In the Eleventh Report of this Bureau, the more important enactments of interest to and affecting labor were published. The 1905 session of the Legislature placed several additional statutes of importance on the books, and changed others by amendments. Inasmuch as the session to convene in January will very likely make further changes, no attempt is made here to give a complete list of the Labor Laws of the State. It is hoped to do this in the form of a bulletin from this office after the adjournment of the next Legislature.

The laws passed and amended in 1905 are as follows (the statute of 1889 is added in addition to the 1905 statutes):

CHAP. XVIII, STATS. OF 1905.—*An Act regulating the employment and hours of labor of children—prohibiting the employment of minors under certain ages—prohibiting the employment of certain illiterate minors—providing for the enforcement hereof by the Commissioner of the Bureau of Labor Statistics and providing penalties for the violation hereof.*

[Approved February 20, 1905.]

The people of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. No minor under the age of eighteen shall be employed in laboring in any manufacturing, mechanical, or mercantile establishment, or other place of labor, more than nine hours in one day, except when it is necessary to make repairs to prevent the interruption of the ordinary running of the machinery, or when a different apportionment of the hours of labor is made for the sole purpose of making a shorter day's work for one day of the week; and in no case shall the hours of labor exceed fifty-four hours in a week.

SEC. 2. No minor under the age of sixteen years shall be employed or permitted to work in any mercantile institution, office, laundry, manufacturing establishment, or workshop, between the hours of ten o'clock in the evening and six o'clock in the morning.

No child under fourteen years of age shall be employed in any mercantile institution, office, laundry, manufacturing establishment, workshop, restaurant, hotel, apartment house, or in the distribution or transmission of merchandise or messages.

Provided, that the judge of the juvenile court of the county, or city and county, or in any county or city and county in which there is no juvenile court, then any judge of the superior court of the county or city and county in which such child resides shall have authority to issue a permit to work to any such child over the age of twelve years, upon a sworn statement being made to him by the parent of such child that such child is past the age of twelve years, that the parents or parent of such child are incapacitated for labor, through illness, and after investigation by a probation officer or truant officer of the city, or city and county, in which such child resides, or in cities and counties where there are no probation or truant officers, then by such other competent person as the judge may designate for this purpose. The permit so issued shall specify the kind of labor and the time for which it is issued, and shall in no case be issued for a longer period than shall seem necessary to the judge issuing such permit. Such permit shall be kept on file by the person, firm, or corporation employing the child therein designated, during the term of said employment, and shall be given up to such child upon his quitting such employment. Such certificate shall be always open to the inspection of the truant and probation officers of the city and county, city or county, in which the place of employment is situated, or of the officers of the State Bureau of Labor Statistics.

And provided, that any such child over the age of twelve years may be employed at any of the occupations mentioned in this Act during the regular vacation of the public schools of the city, county, or city and county, in which the place of employment is situated, upon the production of a permit signed by the principal of the school which such child has attended during the term next preceding any such vacation. Such permit shall contain the name and age of the child to whom it is issued, and the date of the termination of the vacation for which it is issued, and shall be kept on file by the employer during the period of employment, and at the termination of such employment shall be returned to the child to whom it was issued.

No minor who is under sixteen years of age shall be employed or permitted to work at any gainful occupation during the hours that the public schools of the city, town or school district in which his place of employment is situated are in session, unless he or she can read English at sight and can write legibly and correctly simple English sentences, or unless he or she is a regular attendant for the then current term at a regularly conducted night school. A certificate of the principal of such school shall be held to be sufficient evidence of such attendance.

SEC. 3. Every person, firm, or corporation employing minors under eighteen years of age, in any manufacturing establishment, shall post,

and keep posted, in a conspicuous place in every room where such help is employed, a written or printed notice stating the number of hours per day for each day of the week required of such persons.

Every person, firm, or corporation, agent or officer of a firm or corporation employing or permitting minors under sixteen years and over fourteen years of age to work in any mercantile institution, office, laundry, manufacturing establishment, workshop, restaurant, hotel, apartment house, or in the distribution or transmission of merchandise or messages, shall keep a record of the names, ages, and places of residence of such minors, and shall have on file a certificate of age and schooling, as provided in this Act, for every such minor so employed, said record and certificate to be open at all times to the inspection of those whose duty it is to enforce the provisions of the Act.

An age and schooling certificate shall be approved only by the superintendent of schools of the city or city and county, or by a person authorized by him, in writing, or where there is no city or city and county superintendent of schools, by a person authorized by the local school trustees; *provided*, that the superintendent or principal of any school of recognized standing shall have the right to approve an age and schooling certificate, and shall have the same rights and powers as the superintendent of public schools to issue the certificate herein provided, for children attending such schools. The persons authorized to issue age and schooling certificates shall have the authority to administer the oaths necessary for carrying out the provisions of this Act, but no fees shall be charged for issuing such certificates.

An age and schooling certificate shall not be approved unless satisfactory evidence is furnished by the last school census, the certificate of birth or baptism of such child, the public register of birth of such child, or in some other manner, that such child is of the age stated in the certificate.

A duplicate copy of each age and schooling certificate granted under the provisions of this Act shall be kept by the person issuing such certificate, such copy to be filed with the county superintendent of schools in the county where the certificate was issued; *provided*, that all such copies of certificates issued between June 25th and December 25th of any year shall be filed not later than December 31st of such year, and those issued between December 25th and June 25th of the ensuing year shall be filed not later than June 30th of each year. Such certificate shall be substantially in the following form, to wit:

Age and Schooling Certificate.—This certifies that I am the (father, mother, or guardian) of (name of child), and that (he or she) was born at (name of town or city), in the county of (name of county) (if known)

and State (or country) of (name), on the (day and year of birth), and is now (number of years and of months) old.

Signature as provided in this Act.

Town or city, and date.

There personally appeared before me the above-named (name of person signing) and made oath that the foregoing certificate by (him or her) signed is true to the best of (his or her) knowledge and belief.

I hereby approve the foregoing certificate of (name of child) height (feet and inches), complexion (fair or dark), hair (color), having no sufficient reason to doubt that (he or she) is of the age therein certified, and I hereby certify that (he or she) can or can not read English at sight, and can or can not write legibly simple sentences in the English language.

Signature of the person authorized to sign, with his official character and authority.

Town or city, and date.

This certificate belongs to the person in whose behalf it is drawn, and it shall be surrendered to (him or her) whenever (he or she) leaves the service of the person, firm, or corporation holding the same.

The certificate as to the birthplace and age of the minor under sixteen and over fourteen years of age shall be signed by his father, his mother, or his guardian; if a child has no father, mother, or guardian living in the same city or town, his own signature to the certificate may be accepted by the person authorized to approve the same.

Every person authorized to sign the certificate prescribed by this Act, who knowingly certifies to any false statement therein, is guilty of a misdemeanor and upon conviction thereof shall be fined not less than five nor more than fifty dollars, or imprisonment not more than thirty days, or by both such fine and imprisonment.

SEC. 4. Any person, firm, corporation, agent, or officer of a firm or corporation that violates or omits to comply with any of the foregoing provisions of this Act, or that employs, or suffers, or permits any minor to be employed in violation thereof, is guilty of a misdemeanor and shall, on conviction thereof, be punished by a fine of not less than fifty dollars or more than two hundred dollars, or by imprisonment for not more than sixty days, or by both such fine and imprisonment, for each and every offense. A failure to produce any age and schooling certificate or permit, or to post any notice required by this Act, shall be prima facie evidence of the illegal employment of any person whose age and schooling certificate or permit is not produced, or whose name is not so posted. Any fine collected under the provisions of this Act shall be paid into the school funds of the county, or city and county, in which the offense occurred.

SEC. 5. Nothing in this Act shall be construed to prohibit the employment of minors at agricultural, horticultural, viticultural or domes-

tic labor, during the time the public schools are not in session, or during other than school hours.

SEC. 6. It shall be the duty of the Commissioner of the Bureau of Labor Statistics to enforce the provisions of this Act. But any person may lay an information before a magistrate of the commission of any public offense defined in this Act.

SEC. 7. This Act shall take effect sixty days after its passage.

The foregoing statute was declared constitutional in a unanimous opinion of the State Supreme Court in the case of *Ex Parte Spencer*, decided July 9, 1906.

CHAP. V, STATS. OF 1889.—*An Act to provide for the proper sanitary condition of factories and workshops, and the preservation of the health of the employés.*

[Approved February 6, 1889.]

The people of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. Every factory, workshop, mercantile or other establishment, in which five or more persons are employed, shall be kept in a cleanly state and free from the effluvia arising from any drain, privy, or other nuisance, and shall be provided, within reasonable access, with a sufficient number of water-closets or privies for the use of the persons employed therein. Whenever the persons employed as aforesaid are of different sexes, a sufficient number of separate and distinct water-closets or privies shall be provided for the use of each sex, which shall be plainly so designated, and no person shall be allowed to use any water-closet or privy assigned to persons of the other sex.

SEC. 2. Every factory or workshop in which five or more persons are employed shall be so ventilated while work is carried on therein that the air shall not become so exhausted as to be injurious to the health of the persons employed therein, and shall also be so ventilated as to render harmless, as far as practicable, all the gases, vapors, dust, or other impurities generated in the course of the manufacturing process or handicraft carried on therein, that may be injurious to health.

SEC. 3. No basement, cellar, underground apartment, or other place which the Commissioner of the Bureau of Labor Statistics shall condemn as unhealthy and unsuitable, shall be used as a workshop, factory, or place of business in which any person or persons shall be employed.

SEC. 4. (As amended, Stats. of Cal., 1901, p. 571.) In any factory, workshop, or other establishment where a work or process is carried on by which dust, filaments, or injurious gases are generated or produced, that are liable to be inhaled by persons employed therein, the person,

firm, or corporation by whose authority the said work or process is carried on shall cause to be provided and used in said factory, workshop, or establishment an exhaust fan or blower, with pipes and hoods extending therefrom to each wheel or other apparatus used to grind, polish, or buff metals. The said fan or blower, and the said pipes and hoods, all to be properly fitted and adjusted, and of power and dimensions sufficient to effectually prevent the dust and filaments produced by the above said metal-polishing, metal-grinding, or metal-buffing from escaping into the atmosphere of the room or rooms of said factory, workshop, or establishment where persons are employed.

SEC. 5. (As amended, Stats. of Cal., 1903, p. 14.) Every person, firm, or corporation employing females in any manufacturing, mechanical, or mercantile establishment shall provide suitable seats for the use of the females so employed, and shall provide such seats to the number of at least one third the number of females so employed; and shall permit the use of such seats by them when they are not necessarily engaged in the active duties for which they are employed.

SEC. 6. (As amended, Stats. of Cal., 1901, p. 572.) Any person or corporation violating any of the provisions of this Act is guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine of not less than fifty dollars nor more than three hundred dollars, or by imprisonment in the county jail for not less than thirty days nor more than ninety days, or by both such fine and imprisonment, for each offense.

SEC. 7. It shall be the duty of the Commissioner of the Bureau of Labor Statistics to enforce the provisions of this Act.

SEC. 8. This Act shall take effect and be in force from and after its passage.

CHAP. CDXVII, STATS. OF 1905.—*An Act to repeal Title IV of Part III of Division First of the Civil Code and each and every section of said title, and to substitute a new Title Four to take the place thereof in said Code, relating to masters and apprentices.*

[Approved March 21, 1905.]

* * * * *

SEC. 264. Every minor of the age of fourteen years or upwards may be bound by indenture as an apprentice to any mechanical trade or art or occupation of farming to the age of eighteen years, if a female, or to the age of twenty-one years, if a male.

SEC. 265. A minor, with his consent, may be bound by his father, or, in case of his death or incompetency, or where he has willfully abandoned his family for one year without making suitable provision for their support, or is habitually intemperate in the use of intoxicants, or

is a vagrant, then by his mother or legal guardian. An executor, who, by the will of the father, is directed to bring up a child to a trade or calling, has power to bind by indenture in like manner as the father might have done, if living. If such child is illegitimate, the mother alone has power to bind him. If a minor has no parent or guardian competent to act for him, he may bind himself, with the approval of the superior court of the county wherein he resides. If the mother of the minor, whether legitimate or illegitimate, marries after his birth, she can not bind him without the approval of such superior court.

SEC. 266. Every indenture of apprenticeship must be executed in duplicate, must state the age of the minor, and, except as hereinafter provided, must show that he consented thereto, must be signed by him and the person binding and the master, and when made with the approval of the superior court, a certified copy of the order of approval must be attached to the indenture. One copy of the indenture must be delivered to the master and the other kept for the use of the minor by his parent or guardian when executed by him, when made with the approval of the court, it must be filed and deposited with the clerk for safe-keeping for the use of the minor. No indenture binds the minor after the death of the master, but thereafter the minor may be bound anew. Every indenture entered into otherwise than as herein provided is, as against the apprentice, absolutely void.

SEC. 267. Facts of incapacity, desertion, habitual intemperance, and vagrancy must be decided in said court by a jury, before the indenture can take effect, and an endorsement on the indenture, under seal of the court, that the charge or charges are proved, is sufficient evidence of the mother's power to give such consent; but if the jury does not find the charge or charges to be true, the person at whose instance such proceedings may have been had must pay all costs attending the same.

SEC. 268. When a minor is poor, homeless, chargeable to the county or State, or an outcast who has no visible means of obtaining an honest livelihood, the superior court may, with his consent, bind him as an apprentice during his minority. Proceedings thereafter may be instituted by any citizen, and no fee must be charged by any officer for any act in connection therewith. In all indentures by the court for binding out an orphan, or homeless minor as an apprentice there must be inserted, among other things, a clause to the following effect: that the master to whom such minor is bound must cause him to be taught to read and write and the ground rules of arithmetic, ratio and proportion, and must give him the requisite instruction in the different branches of his trade or calling, and, at the expiration of his term of service, must give him or her fifty dollars in gold, and two whole new suits of clothes, to be worth in the aggregate at least sixty dollars gold.

SEC. 269. A master must not remove his apprentice out of the State, and must pay and deliver to him the money, clothes, and other prop-

erty to which he is entitled under the indenture of apprenticeship, to be held by him as his sole property.

SEC. 270. Parents and guardians and such court must, from time to time, inquire into the treatment of children bound by them respectively, or with their approval, and the judges of such courts are responsible for the charge of apprentices bound by a court or with its approval, and must defend them from all cruelty, neglect, breach of contract, or misconduct on the part of their masters.

SEC. 271. The superior court must hear the complaints of apprentices who reside within the county against their masters, alleging undeserved or immoderate correction, insufficient allowance of food, raiment, or lodging, want of instruction in the different branches of their trade or calling, or that they are in danger of being removed out of the State, or any violation of the indenture of apprenticeship, and the court must hear and determine such case and make such order therein as will relieve the party in the future.

SEC. 272. The superior court has the power, where circumstances require it, to discharge an apprentice from his apprenticeship, and, in case any money or other thing has been paid or contracted to be paid by either party in relation to the apprenticeship, the court must make such order concerning the same as seems just and reasonable. If the apprentice so discharged was originally bound by the superior court, it must, if found necessary, again bind such minor, if under age.

SEC. 273. Every master is liable to an action on the indenture for a breach of any covenant thereof on his part. All damages recovered in such action, after deducting necessary charge in its prosecution, belong to the minor, and must be applied and appropriated to his use by the person recovering it in his behalf, and must be paid to the minor, if a male, at the age of twenty-one years, and if a female, at the age of eighteen years. If no action is brought during the minority of the apprentice, it may be commenced by him in his own name at any time within two years after his coming of age.

SEC. 274. An apprentice who is guilty of any gross misbehavior, or refusal to do his duty, or willful neglect thereof, is liable to the complaint of his master in the superior court of the county wherein the apprentice resides. Such complaint must set forth the circumstances of the case, and have attached thereto a citation, signed by the clerk of the court, requiring him and all persons who have covenanted in his behalf to appear and answer the complaint within ten days after the service thereof. The complaint and citation must be served in the manner required for serving civil process. When the parties have answered, or when, though they have not answered, the time therefor allowed after the service of the complaint has expired, the court must proceed to hear and determine the cause, and, if the evidence warrants

it, may render judgment that the master be discharged from the contract of apprenticeship and for costs of suit. Such costs may be recovered from the parent or guardian of the minor, if there is any who signed the indenture, and execution therefor may issue accordingly. If there is no parent or guardian liable for such cost, execution may be issued therefor against the minor, or the amount thereof may be recovered in an action against him after he arrives at full age. He is also liable to the master in an action on the indenture for the breach of any covenant on the part of the apprentice contained therein, committed before the master was discharged from the indenture.

SEC. 275. It is unlawful for any person to entice, counsel, or persuade to run away any apprentice, or to harbor, or conceal him, knowing him to be a runaway. Any party so offending is guilty of a misdemeanor, and may be fined not more than one hundred dollars, to be recovered by the master in any court having jurisdiction.

SEC. 276. Whenever any master wishes to remove out of the State, or to quit his trade or business, he must appear with his apprentice before the superior court of the county in which the latter resides, and if the court is satisfied that the master has done justice to the apprentice for the time he has had charge of him, the court has power to discharge the master from the indenture and to again bind the apprentice, if necessary.

Crimes Against Children.

SEC. 272, PENAL CODE. Any person, whether as parent, relative, guardian, employer, or otherwise, having the care, custody, or control of any child under the age of sixteen years, who exhibits, uses, or employs, or in any manner, or under any pretense, sells, apprentices, gives away, lets out, or disposes of any such child to any person, under any name, title, or pretense, for or in any business, exhibition, or vocation, injurious to the health or dangerous to the life or limb of such child, or in or for the vocation, occupation, service, or purpose of singing, playing on musical instruments, rope or wire walking, dancing, begging, or peddling, or as a gymnast, acrobat, contortionist, or rider, in any place whatsoever, or for or in any obscene, indecent or immoral purposes, exhibition, or practice whatsoever, or for or in any mendicant or wandering business whatsoever, or who causes, procures or encourages such child to engage therein, is guilty of a misdemeanor, and punishable by a fine of not less than fifty nor more than two hundred and fifty dollars, or by imprisonment in the county jail for a term not exceeding six months, or by both such fine and imprisonment. Nothing in this section contained applies to or affects the employment or use of any such child, as a singer or musician in any church, school, or academy, or the teaching or learning of the science or practice of music; or the employment of any such child as a musician at any concert or other

musical entertainment, on the written consent of the mayor of the city or president of the board of trustees of the city or town where such concert or entertainment takes place.

SEC. 273, PENAL CODE. Every person who takes, receives, hires, employs, uses, exhibits, or has in custody, any child under the age, and for any of the purposes mentioned in the preceding section, is guilty of a like offense, and punishable by a like punishment as herein provided.

CHAP. DV, STATS. of 1905.—*An Act to add two new sections to the Penal Code, to be numbered six hundred and fifty-three c and six hundred and fifty-three d, both relating to crimes against employés.*

[Approved March 21, 1905.]

The people of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. A new section is hereby added to the Penal Code, to be numbered 653c, and to read as follows:

653c. The time of service of any laborer, workman, or mechanic employed upon any of the public works of the State of California, or of any political subdivision thereof, or upon work done for said State, or of any political subdivision thereof, is hereby limited and restricted to eight hours during any one calendar day; and it shall be unlawful for any officer or agent of said State, or of any political subdivision thereof, or for any contractor or subcontractor doing work under contract upon any public works aforesaid, who employs, or who directs or controls, the work of any laborer, workman, or mechanic, employed as herein aforesaid, to require or permit such laborer, workman, or mechanic, to labor more than eight hours during any one calendar day, except in cases of extraordinary emergency, caused by fire, flood, or danger to life or property, or except to work upon public military or naval defenses or works in time of war. Any officer or agent of the State of California, or of any political subdivision thereof, making or awarding, as such officer or agent, any contract, the execution of which involves or may involve the employment of any laborer, workman, or mechanic upon any of the public works, or upon any work, hereinbefore mentioned, shall cause to be inserted therein a stipulation which shall provide that the contractor to whom said contract is awarded shall forfeit, as a penalty, to the State or political subdivision in whose behalf the contract is made and awarded, ten dollars for each laborer, workman, or mechanic employed, in the execution of said contract, by him, or by any subcontractor under him, upon any of the public works, or upon any work, hereinbefore mentioned, for each calendar day during which laborer, workman, or mechanic is required or permitted to labor more than eight hours in violation of the provisions of this Act; and it

shall be the duty of such officer or agent to take cognizance of all violations of the provisions of said Act committed in the course of the execution of said contract, and to report the same to the representative of the State or political subdivision, party to the contract, authorized to pay to said contractor moneys becoming due to him under the said contract, and said representative when making payments of moneys thus due, shall withhold and retain therefrom all sums and amounts which shall have been forfeited pursuant to the herein said stipulation. Any officer, agent, or representative of the State of California, or of any political subdivision thereof, who shall violate any of the provisions of this section, shall be deemed guilty of a misdemeanor, and shall upon conviction be punished by fine not exceeding five hundred dollars, or by imprisonment, not exceeding six months, or by both such fine and imprisonment, in the discretion of the court.

SEC. 2. A new section is hereby added to the Penal Code to be numbered 653*d*, and to read as follows:

653*d*. Every person who employs laborers upon public works, and who takes, keeps, or receives for his own use any part or portion of the wages due to such laborers from the State or municipal corporation for which such work is done, is guilty of a felony.

CHAP. XXXIV, STATS. OF 1905.—*An Act to regulate the work and hours of employes engaged in selling, at retail, drugs and medicines, and compounding physician's prescriptions, and providing a penalty for the violation thereof.*

[Approved February 28, 1905.]

The people of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. As a measure for the protection of public health, no person employed by any person, firm or corporation, shall for more than an average of ten hours a day or sixty hours a week of consecutive calendar days, perform the work of selling drugs or other medicines, or compounding physician's prescriptions, in any store, establishment or place of business, where and in which drugs or medicines are sold, at retail, and where and in which physician's prescriptions are compounded; *provided*, that the answering of and attending to emergency calls shall not be construed as a violation of this Act.

SEC. 2. No person, firm or corporation employing another person to do work which consists wholly or in part of selling, at retail, drugs or medicines, or of compounding physicians' prescriptions, in any store, or establishment or place of business where or in which medicines are sold and where and in which physicians' prescriptions are compounded shall require or permit said employed person to perform such work for

more than an average of ten hours a day, or sixty hours a week of six consecutive calendar days.

SEC. 3. Any person, firm or corporation, violating any of the provisions of this Act, shall be deemed guilty of misdemeanor and shall be punished therefor by a fine of not less than fifty dollars, or by imprisonment for not exceeding sixty days, or by both such fine and imprisonment, in the discretion of the court.

SEC. 4. All Acts or parts of Acts inconsistent with the provisions of this Act are hereby repealed.

CHAPTER CXLV, STATS. OF 1905.—*An Act amending an Act entitled "An Act defining the duties and liabilities of employment agents, making the violation thereof a misdemeanor, and fixing the penalties therefor," approved February 12, 1903.*

[Approved March 18, 1905.]

The people of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. Section three of an Act entitled "An Act defining the duties and liabilities of employment agents, making the violation thereof a misdemeanor, and fixing the penalties therefor," approved February 12, 1903, is amended to read as follows:

Section 3. It shall be unlawful for any employment agent in the State of California, to induce, influence, persuade, or engage any person to change from one place to another in this State, or to change from any place in any State, territory, or country, to any place in this State to work in any branch of labor, through or by means of any representations whatsoever, whether spoken, written, or advertised in printed form, unless such employment agent shall have assured himself beyond a reasonable doubt that such representations are true and cover all material facts affecting the employment in question. Whenever any such representation, whereby any person is induced, influenced, persuaded, or engaged to change from one place to another in this State, or from any place in any State, territory, or country, to any place in this State to work in any branch of labor, shall prove to be in any material degree at variance with, or short of the truth, the employment agent responsible for such representations shall immediately return to any person who shall have been influenced by such representations, any and all such fees paid by such person to said employment agent on the strength of such representations, together with an amount of money sufficient to cover all necessary expenses incurred by such person influenced by such representations in going to and returning from any place he shall have been influenced by such representations to visit in hope of such employment.

SEC. 2. Section four of said Act is hereby repealed.

Lumbermen's Lien.

SEC. 3065, CIVIL CODE. A person who labors at cutting, hauling, rafting, or drawing logs, bolts, or other timber, has a lien thereon for the amount due for his personal services, which takes precedence of all other claims, to continue for thirty days after the logs, bolts, or other timber arrive at the place of destination for sale or manufacture, while such logs, bolts, or other timber are in the county in which such labor was performed. The lien hereby created ceases and determines unless the claimant thereof, within twenty days from the time such labor is completed, brings suit to foreclose the same. The plaintiff in any such suit, at the time of issuing the summons or at any time afterwards, may have the logs, bolts, or other timber upon which such lien subsists attached, as provided in this code, upon delivering to the clerk an affidavit by or on behalf of the plaintiff, showing that the defendant is indebted to the plaintiff upon a demand for labor performed, either in the cutting, hauling, rafting, or drawing such logs, bolts, or other timber, and that the sum for which the attachment is asked is an actual bona fide existing debt, due and owing from the defendant to the plaintiff, and that the attachment is not sought, and the action is not brought, to hinder, delay, or defraud any creditor or creditors of the defendant.

Law Regarding Scaffolding.

SEC. 402c, PENAL CODE. Any person or corporation employing or directing another to do or perform any labor in the construction, alteration, repairing, painting or cleaning of any house, building, or structure within this State, who knowingly or negligently furnishes or erects or causes to be furnished or erected for the performance of such labor, unsafe or improper scaffolding, slings, hangers, blocks, pulleys, stays, braces, ladders, irons, ropes, or other mechanical contrivances, or who hinders or obstructs any officer attempting to inspect the same under the provisions of "An Act to amend an Act entitled 'An Act to establish and support a Bureau of Labor Statistics, approved March 3, 1883,' approved February 20, 1901," or who destroys, defaces or removes any notice posted thereon by such officer or permits the use thereof, after the same has been declared unsafe by such officer, contrary to the provisions of said section twelve of said Act, shall be guilty of a misdemeanor.

DECISIONS OF SUPREME COURT AFFECTING CHILD LABOR LAWS.

The litigation concerning the validity of the Child Labor Law and Section 273 of the Penal Code, in which cases the prosecution was carried on by this Bureau, led to two decisions in the Supreme Court, *Ex parte Spencer* on the Child Labor Law and *Ex parte Weber* on Section 273, upholding these statutes in every particular. The decisions are considered of sufficient interest to warrant their publication.

In Bank. Crim. No. 1332.

IN THE MATTER OF THE
APPLICATION OF J. M. SPENCER, }
FOR A WRIT OF HABEAS CORPUS.

The petitioner was arrested and confined upon a charge of violating Sections 2 and 4 of the Act of February 20, 1905, regulating the employment and hours of labor of children and prohibiting the employment of illiterate minors and of minors under certain ages. (Stats. 1905, p. 11.) The return to the preliminary writ shows that the petitioner was arrested and taken into custody upon four several complaints, relating to four different children, each complaint charging him with employing a child under fourteen years of age in the workshop and boiler-room of a steamer, the child not then having a permit to work from the judge of the juvenile court of the county, and the time of such employment not being the time of the vacation of the public schools.

The second clause of Section 2 of the Act provides that no child under fourteen years of age shall be employed in any mercantile institution, office, laundry, manufactory, workshop, restaurant, hotel, or apartment house, or in the distribution or transmission of merchandise or messages; provided, that upon the sworn statement of the parent that the child is over twelve years of age and that the parent or parents are unable, from sickness, to labor, the judge of the juvenile court, in his discretion, may issue a permit allowing such child to work for a specific time; and provided further, that during the time of the regular vacation of the public schools of the city or county, any child over twelve years of age may work at any of the prohibited occupations, upon a permit from the principal of the school attended by the child during the immediately preceding term. Section 4 of the Act declares that a violation of any of the provisions of the Act shall be a misdemeanor. The complaints charge violation of these provisions.

Several objections on constitutional grounds are made to the validity of the Act. It is claimed that it is special law for the punishment of

crime, where a general law could be made applicable, and, therefore, contrary to Sections 2 and 33 of Article IV of the Constitution of California; that it is not of uniform operation, but is discriminatory; and hence in conflict with Sections 11 and 21 of Article I; and that it would deprive persons of the right to acquire and possess property, thus violating Section 1 of Article I of the State Constitution and the Fourteenth Amendment to the Constitution of the United States.

The presumption always is that an Act of the Legislature is constitutional, and when this depends on the existence, or non-existence, of some fact, or state of facts, the determination thereof is primarily for the Legislature, and the courts will acquiesce in its decision, unless the error clearly appears. (*Bourland vs. Hildreth*, 26 Cal. 184; *University vs. Bernard*, 57 Cal. 612; *In re Madera Irr. Dist.*, 92 Cal. 310; *Sinking Fund Cases*, 99 U. S. 718; *Tiedman on Police Power*, Vol. I, p. 10, note; *Cooley, Const. Lim.*, 7th ed., 228.)

"Every possible presumption is in favor of the validity of a statute, and this continues until the contrary is shown beyond a rational doubt. One branch of the government can not encroach on the domain of another without danger. The safety of our institutions depends in no small degree on a strict observance of this salutary rule." (*Sinking Fund Cases*, *supra*.)

"The delicate act of declaring an Act of the Legislature unconstitutional and void should never be exercised unless there is a clear repugnancy between the statute and the organic law. * * * In a doubtful case the benefit of the doubt is to be given to the Legislature; but it is to be remembered that the doubt to which this rule of construction refers is a reasonable doubt as distinguished from vague conjecture or misgivings." (*Bourland vs. Hildreth*, *supra*.)

From their tender years, immature growth, and lack of experience and knowledge, minors are more subject to injury from excessive exertion and less capable of self-protection than adults. They are therefore peculiarly entitled to legislative protection and form a class to which legislation may be exclusively directed without falling under the constitutional prohibitions of special legislation and unfair discrimination.

The first objection to the validity of the part of the section above stated is that it is discriminatory and special because it does not prohibit such employment of minors in all occupations, but only in those specifically mentioned; that work at other places, of which saloons, barbershops, railroads, ferries, and warehouses are specified by counsel as instances, would be equally injurious, and that in order to be general and uniform they should be included in the prohibition. The objection is twofold: first, that the legislation constitutes an unfair discrimination against the particular trades mentioned; second, that it

unduly and without reasonable cause restricts the right of minors to work at any and every occupation in which they may wish to engage. There is nothing in the Act to indicate a purpose on the part of the Legislature to make use of the laudable object of protecting children as a mere pretense under which to impose burdens upon some occupations or trades and favor others. It appears to have been framed in good faith and for the purpose of promoting the general welfare by protecting minors from injury by overwork and facilitating their attendance at schools. The Legislature may undoubtedly forbid the employment of children under the age of fourteen years at any regular occupation if the interests of the children and the general welfare of society will be thereby secured and promoted. The power to forbid their employment in certain occupations and not in all depends on the question whether or not any appreciable number of children are employed in the callings not forbidden, and whether or not those callings are injurious to them, or less injurious than those forbidden. If certain occupations are especially harmful to young children and others are not so, there can be no serious doubt that it is within the power of the Legislature to forbid their employment in one class and permit it in the other. The difference in the results would justify the classification with a view to the difference in the legislation. Also, if children are employed in certain occupations to their injury and are not employed at all in others, or so infrequently that the number is inappreciable and insignificant, the occupations regularly employing them have no ground to complain of discrimination. They compose the entire class to which the legislation is directed, the class which causes the injury to be prevented. And upon the facts assumed neither the children engaged in the occupation in which they are employed nor the persons would be affected by the prohibition as to other occupations. The preliminary questions as to the effect of the specified occupations on the children and the number of children engaged therein, are questions of fact for the Legislature to ascertain and determine. It has determined that the facts exist to authorize the particular legislation. If any rational doubt exists as to the soundness of the legislative judgment upon the existence of the facts, that doubt must be resolved in favor of the legislative action and the law must accordingly be held to be valid in these respects. The specifications of forbidden callings are broad and comprehensive. Even if these, which as counsel assert, are omitted from the classification, we can not say that a saloon is not a "mercantile institution," it being a place where merchandise is sold; nor that a barbershop is not a "workshop," it being a place where a handicraft is carried on; nor that ferries and railroads are not engaged in the "distribution or transmission of merchandise or messages." At all events, in view of the rule that a statute must be liberally construed to the end

that it may be declared constitutional rather than unconstitutional (*People vs. Hayne*, 83 Cal. 117; 26 *Am. & Eng. Encyc. of Law*, 640), we would not give the description of forbidden occupations this narrow construction in order to make the law invalid. The decision of the Legislature that the specified occupations are more injurious to children than others not mentioned and hence the subject of special regulation, and that they constitute practically all the injurious occupations in which children are employed at all, and therefore the only cases in which regulation is needed, is not so manifestly incorrect, not so beclouded with doubt concerning its accuracy, as to justify the court in declaring it unfounded and the law, consequently, invalid.

There is a proviso to this clause of the section, to the effect that if either parent of such child makes a sworn statement to the judge of the juvenile court of the county, that the child is over twelve years of age, and that the parent or parents are unable, from sickness, to labor, such judge, in his discretion, may issue a permit allowing such child to work for a time to be specified therein. There is no force to the objection that this discriminates against orphans and abandoned children. The exception allowed by the proviso is not made for the direct benefit of the child, but for the sick parent. It is a burden put upon the child because of the special necessity of his case which justifies the different provision respecting him. The Legislature deems the necessity of allowing the child to work to aid in the support of the sick parent, sufficient to outweigh the benefits which would otherwise accrue from the education and protection of the child during such inability. If there are no parents whose necessities the child's labor could alleviate, the reason for this exception is wanting. The provision seems a reasonable one in view of the conditions upon which, alone, it can apply.

There is a further proviso or exception, to the effect that any child over twelve years old may work at the prohibited occupations during the time of the regular vacations of the public schools of the city or county, upon a permit from the principal of the school attended by the child during the term next preceding such vacation. This does not, as counsel contends, give the principals of the public schools the exclusive power to give the contemplated permits. Its true meaning is that the permit is to be given by the principal of the school which the child has attended, whether the school is public or private, but that it can extend only to the time of the public school vacation. This Act was approved February 20, 1905. Its provisions relating to attendance upon schools, and those of Section 1 of the Act of March 24, 1903 (Stats. 1903, 388), with the amendment of March 20, 1905 (Stats. 1905, 388), to said Section 1 must be considered together. The Act of 1903, in effect, requires all children to attend, either the public schools, or a private school, during at least five months of the time of the sessions of

the public schools. The amendment of March 20, 1905, extends the time of such compulsory attendance so as to embrace the whole period of the public school session. Therefore, if the parents, guardians, or custodians of a child choose to send it to a private school, it must attend thereon at least during the time the public schools are in session. A permit may then be obtained for it to work during the vacation of the public schools, if its interests or necessities so require, without subjecting it to conditions substantially different from those affecting the children attending the public schools. There is no discrimination. The Legislature has the power to make such reasonable regulations as these with respect to the time of the vacations of schools, whether public or private, in the interest of the public welfare and the welfare of the children.

A third clause of Section 2 declares that no child under sixteen years of age shall work at any gainful occupation during the hours that the public schools are in session, unless such child can read English at sight and write simple English sentences, or is attending night school. The first clause of Section 2 provides that no minor under sixteen shall work in any mercantile institution, office, laundry, manufacturing establishment, or workshop, between ten o'clock in the evening and six o'clock in the morning. Section 5 of the Act further provides that nothing in the Act is to be construed to prevent the employment of minors at agricultural, viticultural, horticultural or domestic labor, during the time the public schools are not in session, or during other than school hours. The petitioner's contention with respect to the first and last clause of Section 2 is that they constitute such important parts of the statute that it can not be presumed that the Legislature would have adopted the other parts thereof if it had been aware of the invalidity of these particular provisions and hence the whole Act must fall. We can not accede to this proposition. They are separable and independent provisions and are not so important to the entire scheme as to justify us in concluding that the Legislature would have refused to adopt the other parts without these, and thereby to declare the entire statute invalid.

Nor can it be conceded that these provisions are invalid. The principles already discussed apply with equal force to the first clause of the section. The proviso concerning illiterate children is a reasonable regulation to prevent those having control of such children from working them to such an extent as to hinder them from acquiring, or endeavoring to acquire, at least the beginning of an education before arriving at the age of sixteen years. The exemption of domestic labor and the several kinds of farming from the operation of the Act is not an unreasonable discrimination. Such work is generally carried on at the home and as a part of that general home industry which should not be

too much discouraged, and it is usually under the immediate care and supervision of the parents or those occupying the place of parents, and hence is not liable to cause so much injury. These circumstances distinguish them from the prohibited industries and is a sufficient reason for the exemption.

We find no reasonable ground for declaring the law invalid.

The petition is denied and the petitioner remanded to the custody of the officer.

SHAW, J.

We concur:

SLOSS, J.; ANGELOTTI, J.; LORIGAN, J.; BEATTY, C. J.

McFARLAND, J., *concurring*:

I concur in the judgment, and in what is said by Mr. Justice Shaw in his opinion; but I do not concur in some of the quotations which he makes from other cases, and particularly in that quotation in which it is stated that the presumption in favor of the validity of a statute "continues until the contrary is shown beyond a rational doubt." That is, in my opinion, too strong a statement of a rule.

McFARLAND, J.

In Bank. Crim. No. 1331.

IN THE MATTER OF THE
APPLICATION OF HENRY WEBER }
FOR A WRIT OF HABEAS CORPUS.

The petitioner was arrested and confined for an alleged violation of Section 273 of the Penal Code. The return shows that he is in custody upon separate complaints relating to different children. Each complaint charges that the defendant did willfully and unlawfully take, receive, hire, employ and use a certain male child, naming him, under the age of sixteen years, in the business of scaling the boilers of a steamer, the said business being then and there dangerous to the life and limb of said child. The petition for a writ of habeas corpus is based upon the proposition that the law under which the complaint was made is unconstitutional and void. Section 273 refers to the preceding Section 272, and it is necessary to state the substance, at least, of both sections.

Section 272, so far as material, is as follows: "Any person * * * having the care, custody, or control of any child under the age of sixteen years, who exhibits, uses, or employs, or in any manner, or under any pretense, sells, apprentices, gives away, lets out, or disposes of any such child to any person, * * * for or in any business, exhibition, or vocation, injurious to the health, or dangerous to the life or limb of such child, or in or for the vocation, occupation, service, or purpose of singing,

playing on musical instruments, rope or wire walking, dancing, begging, or peddling, or as a gymnast, acrobat, contortionist or rider, in any place whatsoever, or for or in any obscene, indecent or immoral purpose, exhibition or practice whatsoever, or for or in any mendicant or wandering business whatsoever, or who causes, procures, or encourages such child to engage therein, is guilty of a misdemeanor. * * * Nothing in this section contained applies to or affects the employment or use of any such child, as a singer or musician in any church, school, or academy, or the teaching or learning of the science or practice of music; or the employment of any child as a musician at any concert or any other musical entertainment, on the written consent of the mayor of the city or president of the board of trustees of the city or town where such concert or entertainment takes place." (Stats. 1905, p. 759.)

Section 273 is as follows: "Every person who takes, receives, hires, employs, uses, exhibits, or has in custody, any child under the age, and for any of the purposes mentioned in the preceding section, is guilty of a like offense and punishable by a like punishment as therein provided." (Stats. 1905, p. 759.)

The contention of the petitioner is that these provisions contain an arbitrary and unreasonable classification, and, consequently, not of uniform operation, and that it constitutes a special law for the punishment of crimes, where a general law could be made applicable. It is said that only a certain portion of the minor children of the State are affected by the Act, namely, those who are under sixteen years of age, and that this is an arbitrary discrimination between those who are over that age and those who are under that age; that any child over the age may enjoy his natural privilege of working for his own support as he pleases, while those under that age are prohibited therefrom. There is no sound reason for any such criticism. The same reasoning might be applied to a large number of laws which are universally conceded to be valid and constitutional. The law providing that a male person under twenty-one years of age is a minor, subject to the legal disabilities of minority, might be rendered unconstitutional by the same process of reasoning. It is competent for the Legislature to provide regulations for the protection of children of immature years. The growth of a child is gradual and the age of maturity varies with different children. It is impossible for any person to fix the exact time when a child is capable of protecting itself. The legislative judgment in regard to the age at which such regulations shall become applicable to the child can not be interfered with by the courts.

It is also stated that the law makes an unfair discrimination by allowing the employment of children as singers or musicians in churches, schools, or academies. The ground of this objection is that such employment, so far as the court can see, may be as injurious to

the health or morals or as dangerous to the life or limb of the child as those which are prohibited in the law, and that no prohibition is lawful under the Constitution unless it extends to all employments which are equally injurious. In matters of this kind the Legislature has large discretion. It must determine the degree of injury to health and morals which the different kinds of employment inflict upon the child, and the corresponding necessity for protecting the child from the effects thereof, and unless its decision in that regard is manifestly unreasonable, there is no ground for judicial interference. We do not think the law in question so unreasonable as to require us to hold it unconstitutional.

The petition is denied and the petitioner is remanded to the custody of the officer.

SHAW, J.

We concur:

SLOSS, J.; ANGELOTTI, J.; HENSHAW, J.; MCFARLAND, J.; LORIGAN, J.;
BEATTY, C. J.

FINANCIAL STATEMENT.

FOR THE FIFTY-SIXTH FISCAL YEAR ENDING JUNE 30, 1905, AND THE
FIFTY-SEVENTH FISCAL YEAR ENDING JUNE 30, 1906.

FIFTY-SIXTH FISCAL YEAR.

APPROPRIATIONS.

Salary of Commissioner.....	\$3,000 00
Salary of Deputy Commissioner.....	1,800 00
Contingent Fund	2,500 00
Printing.....	625 00
Office rent.....	600 00
Balance from Contingent Fund (fifty-fifth fiscal year).....	248 15
Balance from Printing Fund (fifty-fifth fiscal year).....	625 00
Total appropriations.....	<u>\$9,398 15</u>

DISBURSEMENTS.

Salary of Commissioner.....	\$3,000 00
Salary of Deputy Commissioner.....	1,800 00
Salaries of Special Agents (Contingent Fund).....	2,196 15
Contingent and traveling expenses, as per bills rendered (Contingent Fund).....	552 00
Printing Biennial Report, stationery, blanks, etc. (Printing Fund).....	1,250 00
Office rent.....	600 00
Total disbursements.....	<u><u>9,398 15</u></u>

FIFTY-SEVENTH FISCAL YEAR.

APPROPRIATIONS.

Salary of Commissioner.....	\$3,000 00
Salary of Deputy Commissioner.....	1,800 00
Contingent Fund	3,500 00
Printing.....	1,250 00
Office rent.....	600 00
Total appropriations.....	<u>\$10,150 00</u>

DISBURSEMENTS.

Salary of Commissioner.....	\$3,000 00
Salary of Deputy Commissioner.....	1,800 00
Salaries of Special Agents (Contingent Fund).....	2,296 00
Contingent and traveling expenses, as per bills rendered (Contingent Fund).....	1,204 00
Printing blanks, stationery, etc. (Printing Fund).....	408 75
Office rent.....	600 00
Total disbursements.....	<u>9,308 75</u>
* Balance.....	<u>\$841 25</u>

* This is in the Printing Fund and will be used with the \$1,250.00 (Printing Fund of the fifty-eighth fiscal year) in publishing this report and providing material for balance of current term.

BIENNIAL REPORT

OF THE

DEPARTMENT OF HIGHWAYS

OF THE

STATE OF CALIFORNIA

DECEMBER, 1906

N. ELLERY, - - - - - Commissioner



SACRAMENTO:

W. W. SHANNON, - - - SUPERINTENDENT STATE PRINTING
1906.



SACRAMENTO, CALIFORNIA.

OFFICE OF DEPARTMENT OF HIGHWAYS,

November 30, 1906.

To His Excellency, GEORGE C. PARDEE,

Governor of the State of California.

SIR: I herewith submit for your consideration the report of the Department of Highways, covering the period from November 1, 1904, to November 30, 1906, as provided for in Chapter CCLXXII of Statutes and Amendments, 1897; and, appended thereto, the Report of the Lake Tahoe Wagon Road Commissioner.

Very respectfully,

N. ELLERY.

State Highway Commissioner.

Attest: CLARK ALBERTI, Secretary.

REPORT OF THE DEPARTMENT OF HIGHWAYS.

Road affairs in this State for the past two years have not received sufficient public attention that proper remedial measures might be of general demand, but they are, however, none the less needed and desired. The lack of system still prevails and causes no end of monetary loss in both construction and maintenance—a fact patent to all who carefully study the conditions that surround them when traveling our highways.

Surely there is a slow growth toward ultimate permanent construction which is shown principally in bridge and culvert work, but as yet no great advance toward good roadbeds has been made. The causes for this lack of system are apparent.

The general plan of conducting our road business leads to no end of modes of building and repair. Various opinions and ideas of officials charged with the road business and who in many instances have had no proper training in road work, as their previous labors were applied along other lines, create too many plans for the work. In numerous instances, too, men have charge who make good and substantial progress in their work, but for some slight cause are superseded by others holding completely divergent ideas. These changes must have their bearing on the work, and consistently show in the mixed results. There are also local influences so potent in shaping the road expenditures as to often prevent good and permanent results.

The struggle of California road-builders to obtain from crude oil its full benefits to highway work has been of varied results. In some counties, through lack of proper application, selection, and treatment, oil for roads has fallen under the ban and its disuse advocated and accomplished; while in other counties intelligent use of oil has proven admirable as a road material and dust preventive. During 1906 instances came to the attention of this Department where oil was applied, without any preparation of roadbed, and allowed to flow as it would over the road surface. No effort to mix or hold the oil in place was made and resulted in a miserable, uneven, bad road. Such work is vitally wrong, uneconomical, and a positive setback to road improvement.

General evidence of the need of reform in the road system of this State is afforded by a consideration of the recurring attempts to change

the road laws. Every session of our Legislature brings forth various measures in an effort to rectify the faults manifested in the particular locality from whence the need of the change originated, but so far such measures have not struck the right remedy and have proven futile.

The yearly expenditures of this State for country roads, outside of municipal corporations, have now reached \$2,750,000. In addition to this it is estimated that \$250,000 per annum is expended from the county general funds for bridges and oil on the 50,000 miles of highways.

A public expenditure of such proportions should be directed partially toward permanent improvement. But before we can materially effect permanent work, this State must begin a practical object lesson in road construction and maintenance by giving some good main highways maintained by the counties under State direction. In fact, apply the State-aid plan.

This scheme of benefit is not new or untried. A great many Eastern states have adopted the plan and after several years of improvement under it, during which many miles of excellent and durable roads have been built and maintained, there is a general demand by their people for its extension. These states went through our experiences, and until they finally embraced the aid law, were continually tinkering with their road laws for relief.

For California this scheme will systematize road business, bring construction and maintenance under trained men, place at the disposal of the counties systematic and uniform plans, relieve much of local influence, be a practical educator, and thereby affect all road work to so great an extent that eventually when the improvement brings maintenance to its proper form, road taxation will materially decrease. Therefore, it is recommended that the following State-aid road law, patterned after the New York law, be enacted:

AN ACT TO PROVIDE FOR THE IMPROVEMENT OF THE PUBLIC HIGHWAYS, AND TO
MAKE AN APPROPRIATION THEREFOR.

*The People of the State of California, represented in Senate and Assembly, do
enact as follows:*

SECTION 1. The Board of Supervisors in any county of the State may, and upon presentation of a petition as provided in section two hereof, must pass a resolution that public interest demands the improvement of any public highway, or section thereof, situate within such county, and described in such resolution: but such description shall not include any portion of a highway within the boundaries of any city or incorporated village; and within ten days after the passage of such a resolution shall transmit a certified copy thereof to the State Highway Commissioner.

SEC. 2. The owners of two thirds of the lineal feet fronting on any such public highway or section thereof in any county of the State may present to the Board of Supervisors of such county a petition setting forth that the petitioners are such owners and that they desire that such highway or section thereof be improved under the provisions of this Act.

SEC. 3. Such Highway Commissioner, upon receipt of such resolution, shall investigate and determine whether the highway or section thereof sought to be improved is of sufficient public importance to come within the purposes of this Act, taking into account the use, location, and value of such highway or section thereof for the purposes of common traffic and travel, and after such investigation shall certify his approval or disapproval of such resolution. If he shall disapprove such resolution, he shall certify his reasons therefor to such Board of Supervisors.

SEC. 4. If he shall approve such resolution, such Highway Commissioner shall cause the highway or section thereof therein described to be mapped both in outline and profile. He shall indicate how much of such highway or section thereof may be improved by deviation from the existing lines whenever it shall be deemed of advantage to obtain a shorter or more direct road without lessening its usefulness or wherever such deviation is of advantage by reason of lessened gradients. He shall also cause plans and specifications of such highways or section thereof to be thus improved to be made for telford, macadam, or gravel roadway or other suitable construction, taking into consideration climate, soil, and materials to be had in the vicinity thereof and the extent and nature of the traffic likely to be upon such highway, specifying in his judgment the kind of road a wise economy demands. The improved or permanent roadway of all highways so improved shall not be less than eight feet nor more than sixteen feet in width, unless for special reasons to be stated by such Highway Commissioner it is required that it shall be a greater width. He shall, if requested by the resolution, include provision for steel-plate or other flat-rail construction in double track.

SEC. 5. Upon the completion of such maps, plans, and specifications, such Highway Commissioner shall cause an estimate to be made of the cost of construction of the same and transmit the same to the Board of Supervisors from which such resolution proceeded together with a certified copy of such maps, plans, specifications, and of his certificate of the approval of the highway or section thereof so designated as aforesaid.

•SEC. 6. After the receipt thereof, upon a majority vote of such Board of Supervisors, it may adopt a resolution that such highway or section thereof so approved shall be constructed under the provisions of this Act, or of any existing Act, and thereupon shall transmit a certified copy of such resolution to such Highway Commissioner.

SEC. 7. In case the boundaries of such proposed highway shall deviate from the existing highway, the Board of Supervisors must make provisions for securing the requisite right of way prior to the actual commencement of the work of improvement.

SEC. 8. Upon receipt of the certified copy of the resolution provided in section six, such Highway Commissioner shall advertise for bids once a week for four successive weeks in a newspaper published at the county seat of such county and in one such other newspaper as shall be deemed of advantage for the construction of such highway or section thereof, according to such plans and specifications, and award such contract to the lowest responsible bidder, except that he may in his discretion award the contract to the Board of Supervisors in the county in which such highway lies: *provided*, that they shall agree to do said work at a cost at least ten per cent less than the lowest bid received, and except that no contract shall be awarded at a greater sum than the estimate provided in section five. But if no bid otherwise acceptable be made within such estimate, such Highway Commissioner may amend his estimate, certify the same to the Board of Supervisors, and upon the adoption by it of a resolution as provided in section six based on such amended estimate, proceed anew to obtain bids and award the contract as herein provided. Such Highway Commissioner may reject any or all bids, and before entering into any contract for such construction he shall require a bond with sufficient sureties conditioned that if the proposal shall be accepted, the party thereto will perform the work upon the terms proposed and within the time prescribed and in accordance with the plans and specifications; and as a bond of indemnity against any direct or indirect damages that shall be suffered or claimed during the construction of such road, and until the same is accepted. The people of the State of California shall in no case be liable for any damages suffered. Partial payments may be pro-

vided for in the contract, and paid in the manner herein provided, when certified to by such Highway Commissioner, to an amount not to exceed seventy-five per cent of the value of the work done; twenty-five per cent of the contract price shall be retained until the entire work has been accepted. Whenever a county engineer or surveyor has been appointed or elected in the county in which such highway or section thereof is to be constructed, he shall have general charge and supervision of the work under the direction of the Highway Commissioner, and shall report to him from time to time the progress of the work and such facts in relation thereto as may be required. If there is no county engineer or surveyor, such Highway Commissioner shall have some competent person to superintend and have engineering supervision of the work.

SEC. 9. Two fifths of the expense of the construction thereof shall be paid by the State Treasurer upon the warrant of the Controller, issued upon the requisition of such Highway Commissioner, out of any specific appropriations made to carry out the provisions of this Act. And three fifths of the expense thereof shall be a county charge in the first instance, and the same shall be paid by the County Treasurer of the county in which such highway or section thereof is, upon the requisition of such engineer or surveyor; but the amounts so paid shall be apportioned by the Board of Supervisors, so that if the same has been built upon a resolution of said board without petition, forty per cent of the cost of construction shall be a general county charge, and twenty per cent shall be a charge upon the road district in which the improved highway or section thereof is located, and if the same has been built upon a resolution of said board after petition as provided in section two, forty per cent shall be a general county charge and twenty per cent shall be assessed upon and paid by the owners of the lands benefited in the proportion of the benefits accruing to said owners as determined by the County Assessor in the next section hereof.

SEC. 10. The Assessor of the county in which any highway or section thereof has been improved or constructed pursuant to petition as provided in section two of this Act, shall have power, and it shall be his duty upon receiving notice from the Board of Supervisors of the county of the cost of construction or improvement of such highway or section thereof in such road district, to assess an amount equal to twenty per cent of said total cost upon the lands fronting or abutting on such highway or section thereof. Such assessment shall be apportioned according to the benefits accruing to the owners of the lands so located, according to the best judgment of said Assessor, upon at least ten days' notice of the time and place of such apportionment to the persons affected thereby, and after such persons have had an opportunity to be heard, and the assessments so made when duly attested by the oath of such Assessor shall be collected in the same manner as the general taxes of such county are collected.

SEC. 11. The construction and improvement of highways and sections thereof, under the provisions of this Act, shall be taken up and carried forward in the order in which they are finally designated, as determined by the date of the receipt in each case of the certified copy of the resolution provided in section six by such Highway Commissioner as hereinbefore provided.

SEC. 12. Upon the completion of such highways or sections thereof so constructed by such Highway Commissioner and his acceptance of the same after payment has been made as herein provided, such Highway Commissioner shall inform the Board of Supervisors of such counties that the highways or sections thereof designated have been constructed as herein provided; and he may serve notice on said board to accept such highway thus constructed, which notice shall be filed in the office of the clerk of such county; and twenty days after service and filing of said notice, such highway or section thereof shall be deemed accepted by said Board of Supervisors of said county; and thereafter they shall maintain the same as a county road and apportion the expense as they may be empowered by law. The county wherein such improved highways lie shall care for and keep the same in repair under the direction and supervision of the State Highway Commissioner, and such rules and regulations as he may prescribe. Should the county fail to comply with said rules and regulations, then such Highway Commissioner shall

cause the maintenance work to be done, and the cost of the same shall be a county charge, paid for in the same manner as for other county roads.

SEC. 13. Whenever any county has had aid in building any such highway, and it seems advantageous to such Highway Commissioner that a section or sections of highway, not exceeding one mile in length, shall be constructed under this Act to connect these roads together, and would be a great public utility and general convenience, he may serve notice on the Board of Supervisors of such county, and shall file one in the County Clerk's office, designating the highway already constructed and the existing termini, and the section or sections, in his opinion, necessary to be constructed and the reasons therefor. And it shall be the duty of the Board of Supervisors to provide for the construction of such connecting highway or section thereof, within one year after the service and filing of such notice. The procedure for such work shall be in accordance with the provisions of this Act.

SEC. 14. There is hereby appropriated out of any money in the State Treasury not otherwise appropriated, the sum of fifty thousand dollars to carry into effect the provisions of this Act.

SEC. 15. The operation of this Act shall not be affected by any conflicting Act or conflicting part of any Act wherever the same may now exist, and the highways may be improved under this Act or any existing Act relating to roads.

SEC. 16. This Act shall take effect immediately.

That the extent of and interest in road improvement under the aid plan may be better realized, a resumé of the work undertaken and accomplished by various Eastern states is given:

New Jersey.—The first State-aid law became operative in 1892. One third of the expense of building State roads is borne by the State, and two thirds by the county. The State appropriates \$250,000 a year as State aid, the limit being \$400,000. Counties must assume maintenance. Miles constructed, 1,111; cost, \$1,925,441.

Massachusetts.—State aid established in 1893; the State pays three fourths, the counties one fourth. Six hundred and fifteen miles have been built, at a cost of \$6,330,000. The State also pays for maintenance. There are 20,000 miles of roads in the State, and it is estimated that 1,900 miles will ultimately be improved by State aid. The State appropriates \$450,000 annually for construction, and in 1905 appropriated \$60,000 for maintenance.

Connecticut.—State aid began in 1895. In towns where the valuation does not exceed \$1,000,000, the State pays three fourths and the town one fourth; where the valuation exceeds \$1,000,000, the State pays two thirds and the town one third the cost of construction. State payments are limited to \$225,000 for any one year. Towns must maintain the roads so built. Four hundred and fifty miles of gravel and macadam roads have been constructed, at a cost of \$2,573,574.

New York.—State aid was established in 1898, the State paying fifty per cent of the cost of roads, the counties thirty-five per cent, and the towns or abutting property owners fifteen per cent. From 1898 to July 1, 1905, a grand total of \$16,284,000 was appropriated by the

State, the counties, and the towns for the improvement, repair, and maintenance of public highways within the State, of which there are 74,097 miles. To July 1, 1906, 692 miles of road had been constructed by State aid. Maintenance is undertaken by the counties. The State has recently bonded itself for \$50,000,000—\$5,000,000 to be available each year for ten years, for the improvement of the public roads.

Vermont.—State aid inaugurated in 1898; the State pays one half, the county one half.

Maine.—In 1901 the Legislature provided that any city or town may receive from the State one half the sum, at least \$100, expended on some road within its corporate limits, to be designated as a State road. The maximum amount to be drawn by any town in any one year is \$300.

Pennsylvania.—The Legislature of 1903 passed a State-aid law providing that two thirds of the cost of building roads shall be borne by the State, one sixth by the county, and one sixth by the township. An appropriation of \$6,500,000 was made—\$500,000 for each of the first two years, \$1,250,000 for each of the next two years, and \$1,500,000 for each of the next two years. The State and the counties share equally the cost of maintenance.

Delaware.—Inaugurated State aid in 1903, the cost of roads being borne equally by State and county.

Ohio.—State aid was inaugurated in 1904, one fourth of cost of road construction to be paid by the State and three fourths to be a county charge—one third of said three fourths to be paid by the township. In apportioning the twenty-five per cent paid by the township, ten per cent is a charge upon the whole township, and fifteen per cent a charge upon the abutting property. Counties must maintain roads so built.

Maryland.—The Legislature of 1904 provided \$200,000 annually for macadam roads, one half the cost to be paid by the State and one half by the county. The amount received by each county from the State bears the same ratio to the total State appropriation as the public-road mileage of the county bears to the total public-road mileage of the State. Roads to be maintained by the counties.

New Hampshire.—The Act of 1905 requires each town to set apart for the main highways a portion of the money raised by local taxation for road purposes, the amounts so set apart ranging from twenty-five cents to \$1 on each \$1,000 of valuation, according to the total amount of valuation. To secure State aid the local authorities must raise an additional sum equal to fifty per cent of the said portion set apart for

main highways. State aid is given in amounts ranging from twenty cents to \$3 for every \$1 locally raised as aforesaid, according to the total valuation. The highways are maintained by the counties and towns.

Minnesota.—Act of 1905 provides that for State aid in road building one twentieth of a mill shall be levied on each one dollar's valuation of all taxable property; also sets aside for the same purpose all money accruing from investment of the internal improvement land fund. Money is apportioned to the counties according to area and expense of construction. No sum apportioned to a county shall exceed one third of the amount expended by the county.

Michigan.—In 1905 established State rewards to townships and counties that build gravel or macadam roads, of \$250, \$500, \$750, and \$1,000 a mile, according to kind of road built, when approved by the State highway commissioner.

SOME SUGGESTIONS IN CONSTRUCTION OF COUNTRY ROADS.

During the travel necessitated by the work of this Department, roads in various parts of California have been studied with a view to benefiting them by some of the simpler changes in construction. In the early location of a road very little forethought was given to its alignment or grade, so that in innumerable instances a slight change of location and grade will result in great reduction in cost of maintenance. Steep pitches occurring on the mountain roads should be, as far as possible, removed by the counties, so that the winter rains and melting snow will not destroy by erosion the roadbed and thereby cause each spring an excessive repair expense.

Good drainage should be obtained by crowned roadbeds and side ditches. But where water is conducted along the side of the roadway it should be diverted before too long stretches are reached. Culverts are needed at closer intervals as the grade increases, and in all cases should be made of lasting material. Salt-glazed, vitrified sewer pipe, where the expense is not excessive, gives an excellent and substantial culvert. In its use, however, the intake and outfall must be protected by stone work properly set in cement mortar. Preference is given to sewer pipe for the reason it is of smooth interior and far less liable to get stopped up than either wood or stone. From the experience on the Lake Tahoe State road, pipe culverts cost at least one third less than stone culverts in a granite country, and give far better results. Counties employing wood in culvert construction should, as rapidly as funds will permit, replace them with pipe culverts. The inauguration of this sole permanent road improvement would in a very few years

prove its efficiency and economy. In furtherance of a general adoption of this work there is given below a table, with the flow of water through pipe culverts.

<i>Grade of Pipe, 3 inches to 25 feet.</i>		<i>Grade of Pipe, 6 inches to 25 feet.</i>	
Diameter of Culvert, in inches.	Capacity of Flow, cubic feet per second.	Diameter of Culvert, in inches.	Capacity of Flow, cubic feet per second.
12	3.4	12	4.8
15	6.3	15	8.9
18	10.4	18	14.7
20	13.8	20	20.5
24	22.7	24	37.8
30	41.6	30	73.7

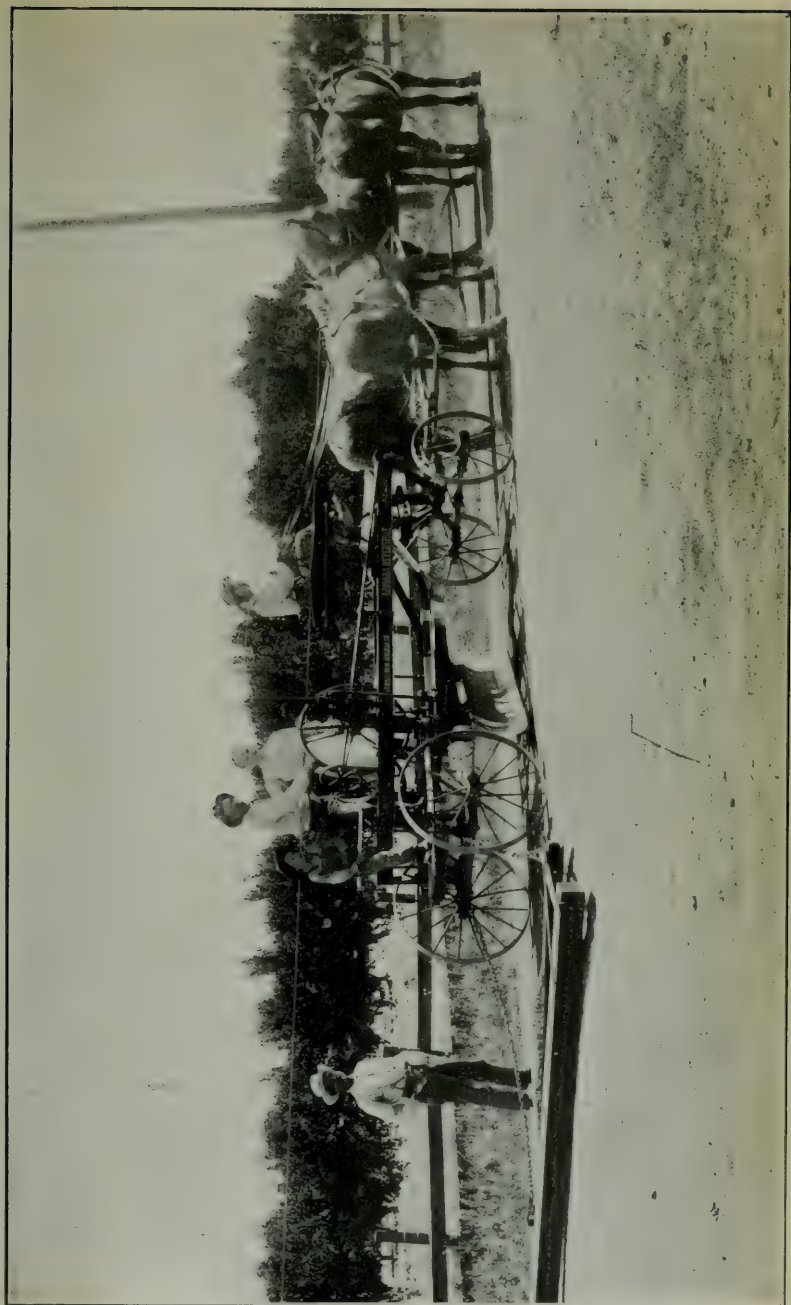
The grade may be increased as shown by the table and greatly increase the capacity.

Where culverts can not conduct or span the water, small bridges should be built on the most economical basis. Reinforced concrete has now so far advanced in structural practice as to give a reasonably cheap structure in all easily accessible locations for all the ordinary bridge lengths. It is practically indestructible. Therefore, this material and stone masonry, where stone is easily obtainable, if used in place of wooden or combination structures, will reduce expensive reconstruction to a minimum.

However, in isolated cases where neither of these materials is available or very costly of construction, wooden bridges may be allowable. At best, wooden structures made of the pine of the mountain districts and unprotected from the weather will have a life of only fifteen years. Economy suggests that such bridges be completely housed and thereby increase their life at least fourfold.

Numerous cases of too narrow roadbeds are encountered. Ten feet in width should be the minimum, in the opinion of most drivers, and then 18 by 50 feet turnouts should be provided at all points of vantage. The sharp curves of the roadway need an increased width, but not as generally practiced. It has been the custom to make the extra width on the turn. Experience, however, determines that the necessity for width is just on either side of the apex of the curve and thus give an opportunity to handle long teams.

One very difficult problem in road construction is the proper handling of adobe soil for roadbeds. A considerable mileage of country roads traverse this soil and are, during the winter months, practically impassable. One good and simple remedy is to saturate the adobe, when slightly plastic, with sand or fine gravel, that it may have a body and capacity to hold weight. Wherever sand is available it is suggested to the authority having such roads in charge, to give this plan a thorough test. Another matter clearly brought to the attention of this Depart-





WINTERS-DAVISVILLE OILED EARTH ROAD. ON LEFT, MAIN ROAD SMOOTHED; ON RIGHT, PART YET UNSMOOTHED.

ment, is the care that must be exercised in graveling or macadamizing on adobe soil. A narrow strip of either material allows the vehicles to pick up the wet adobe on either side, and beginning at the road shoulders will gradually force the gravel or rock into the mud and create a rough road of adobe mud and uneven rocks. At all events, get the roadbed well drained and a width of roadway sufficient for the passage of vehicles. In general, the lasting quality of any road material is severely taxed to resist the wear where the wheels constantly follow in one line or rut. A traveled way of 16 feet in width is none too wide to avert this concentrated wear.

OILED ROADS.

No material is quite so important to our road improvement as crude asphaltic oil. It may be used as a dust preventive, a roof to shed the rain water from the foundation, and as a lubricant to reduce the rate of wear to the road surface. While these improvements are of vast importance when properly handled, it must be borne in mind that only partial results, and in many cases no results, are obtained with improper application, selection, and treatment of oil.

Upon inspection of oiled roads of this State it was found that no general system prevailed. In many cases, oil was applied to a rutty road, uneven and worn out, and then allowed to collect in puddles. This was labeled an oiled road. It takes but a short time to lose faith in work under such methods and it has been due to this lack of preparation and care that so many counties have discontinued the use of oil. However, such work was not found on all roads visited, as several counties of California have excellent oiled roadways. A good oiled earth highway was particularly noticed in Supervisorial District No. 2, Yolo County, where a highly intelligent use of oil may be seen on the Winters-Davisville road. Here is an earth road of splendid cross-section, prepared and oiled at a cost not exceeding \$150 per mile, and creating a road at this figure fit for heavy travel as well as light vehicles. The plan followed in this work is presented as an extremely sensible and scientific solution of the problem.

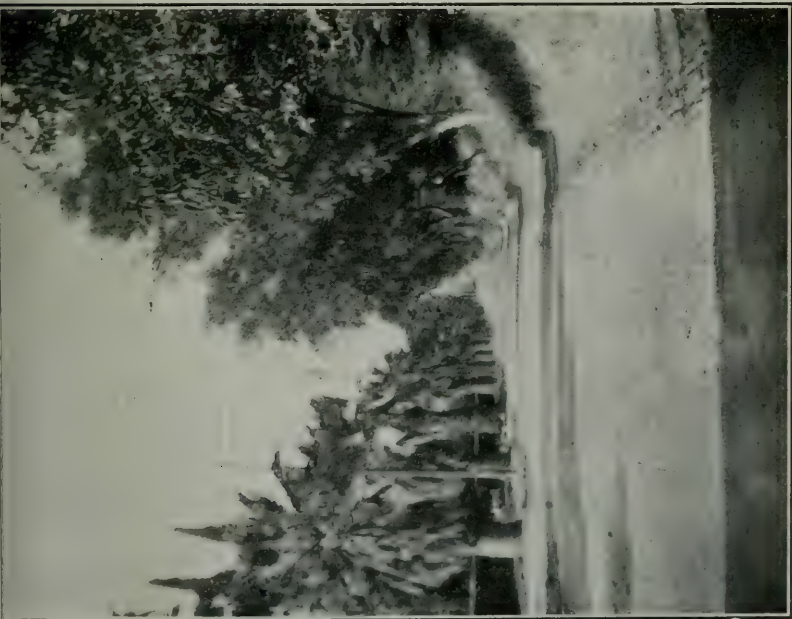
The roadway is first cut out to the cross-section desired, with the crown easily decreasing in elevation to a slight gutter about seven feet from the property line, and from this point there is a rise to the edge of the right of way. The crown is not excessive, perhaps eight inches, thus giving ample opportunity for a lateral spreading of the travel. After the road is cut to a hard, even base and all weak spots remedied, oil is applied at the rate of one gallon to the square yard of surface; then the grader returns the earth, which was piled at either side of the part of road to be treated, immediately over the oiled portion.

While this is being done, a drag attached to the rear of the grader, as shown in the accompanying view, smooths the earth over the oil to a depth of four or five inches. After thorough rolling and compacting of the earth on the oil, travel is permitted on the roadway. At this point an excellent plan is used: The travel necessarily creates a rough surface, and if allowed to continue without any further work a very inferior road would result. But the grader and attached drag go over and smooth the surface as necessity requires, keeping the work in almost perfect shape. By simply repeating this process, with grader and drag, to keep the road smooth until the oil eventually comes up to the surface, an extremely hard, oiled road of earth is given. At any point, where there appears on the surface too much oil for the material, a local application of sand or earth is made. This process makes an oiled road by fully saturating the oil, giving it a body hard enough to withstand heavy travel with scarcely any indentation or drag to the tractive power.

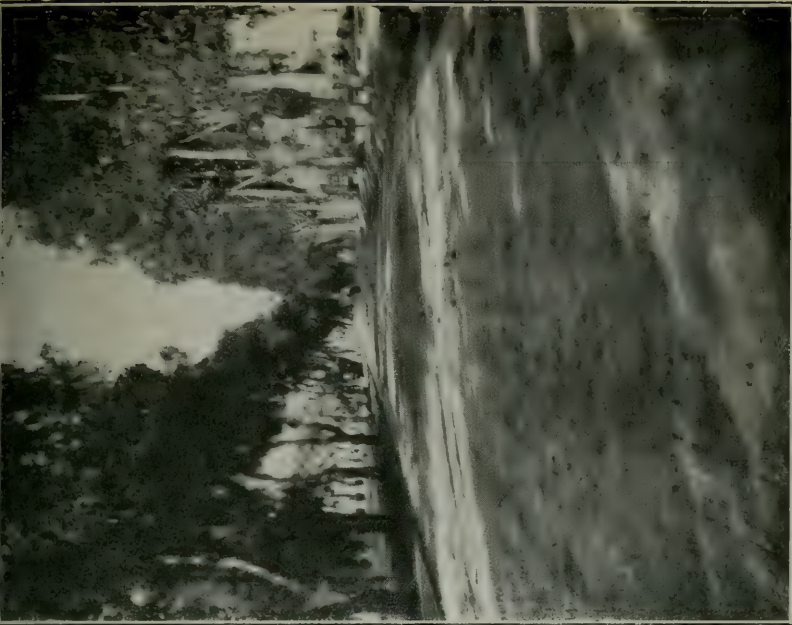
Upon examination of many miles of oiled country roads, it was observed that soft, plastic bunches of oiled material have accumulated near the edge of the travel, showing conclusively that too much oil was used for the material involved. The use of an excessive amount of oil has given rise to the teamsters' objection to the heavy pull—an objection well sustained by experience, but one dispelled by the foregoing method of oiling.

In southern California considerable mileage of good oiled roads may be found. Riverside County employs a method very similar to the one used in Yolo County, with remarkably fine results. The sub-grade is crowned to the proper cross-section, when it is watered and rolled thoroughly to a solid even form. Upon this is placed about four inches of granite stone found handily near, which is in turn wet and rolled until compacted. On this surface is sprinkled from one half to one gallon of heavy asphaltic oil to the square yard. Then over this is deposited about two inches of fine granite material, enough in each instance to completely keep the oil from reaching the surface for several days. Whenever oil appears in a slight puddle on the surface it is immediately covered with fine crushed rock. This method gives a road closely resembling a bituminous macadam pavement, and one which has a wearing capacity far beyond the life of the roads treated with a top layer of oil.

From the experience in our State on oiling roads, the following deductions drawn are paragraphed rather than placed in specified form, as too many conditions arise requiring special treatment in individual cases and therefore general specifications might be at fault for some special piece of work.



PALM AVENUE, RIVERSIDE. FOUR-INCH GRAVEL BASE, $\frac{1}{2}$ GAL. OF OIL TO THE SQ. YD. TWO YEARS OLD. PHOTOGRAPHED 1906.



MAGNOLIA AVENUE, RIVERSIDE. FOUR-INCH GRAVEL BASE, 1 GAL. OF OIL TO THE SQ. YD. ONE YEAR OLD. PHOTOGRAPHED 1906.

ROAD OIL.

Perhaps many miles of California roads have received applications of oil which contained but a small percentage of asphaltum, and which made a failure positive in such cases. The selection of a proper oil is very essential, affecting, as it does, the whole work. At the City Engineer's office, in Riverside, two specimens of oil were displayed, after evaporation. Both were originally of heavy gravity, and after reduction the asphaltum residuum in one sample was *nil*, while in the other sample a heavy percentage of asphaltum remained. Upon looking at those results it was plainly evident why some failures had occurred after considerable care had been used in road preparation. For such reason it is especially suggested that oil that is to be used for road purposes should be thoroughly tested for asphaltum and amount of foreign matter and water contained therein. Good road oil should contain forty per cent of asphaltum and have no more than three per cent of foreign matter and water.

Undoubtedly the best and simplest test of the road-making value of an oil is to evaporate a weighed sample in an open, metal dish, down to the hardness of commercial "D" asphalt and weigh the residue. This plan gives both the original asphalt and that formed during evaporation, and while this does not exactly correspond to the amount of asphalt created when sun-dried, yet the comparative values of oil are accurate. The only apparatus required for this test is an iron pan, a scale, and a heating apparatus.

Another item of interest and discussion in connection with oil for road building is whether it should be applied cold or hot. Good roads have been obtained by either process, but, as cold oil is considerably cheaper, my preference is for cold oil, allowing however, that where oil is very heavily asphaltic, heating may be required to give fluidity enough to apply the oil.

The selection of the oil is a matter of vast importance. Always require a test for asphalt contained, and foreign substance, and seek that quality containing the greatest percentage of asphaltum.

ROAD PREPARATION FOR OILING.

Earth Roads.—Roads made of earth present the easiest mode of construction and the least expensive, when first cost only is considered, but as such to have them good roads requires constant attention. They should be properly drained to meet all conditions of rainfall and crowned sufficiently to create a roof for the water to run off. Where oil is to be applied, the roadbed should be cut out evenly and compactly and solidly, in no case, however, leaving weak or wornout spots. Upon

this should be applied from three fourths to one gallon of good asphaltic oil, the amount varying to meet special conditions, and then immediately cover it with about four inches of earth. If sand or fine gravel is readily available, employ this material, as it gives a better body to the artificial bitumen. Then compact by rolling the earth upon the oil, and care for your roadway with a drag and grader as previously outlined. By all means give your road a chance to show its efficiency by properly caring for it.

Oil on Alkali.—Where the roadway is composed of earth containing alkali or lime a different plan must be followed. It is now known that the asphalt of the oil is disintegrated by either material into two substances, petrolene and asphaltene, neither of which taken separately has any road value. Therefore, to obtain an oiled road of any reasonable life we must cover the alkali soil with some material with which the oil must be incorporated.

GRAVEL ROADS.

The almost universal plan of making gravel roads in California is by dumping on the road unscreened gravel and allowing the travel to spread and pack it down. A change is here necessary for oiling purposes. First make a sub-grade of the given cross-section evenly compacted by wetting and rolling, and then apply four or five inches of the larger and heavier part of a screened gravel. Roll this well with about a ten-ton roller, and then apply about a gallon of oil to the square yard of surface. Upon this apply about three inches of fine gravel and sand, and then thoroughly roll again. Under such a plan there is no reason why gravel roads should not produce a very excellent road of good wearing quality.

Road materials in this State are so distributed that no section need be without some form of rock road. The streams of the valleys contain extensive beds of gravel which may be used to construct oiled graveled roads of durability.

MACADAM ROADS.

What applies to the sub-grade for gravel roads is also applicable to macadam construction. On the sub-grade from four to six inches, according to foundation, of crushed rock should be applied and thoroughly wet and rolled. On this apply one gallon of heavy asphaltic oil per square yard of surface, and then cover with two inches of finely crushed rock. Upon this should be placed about one inch of screenings. This material must then be thoroughly rolled and cared for until the oil has reached or nearly reached the surface of the



BROCKTON AVENUE, RIVERSIDE. FOUR-INCH MACADAM BASE, $\frac{1}{2}$ GAL. OF OIL TO THE SQUARE YARD. TWO YEARS OLD. PHOTOGRAPHED 1905.



NORTH ORANGE AVENUE, RIVERSIDE. OILED TWO YEARS AGO. PHOTOGRAPHED 1906.

screenings. Wherever there is a tendency for oil to collect on the surface cover it with more screenings.

In all instances where oil is applied beneath the real surface of the roadway, there is a tendency for it to rise and not to penetrate downward in direction to any great extent. This is due to the weight above forcing the material down, and the oil ascends, filling the interstices. It is my firm belief that this plan, if properly followed out, will give exceedingly gratifying results. If the top rock is hard the oil will extend its wearing life very materially by acting as a lubricant in prevention of the grinding process, and by having a depth of oil, say four inches, in the road gives an elastic binding which takes up the weight and shocks of travel, reducing the wear and the raveling of the ordinary macadam road.

REPAIRS TO OILED ROADS.

Whenever a weak spot or rut shows in an oiled road it should immediately be repaired by cutting out a section with vertical sides, which shall be filled, in the case of gravel or macadam, with mixed oil and fine gravel, or fine crushed rock. On oiled earth roads the rut should be cut out, oil poured in, and then the excavation filled with about three inches of soil or preferably sand. Thoroughly tamp all material placed for repairs and in all cases make the fill slightly above the road surface to allow for settlement. The vertical sides to the excavation give shoulders beyond which the traffic can not shove along the new material or scatter it from its position.

In the appendix to this report are given two sets of oiled road specifications—one for streets in Los Angeles city and the other for streets in Santa Monica. The latter consists of a departure from the plan outlined and suggested above, but as yet this Department has no actual knowledge of its results. The result of road oiling throughout California, after a very large expenditure by the counties, has not proven satisfactory, except in a few counties and localities. With this in mind it is earnestly believed an appropriation from the State for experimental and object-lesson oiled roads, to be applied in about five sections under different existing conditions, would prove highly beneficial to those having charge of county roads.

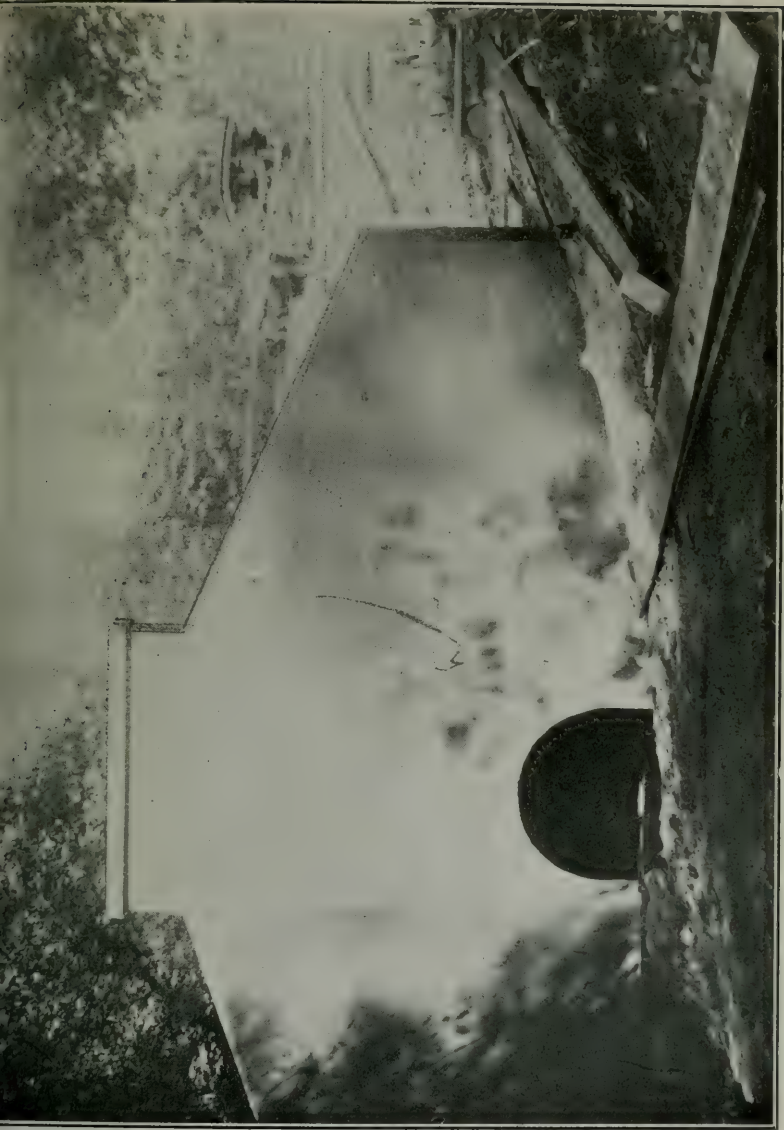
From the data collected by this Department there seems to be little doubt of the extreme importance of oil in making roads, and I therefore recommend that an appropriation of \$7,000 be made for experimental, object-lesson oiled roads.

LAKE TAHOE WAGON ROAD.

This Department has, for the past two years, advised with the Commissioner of the Lake Tahoe Wagon Road on all matters of improvement of the road. By the powers given the State Commissioner by the Act of 1903, relating to the care, management, and protection of State roads, and the Act of 1905 for the construction of permanent bridge work on the Lake Tahoe Wagon Road, duties devolved upon this Department, the carrying out of which led to the thorough inspection of all work done on the road and the ascertaining of a good knowledge of its needs.

During the Legislature of 1899 there was an appropriation made for the construction of certain improvements and for a survey of the road. The State Commissioner under whose charge it was placed began the survey September 27, 1900, and continued the work until the exhaustion of the funds available therefor. The survey, as it stands to-day, extends over twenty-five miles of the sixty miles of the road. On the work completed all crossings, topographical features, widths of road, grades, and permanent survey monuments were marked and set. For the purpose of marking the total survey, milestones cut of granite, at Folsom, of the size of 18 inches in width, 6 inches in thickness, and 54 inches in length, and indicating the distance to Placerville, were delivered at Riverton, where now all but those employed on the surveyed part are lying by the roadside. Without further delay, the remaining thirty-eight miles of the road should be surveyed, so that the setting and placing of the milestones may be completed. I therefore again recommend an appropriation of \$2,000 for this work, to be expended under the direction of this Department.

The Lake Tahoe Wagon Road originally had all structures such as culverts and bridges built of wood, and all places where culverts with fill were required the poorest construction of wood with brush and log fill was used. In numerous places these fills sag and completely give out so that travel can not pass. It has been the policy of this Department to wait until any structure becomes unserviceable and then recommend its construction in permanent form. Thus all culverts, in the past five years, have been reconstructed of stone or vitrified salt-glazed sewer pipe, and culverts with fill of the same materials with a heavy stone wall to protect the roadbed. The bridges, too, with one exception at Strawberry, have been constructed of permanent material. On August 15, 1906, the road possessed fifty-two vitrified pipe culverts, ten pipe culverts with finely made walls and fill, eleven stone culverts, nine stone culverts with heavy stone walls and fill, and fourteen permanent culverts of either pipe or stone from the Five-Mile House to the western end.



LAKE TAHOE WAGON ROAD. NEWLY CONSTRUCTED CONCRETE CULVERT AT OGLESBY CANYON.

Additional to this, one reinforced concrete culvert and the fine cut ashlar granite stone bridge of 81 feet span at Riverton, represent permanent work. To complete the work of permanent reconstruction on this road, a careful count, made August 16, 1906, gives the following requirements: Excluding those culverts required on the grade from the summit of the road to the Little Truckee River, one hundred and fifty-seven culverts, eight bridges of 20 to 30 feet span, and one structure 50 feet in span.

On account of the great many culverts needed on a mountain road, there must necessarily be a large expense attached to their replacement, and in the case of the Tahoe road the work progresses slowly, as only the funds left after the roadbed is maintained go into culverts. One source of extreme inconvenience on the western nine or ten miles of the road is the light, thick dust in the summer. Each spring this part of the road must be recrowned and worked over with a grader. If oil could be effectively applied to this very light reddish soil, it would result in a very material saving to the State. It is therefore recommended that an experiment with oil be made on the Lake Tahoe Wagon Road and \$1,000 be appropriated therefor.

Under the statute of 1905, appropriating funds for the construction of permanent bridge work on the Lake Tahoe Wagon Road, the State Commissioner was authorized to make plans and specifications for the two specially intended improvements—the Oglesby Cañon bridge and the Trout Creek bridge.

On April 22, 1905, I visited and made measurements sufficient for the location in line and profile of the Oglesby Cañon structure. It was decided to build a concrete culvert reinforced with railroad iron which was owned by the State and of little other use. Plans and specifications were drawn and filed in the office of the Department of Highways, and a view of the structure accompanies this report. On August 4, 1905, advertisements inviting proposals were inserted in a Sacramento paper and in a Placerville paper. In response to which but two bids were received, as follows:

T. M. Burns, Sacramento.....	\$950.00
Jenkins & Wells, Sacramento.....	1,094.00

As the bids appeared high, Mr. Lyon, the commissioner, was advised to reject them and readvertise, which was done. In response to the second advertisement three bids were received, as follows:

G. S. Morton, Placerville.....	\$1,027.00
James McGillivray, Sacramento.....	848.00
T. E. Clark, Sacramento.....	846.00

After consideration, Mr. T. E. Clark was granted the contract on August 21, 1905, for the sum of \$846, the structure to be completed

October 5, 1905. On this last mentioned date I examined the reinforced concrete culvert built by Mr. Clark and found it completed according to specified measurements. As Mr. A. S. Lyon, the commissioner, had charge of the work through his inspector, I depended upon their report relating to the foundation work. Such a report, over the signature of the inspector, was received and filed in the Department of Highways, and Mr. Clark was paid the contract price of \$846, plus \$25 additional on an agreement entered into by Mr. A. S. Lyon and Mr. T. E. Clark and for extra elevation to the wing walls above that specified. Before the twenty days allowed for holding the bond for defective work had expired, Mr. Lyon found, by a washout at the intake of the structure, a lack of proper foundation work and reported such condition to this office. On November 7, 1905, I visited the structure in company with Mr. A. S. Lyon, and had laborers expose the foundation at several points. The lack of proper work was plainly visible, so upon my return to Sacramento Mr. Clark was requested to place the foundation in the required specified shape and remedy three cracks in the concrete. He sent men to do the work and spent \$75 thereon. This work, upon a second examination, was not entirely satisfactory, so the cash bond of \$100 is still in Mr. Lyon's possession. When this needed foundation work is completed during the early spring, the State will acquire a good, serviceable and permanent structure.

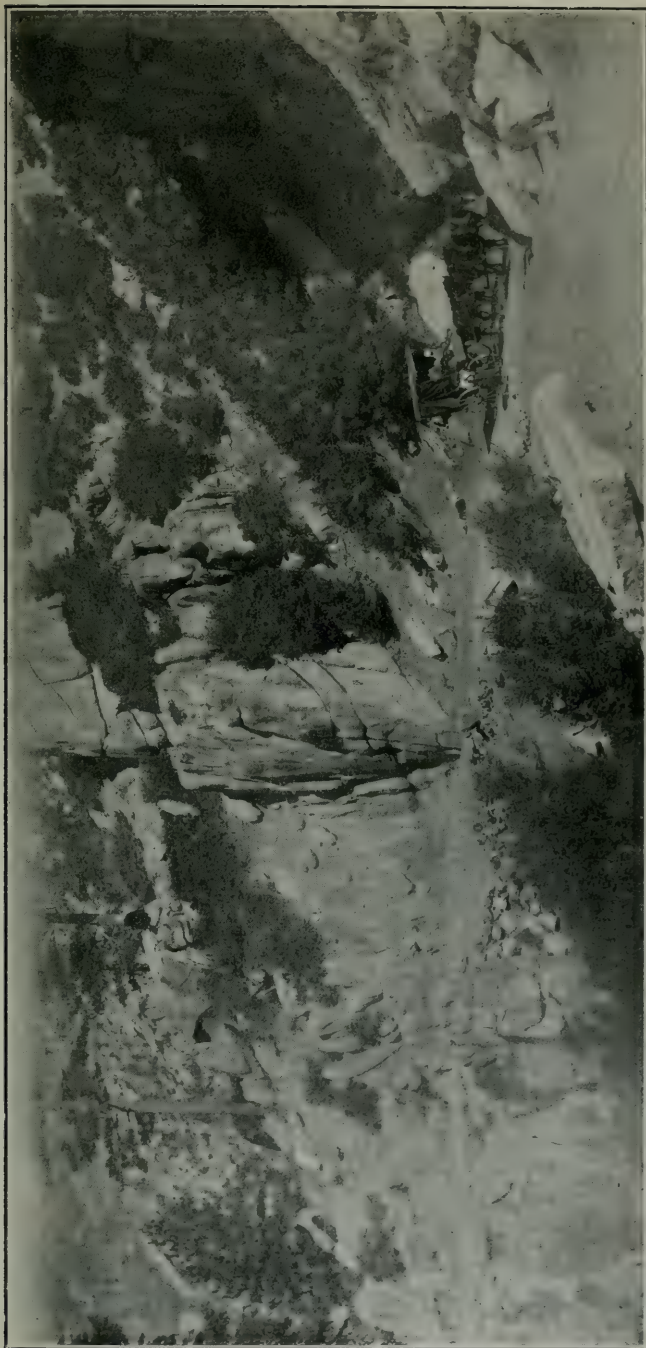
After the trouble encountered in the construction of the Oglesby Cañon culvert it was decided to build the Trout Creek bridge by day labor. Consequently, plans and specifications were drawn by me for a 26-foot segmental stone arch bridge. The structure is to be built of squared rubble granite and its abutment foundations both rest on bed-rock. Mr. Lyon, at this date, has both abutments built to the springing line and the stone cut and the apparatus for building and cement on the ground, so that the work of completion will go on as early as Lake Valley may be entered next spring.

Under the present law, the Commissioner of the Lake Tahoe Wagon Road has direct charge of the road and the expenditure of the maintenance appropriation, thus dividing the State road business in an unsystematic and uneconomic manner. Believing the work could be more advantageously done if directly under the supervision of the Department of Highways, the following law is recommended:

AN ACT TO PLACE THE LAKE TAHOE WAGON ROAD UNDER THE CARE, CONTROL, MANAGEMENT AND SUPERVISION OF THE DEPARTMENT OF HIGHWAYS OF THE STATE OF CALIFORNIA; TO PROVIDE FOR NECESSARY ALTERATIONS AND EXTENSIONS OF SAID ROAD, AND THE REPAIR AND CONSTRUCTION OF THE ROAD STRUCTURES THEREON.

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. On and after the thirtieth day of June, A. D. nineteen hundred and seven, the Department of Highways, State of California, shall have the care, control, management, and supervision of that certain wagon road belonging to the



SONORA AND MONO ROAD. ON THE "GRADE" TO THE SUMMIT, ELEVATION 7,000 FEET.

State of California known as the "Lake Tahoe Wagon Road," and situated in the county of El Dorado, in said State, commencing at the junction of the said road with the Placerville and Newtown road, a short distance from the village of Smith Flat, in said county of El Dorado, and running thence to a point on the east boundary line of said State at or near Lake Tahoe.

SEC. 2. It shall be the duty of the Department of Highways to keep said road, and the bridges and culverts thereon, open to travel at all times, except when prevented by the severity of the elements. It shall repair and rebuild said road, or any of the structures thereon, when in its judgment necessary and there are funds provided therefor. The Department of Highways may alter or change the route of said road, and may and shall do all things necessary or proper to care for, manage, maintain, improve, protect, alter, or extend said road, together with its road structures, and in so doing said Department of Highways is authorized to employ assistance, and to procure all material and property, real and personal, in its judgment necessary therefor.

SEC. 3. The Department of Highways shall have power to appoint a superintendent of the Lake Tahoe Wagon Road, who shall hold office at the pleasure of the Department. Such appointee shall not be eligible for such appointment unless possessing special qualifications for the duties devolving upon said office. Such superintendent shall receive six hundred dollars per annum in salary, and his necessary traveling expenses while in pursuance of his duties. Said salary shall be paid in the same manner and at the same time as that of other State officers.

SEC. 4. All Acts or parts of Acts in conflict with the provisions of this Act are hereby repealed.

SEC. 5. This Act shall take effect and be in force from and after June thirtieth, nineteen hundred and seven.

THE SONORA AND MONO ROAD.

The Legislature of 1905 appropriated \$20,000 for the construction of bridges, culverts, and grading on the Sonora and Mono State road, in addition to the maintenance appropriation of \$4,000 per annum. With the meager allowance prior to this appropriation, nothing except necessary temporary repairs and drainage could be undertaken. Since the spring of 1905, however, the work has progressed satisfactorily. Ditching has been generally done, the Eagle Creek bridge, a wooden structure of 50 feet span, has been reconstructed; the lava cap at the western end of Bald mountain, over which the road is built, gave annual trouble until a ditch was cut in solid rock, on the upper side of the road for 1,500 feet; sixteen stone culverts have been built, and about ten miles of filling in over granite boulders has been accomplished.

During the year 1906 much work has been done in coöperation with the Union Construction Company, a corporation desirous of getting water power from a point near Baker's station on the road. They applied for permission to put men on the road and work it from the western extremity to Baker's station, a distance of about thirty-eight miles. This was granted without delay and also coöperation extended from this office. Thus, during 1906, said company cut out the roadway for this distance, to 16 feet in width, taking out all protruding rocks, cutting out the brush and timber, and smoothing the roadway. This

Department bought two dump-carts, 1,730 feet of salt-glazed vitrified sewer pipe, and eighty sacks of cement, to assist in the work. With the carts we surfaced the Patterson grade five miles in length over one of the rockiest and roughest stretches of the whole road. The pipe and cement were shipped to Middle Camp near the road and will be placed next spring by the company in all places where culverts are needed on the first thirty-eight miles. This will give all permanent culverts for the first thirty-eight miles of the road and relieve all necessary maintenance expense hereafter on this line of improvement.

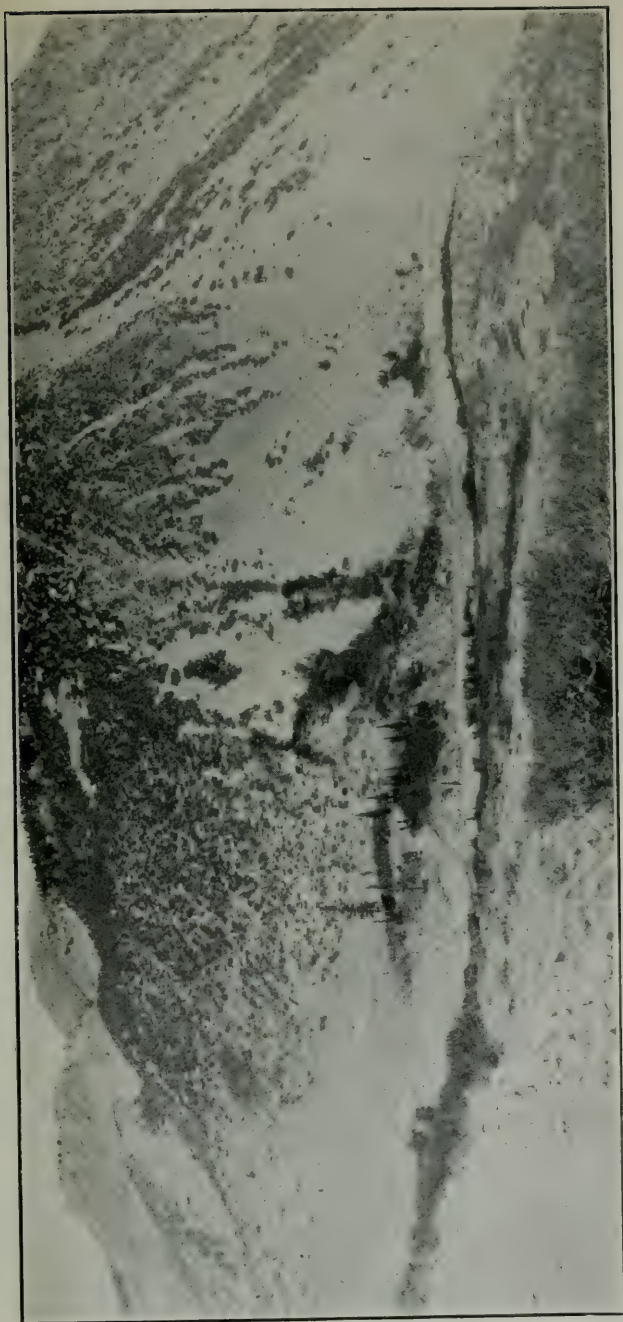
From the summit of the road, at the junction of Mono and Tuolumne counties, to Baker's station, the road was kept passable for travel, while most of the work was done in conjunction with the crew of from two hundred to three hundred men employed all summer by the aforesaid company, under the direction of this Department. Consequently, the road derived vast benefits from this plan with but little cost to the State.

The main bridge over the Stanislaus River was reconstructed of wood by the company and will be housed-in next spring by this Department, thereby prolonging its life at least fourfold. A full and complete design of a rubble stone bridge of 50 feet span was made for the above crossing, and bids advertised for. Upon the receipt of only one bid from Mr. O. L. Morton, July 17, 1906, for \$9,800, and having the assurance that the Union Construction Company would build a first-class wooden structure without cost to the State, it was rejected.

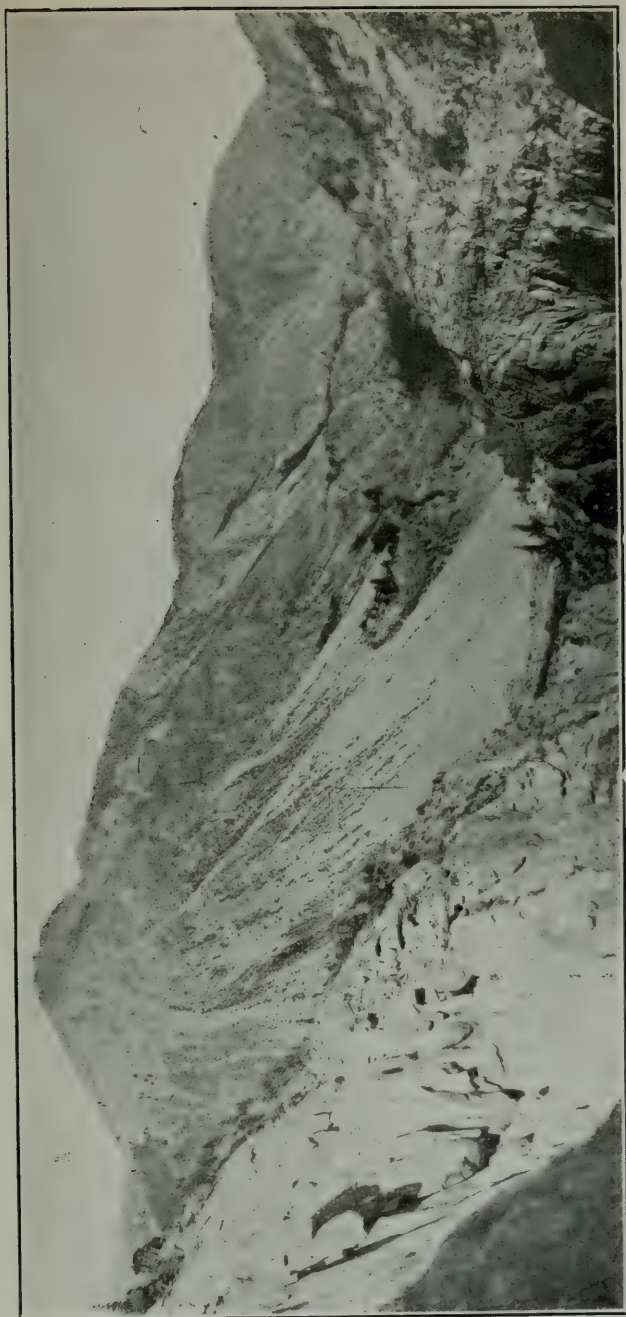
Next spring this Department may, from the balance of over \$13,000 in the bridge, culvert, and grading appropriation, do much work on the remaining forty miles of road. That part of this road contained in Mono County may be benefited by several changes in alignment and grade. One particular and very essential change is the Quinlan grade—a piece of road traversing a slide clay bank, and which can be entirely avoided by lengthening the road about a quarter of a mile. This, with some minor changes of line, should be proceeded with immediately. It is therefore recommended that the State Department of Highways be vested with power to obtain or condemn rights of way for State road purposes in the name of the State.

During August, 1906, the old combination bridge at Riverton, on the Lake Tahoe Wagon road, was torn down and the iron transported to Junction, Mono County, for use in the construction of a bridge over the West Walker River. The present structure at this crossing is dangerous and will be torn down as soon as the other material may be gotten on the ground in the spring.

For a mountain road traversing the Sierra Nevada Mountains and seventy-eight miles in length, the present maintenance fund appropriation of \$4,000 per annum is wholly inadequate. It is therefore recommended that this sum be increased to \$6,000 per annum.



MONO LAKE BASIN ROAD, NEAR WARREN CREEK, SHOWING BROKEN ROCK.



MONO LAKE BASIN ROAD, SHOWING ROCK BLAST FOR ROADBED IN LEFT-HAND CORNER, AND ROAD LINE.



MONO LAKE BASIN ROAD.

The construction of this road has been materially retarded by the lack of labor and the short seasons during which work can be accomplished on it. Under the contract of Mr. James Touhey for the eastern end of 4 miles 1,010 feet of the road, there was expended by this Department, through its foreman, Mr. T. Silvester, the \$3,500 contract retention money and \$941.80 of the cash bond of \$1,000 held for the faithful performance of the work. Mr. Touhey failed to comply with the specifications, and after due notification to remedy the defects of his work, was, under the terms of the contract, relieved of further work.

This portion of the road is now in good shape, and a detailed list of expenditures from the bond money is given in the appendix to this report. The upper or western end of the road, 5 miles 593 feet in length, is now under contract to Mr. J. F. O'Brien of San Francisco, for the sum of \$23,861. In 1905, his first year of work, there was built two miles of the most difficult part of the road, thus leaving about one half mile of road to reach Rhinedolla Lake, where the work for the remainder of the distance is comparatively easy of construction. In 1906, through a late spring and heavy snows and a very great lack of labor in Mono County, only \$590 worth of work was done on the contract. The State Highway Commissioner especially investigated the labor problem with relation to the road and found it highly improbable that much work could be done, therefore the time of completion has been extended to September 20, 1907. The great difficulty encountered in carrying out this work on the second contract has been augmented by the mountain side giving way under a heavy blast, so that the resulting chasm of 400 feet must be bridged for 25 feet by the contractor. Steam drills have been employed in cutting away the solid granite rock for the roadway. Nearly all the roadbed must be made by hauling material from nearby pits, thus creating a surface on the solid or broken rock.

Where the road traverses a talus mountain, both lower and upper retaining walls were necessary for a distance of 3,300 feet each. No doubt when completed this road will present some of the most difficult of mountain road work, and to the increasing travel of that section one of the finest scenic routes of California.

At the session of the Legislature in 1905, there was appropriated \$500 per annum for the maintenance of the finished part of this road. Very nearly all of this amount has been expended in removing the earth and rocks that rolled into the road from the mountainside above the road. A new road cut into the mountain as this one has been, has, for four or five years, a great amount of loose material to be removed each spring. This appropriation should, therefore, certainly be increased to \$1,000 per annum, so that proper maintenance may be obtained.

ALTURAS-CEDARVILLE ROAD.

The first State aid to road construction in the coöperative sense was extended to Modoc County in the reconstruction of the Alturas-Cedarville road. In pursuance of the terms of the statute appropriating \$7,000 for the work, available in two equal parts for the years 1905 and 1906, the State Highway Commissioner visited the road May 25, 26, and 27, 1905, and outlined the most urgent needs in reconstructive work. In company with Mr. H. S. Smith, who was placed in charge of the work, and some citizens of Modoc County, a route was gone over entirely changing the present road in an endeavor to avoid the bad adobe soil on the western part of it. Various arguments were brought to bear in favor of the change, but after careful examination, which failed to show whereby benefits could be derived by such change, it was decided to adhere closely to the old line of road, changing local grades or alignments where certain improvements could be made. With this end in view, Mr. Smith was given instructions to widen out the road in narrow places, change the grade at many points selected by myself, fill the Stockdale slough—a very low, muddy sag—place stone culverts on new work, and get the best grade and alignment possible under the conditions. The county of Modoc, through its supervisors, appropriated \$3,000 to be expended with the State money and under the charge of this Department.

Two very bad locations of road near the Warner Range Mountain summit, one on either side, were re-located and re-constructed with wide roadbed and easy grades. On the west side of the summit there was an eighteen per cent grade on a turn which, in the winter time, from all accounts, was covered with ice and snow, making a most difficult place for any kind of team. This was changed by swinging to the north, thus giving more distance with an even grade of six per cent for about one half mile and more exposure to the sun. On the east side of the summit, the new grade was made above the old one for 8,050 feet at six per cent grade, again reducing a mean, heavy pull. All work was done with the idea of permanency, all bridge abutments being of dry rubble masonry, and the fill work at Stockdale slough was for the whole distance on both sides riprapped with stone, while much permanent stone walling was built.

The work, covering a period of two years, is best explained by Mr. Smith's reports to this Department:

REPORT ON ALTURAS-CEDARVILLE ROAD.

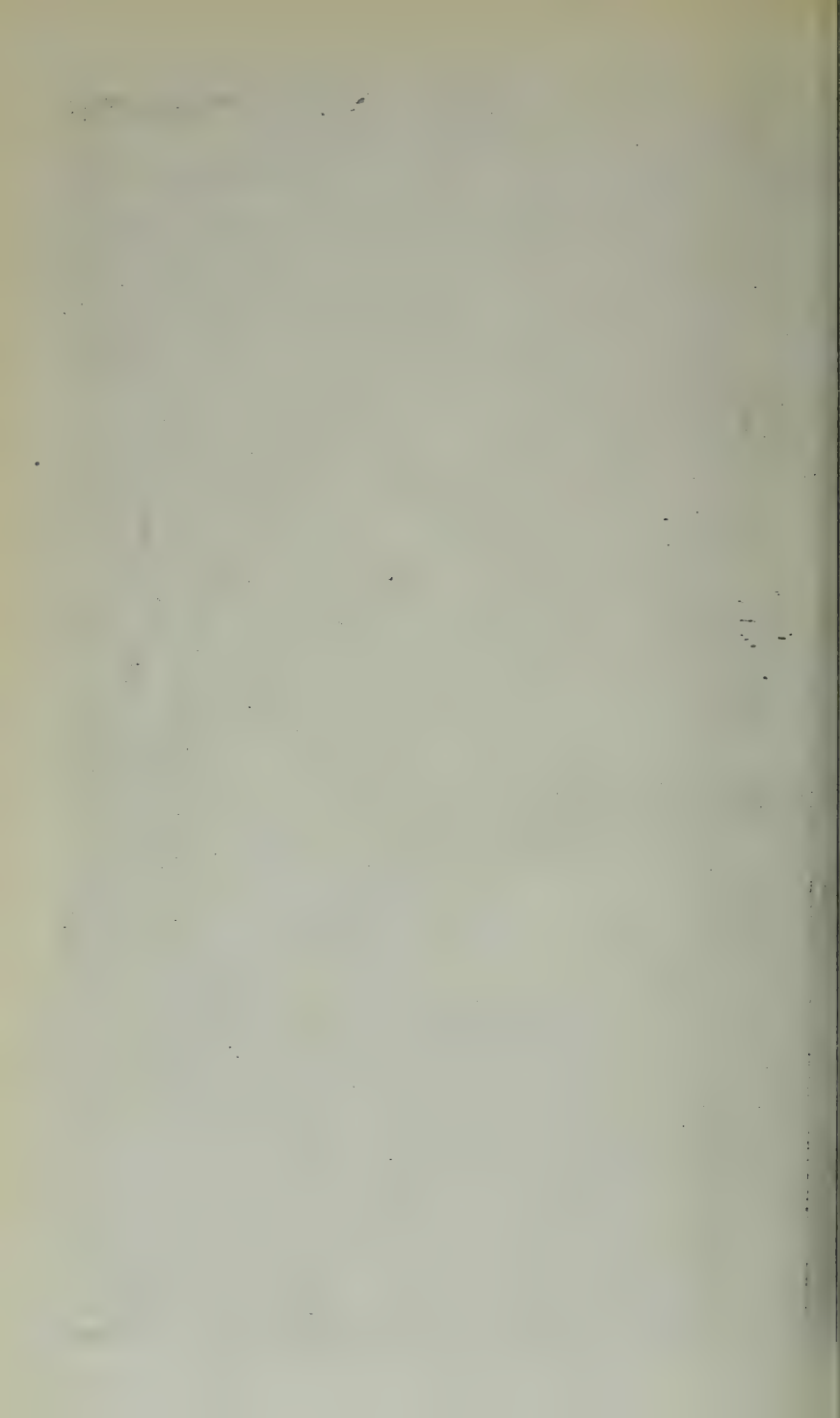
NOVEMBER 10, 1905.

MR. N. ELLERY, *Commissioner of Highways, State of California.*

SIR: As there was great need of turnouts on this road, the first thing done was to remedy this defect. We widened the road at various sharp turns, not unnecessarily cutting or filling. This made our work quite rapid at the start, but we shortly struck rough and rocky ground, necessitating the use of pick and shovel



ALTURAS AND CEDARVILLE ROAD, AT WORK REDUCING STEEP GRADES NEAR SUMMIT OF WARNER MOUNTAINS. (OLD ROAD ON RIGHT SHOWING EXCESSIVE GRADE.)





ALTURAS AND CEDARVILLE ROAD. NEWLY CONSTRUCTED 6% GRADE, TAKING PLACE OF OLD ROAD IN PLACES 18% AND 20%.



almost exclusively. Our first work began about one mile westerly from Cedarville, from which point we continued up the mountain in the direction of Alturas, doing the following work:

For 305 feet cut into the bank 4 feet; average cut, 6 feet; gave width of 14 feet.

For 90 feet cut into the bank 4 feet; average cut, 4 feet; very hard.

For 120 feet cut into the bank 5 feet; average cut, 3 feet; all blasting.

For 240 feet cut into the bank 3 feet; average cut, 10 feet.

For 45 feet filled outer edge $2\frac{1}{2}$ feet in depth, giving wide roadway.

For 60 feet filled outer edge 3 feet in depth, giving wide roadway at water trough.

At this point a stone culvert 20 inches by 20 inches by 20 feet was constructed, the rock for which was obtained from blasting a large boulder protruding from the bank into the road. We then made a cut into the bank 8 feet around a very sharp curve for a distance of 180 feet. Average cut of bank 15 feet deep. At the end of this cut we encountered a very large boulder 18 feet by 36 feet, which was blasted and used for retaining walls and fill below. Around this large rock was considered one of the most dangerous places, being so slippery in winter. From here we cut and filled the road, evening it to Cressler's cabin to an average of eight per cent. Another bad place remedied: The creek 150 feet below the road each winter cut away its bank, causing the whole side hill to give way, so that it had been thought impossible to save the roadbed at all at this point. Under the direction of the State Highway Commissioner we cut away the creek bank for 580 feet in length and 25 feet in height, making a slope of one to one. Continuing we cut and filled as follows:

For 50 feet cut into bank 3 feet; average depth, 8 feet; built rock wall and filled lower side.

For 102 feet cut into bank 2 feet; average depth 30 feet; filled lower side.

For 147 feet blasted out all protruding boulders.

For 327 feet cut into bank 3 feet; average depth, 5 feet; filled lower side.

For 51 feet cut into bank 10 feet; average depth, 6 feet; making a turnout.

For 144 feet cut into bank 4 feet; average depth, 8 feet; filled lower side.

This finished the work for this year on the eastern slope of the summit except near the top, where the following work was done:

For 45 feet cut into bank 3 feet; average depth, 6 feet; built wall 45 feet by 6 feet high.

For 182 feet cut into bank 4 feet; average depth, 3 feet; filled lower side.

For 200 feet cut into bank 2 feet; average depth, 3 feet; filled lower side.

For 100 feet cut into bank 4 feet; average depth, 3 feet; 30 feet through solid rock.

Entire distance was walled 2 feet in elevation.

At this point a culvert 20 feet by 36 feet by 30 feet was built and filled over to a depth of 18 inches. The summit itself was cut for a distance of 100 feet, 30 inches deep and 70 feet wide, to allow a suitable place for heavy freight wagons to couple up. The grade on the old road was very rough and uneven, averaging about fourteen per cent. From the point of commencement to the summit the new work reduces the grade to an eight per cent average.

We now commenced work on the western side of the mountain 250 feet from the summit and turned to the north, leaving the old road entirely. This change was very essential, as one turn contained a grade of eighteen per cent and was practically impassable during the winter. The following work was here required:

For 170 feet a thorough cut of 10 feet in depth; hard soil was blasted.

For 100 feet a thorough cut of 4 feet in depth.

For 76 feet a cut and fill of 3 feet, done with plow and scraper.

Here was placed a stone culvert 24 inches by 24 inches by 75 feet, and fill made.

For 57 feet a fill 10 feet in depth, with retaining wall each side, average height 8 feet.

For 100 feet thorough cut of 8 feet in depth.

For 67 feet, fill of 7 feet to a bridge.

This bridge structure is composed of stone abutments and hewn timbers of the following dimensions:

8 stringers.....	14 in. x 16 in. x 24 ft.
19 pieces.....	10 in. x 14 in. x 19 ft.
2 sills.....	10 in. x 14 in. x 22 ft.
2 wheel guards.....	14 in. x 16 in. x 26 ft.
Abutments.....	24 ft. x 15 ft. high.

There was used eighty gallons of coal tar upon the joints and woodwork of the structure and by ascertained figures sawed lumber would have cost \$190 more delivered than the used hewn lumber.

From the bridge the work was carried forward as follows:

For 350 feet, fill of 10 feet in depth; walled whole distance, 11 feet high.

For 175 feet, cut of 8 feet in depth; filled on lower side.

For 350 feet, fill of 8 feet in depth.

For 200 feet, cut of 8 feet in depth, through lava ledge.

For 250 feet, cut of 2 feet in depth, through lava ledge.

A stone culvert of 20 inches by 24 inches by 40 feet dimensions was constructed, when we continued cutting and filling and building walls.

For 120 feet, fill of 15 feet in depth; built wall both sides, 15 and 20 feet high.

For 270 feet, cut of 3 feet in depth; fill on lower side.

For 162 feet, cut of 5 feet in depth, through solid rock.

For 335 feet, fill average 6 feet in depth; built retaining wall lower side.

For 450 feet, cut average 3 feet in depth; fill lower side through brush and timber.

For 210 feet, fill average 4 feet in depth; wall lower side.

For 250 feet, cut average 2 feet in depth; fill lower side.

For 177 feet, cut average 9½ feet in depth; solid rock.

For 60 feet, fill average 6 feet in depth; wall lower side.

For 75 feet, cut average 3 feet in depth; wall lower side.

For 450 feet, cut average 3 feet in depth; fill lower side.

At the last stretch the old road is entered, where we made a clearing 600 feet long through heavy timber to avoid a bad, slippery grade and constructed thereon a temporary bridge. After completing this work we moved to Stockdale slough, where two bridges of 16 feet span and 14 feet in width were built. Their stone abutments are 16 feet by 4 feet in elevation. All wood work on the superstructures was thoroughly tarred at joints and connecting points. Along the roadway, across the slough, we laid a riprap wall on each side of the road for a distance of 687 feet, or a total of 1,374 feet. The average height of this work was 4 feet, width at base 4 feet, and sloped off to 1½ feet at the top. Between these walls was a fill of 18 inches of rock and covered with 6 inches of gravel.

As our yearly appropriation was getting low we concluded to drop work at this point, leaving 365 feet to be finished next year. We, however, gave it a coating of 18 inches of gravel, thus insuring the road until work is completed upon it, which can be done for \$250.

Respectfully submitted.

(Signed) H. S. SMITH,
Engineer and Superintendent.

For the year 1906 Mr. Smith continued on the work and reported as follows:

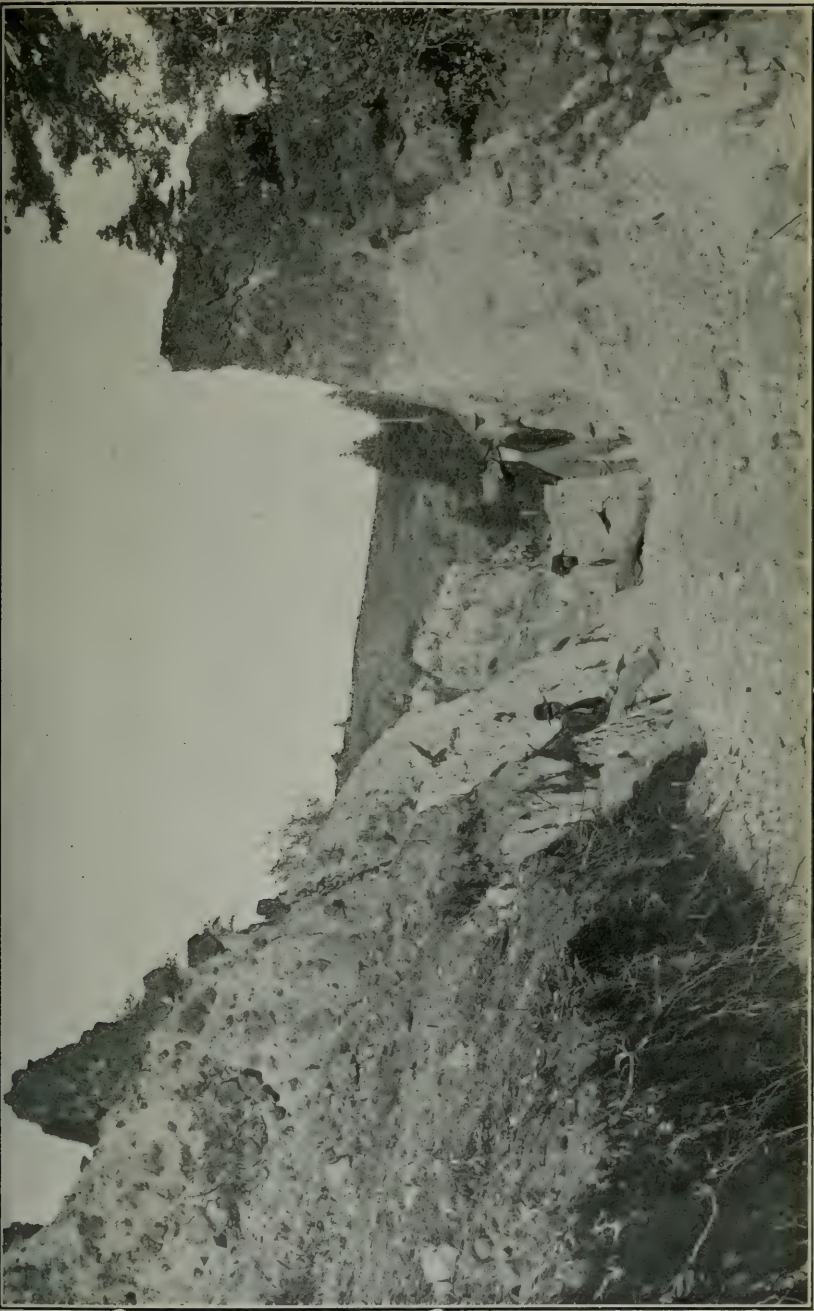
REPORT ON FINAL WORK ON THE ALTURAS-CEDARVILLE ROAD.

OCTOBER 30, 1906.

MR. N. ELLERY, *State Highway Commissioner, Sacramento, Cal.*

SIR: In making my report upon work performed during the year 1906 upon the Alturas-Cedarville Road, will say that I shall be as brief as possible, realizing that a lengthy document is entirely unnecessary.

We commenced work about 500 feet from the summit of Cedar Pass at a point on the old road (or rather the road completed last year), by making a preliminary



ALTURAS AND CEDARVILLE ROAD, SHOWING LAVA ROCK CUT ON IMPROVEMENT WORK.



survey to Stough's ranch, a distance of 8,000 feet. We found we could easily make a six per cent grade. Consequently, on the 15th of June we made a camp near the work at "Cressler's Cabin," and on the 18th commenced work in earnest with a crew of seven men and four horses. Finding it almost impossible to obtain men at any price, was compelled to make an advance of a little more than ten per cent over last year's rates. Our force was soon increased to sixteen men and sixteen horses, but even with this number of men we could make but slow progress, owing to the extreme unsettled state of the weather, which was very cold and wet.

Our first work was clearing away the brush and timber (after having made a final location of the road), and that we found very slow and laborious, especially removing the timber, as it was very heavy and dense.

Later on it was found necessary to dismiss several of the men, as they thought they were being worked too hard, having the idea in their heads that as this was public work they ought to have a sort of picnic, and because they were compelled to put in eight hours per day on the work (which did not include their going and coming to and from the camp), some made it quite unpleasant for the entire crew, consequently the change referred to was made.

The entire distance of the new grade (called by all "the Stough Grade") is 8,050 feet, as against 4,960 feet by the old road. We moved in that distance something over 13,629 yards, which includes a fill of 1,777 yards over a small ravine. The work was done principally with plows and road grader, although we were forced to do some blasting and resort to the use of pick and shovel. The heaviest work was the fill already referred to, which was over a stone culvert in said ravine.

Great difficulty was encountered in procuring rock that was suitable for the culvert, and for the walls for the fill—for we ripped the fill. We made one bridge over a small stream, the same being as follows: Roadway, 40 feet wide; length of bridge, 12 feet, with necessary approaches, which made a fill of an average of 60 feet in length and 8 feet in depth. We worked through 450 feet of porphyry, which required the use of two hundred and seventy pounds of dynamite; this work, however, was not heavy, but very tedious, owing to the condition of the rock, which seemed shattered in every direction.

When the size of the crew is considered and the conditions we had to contend with, the undersigned thinks the work done (which is of the best and shows for itself) is a good job and was executed very cheaply.

We also finished the work (which was commenced last year) at Stockdale slough, near Alturas—being a distance of a little over 300 feet. This work consisted of making two rock walls averaging 3 feet in height, and covering the old road with rock, then covering that with 10 inches of gravel. A heavy fill was made on "the lane" (as it is called) of a distance of 250 feet in length, by 6 feet in depth, with a roadway on top of 16 feet in width. This was easily accomplished, as the gravel was close to the work.

Great credit is due W. H. McCormick, of Eagleville, the foreman, who not only acted in the aforesaid capacity, but as blacksmith also; oftentimes he was forced to drive a team, fill scrapers, and work on the dump, always holding himself ready, night or day, Sundays or any other time, to fill any place required of any of the men. Much of the time he did all the blasting, not feeling warranted in hiring an expert in that business.

Respectfully submitted.

(Signed) H. S. SMITH.

Superintendent of Improvements, Alturas and Cedarville Road.

KINGS RIVER CANON ROAD.

Although the Act making the appropriation for the survey and construction of the Kings River Cañon Road was passed by the Legislature of 1905, the same did not become available until June 1, 1906.

During the year 1905, after the passage of the Act, a party was formed in Fresno County to visit the cañon, and the Commissioners

under the law, consisting of the Governor and the State Highway Commissioner, were invited to make the trip. Accordingly on July 10, 1905, the party proceeded from Fresno to Millwood and from there to the cañon. Taking advantage of this excellent opportunity to gain some practical ideas of the country through which the road was proposed, Mr. J. S. Eastwood, a deputy county surveyor and engineer, and myself, undertook to obtain preliminary data that we might offer some suggestions from our personal observations. We visited many places likely to be on the various routes, and upon our return reported our conclusions to the head of the commission, the Governor. Therefore, herewith is given the report as describing fully the results of our investigations:

REPORT ON KINGS RIVER CANON ROAD.

SACRAMENTO, CAL., August 4, 1905.

To HON. GEORGE C. PARDEE, *Governor of California*, and
THE HONORABLE BOARD OF SUPERVISORS OF FRESNO COUNTY.

GENTLEMEN: By reason of the law passed by the Legislature of California during the session of 1905, which appropriated funds for the construction, in coöperation with Fresno County, of a wagon road from the General Grant National Park, in Fresno County, in an easterly direction to and into the Kings River Cañon, there was a party formed at the City of Fresno, July 10, 1905, which proceeded to Millwood by stage and then by saddle animals to the objective point in the cañon.

Under the law, the Governor of California and the Commissioner of Highways were constituted a commission to locate, survey, and construct the road above mentioned. Through illness in the Governor's family he was compelled to forego the trip, but the Commissioner of Highways, representing the State and the commission, and Mr. J. S. Eastwood, a civil engineer, representing the County of Fresno, preliminarily inspected and examined the probable routes into the cañon, and herewith place before your honorable body the conclusions and deductions arrived at.

We visited the South Fork of the Kings River Cañon, Bubb's Cañon, and went as far as the Kearsarge Pass between Fresno and Inyo counties. The unanimity of opinion in the party of which we were part was very strongly for opening this grand and magnificent scenery to the public by a more convenient means of traveling to the floor of the main cañon than now exists. We unhesitatingly recommend that this beautiful mountain scenery be connected with the San Joaquin Valley by the proposed wagon road, and think the plan of coöperation of State and county in the construction of such a thoroughfare excellent.

Outside of the places visited we viewed from the distance but a very small portion of the Tehipite section, but have every assurance for believing that in its extraordinarily fine views there is supplementary reason for this needed road.

Aside from our general observations, we examined, as well as our limited time would permit, the routes leading from or near the General Grant National Park to the cañon, and in connection with the U. S. Geological Survey maps in our possession endeavored to obtain the leading features of the country preliminary to a road location. We traveled the trails quite thoroughly, noted the road in the park and made long trips on foot to determine the practicability of a road. The survey made by the present County Surveyor of Fresno County, Mr. McKay, was viewed almost its entire length from the park to the saddle or dip in the ridge just west of Redwood Creek. From the mouth of Boulder Creek to the flat near the Cedar House we traversed the bed of the main cañon on foot, while from the mouth of Boulder Creek, westerly, we thoroughly acquainted ourselves with the country as far as the mouth of Ten-Mile Creek. We crossed Boulder Creek and noted its

ruggedness near the trail. Mr. Ellery inspected the ridge leading into the cañon from near Lookout Peak, near Summit Meadows. This was along the preliminary survey of the former County Surveyor, Mr. G. L. Hoxie, and consisted in that part where he dropped from the high ridge near Horse Corral meadows to the floor of the cañon. These trips, in connection with a general view of the country and the limitations given in the statute appropriating money for the construction of the road, led us to conclude as follows:

1. A road constructed under this law must have the General Grant National Park as a terminus.

2. The location must be in Fresno County, if said county is to furnish money to aid in construction and to maintain it.

3. The location must be such as to give the longest period of service during the season.

4. It must be so located as to give the greatest benefit to the public in giving access to the main and best scenery.

5. It must be so located as to make a permanent road for the least first cost possible, consistent with good and inexpensive maintenance.

Fully considering all of these points in the determination of the best route, it will be found that the beginning should be at the end of a wagon road built through the General Grant National Park to the northeast gate, a short distance from the summit of the divide which must be crossed, then ascending this ridge and crossing it, whence the line should descend the drainage basin of the Ten-Mile Creek to a point near the end of a road now terminating on Ten-Mile Creek. This distance must be covered in a manner that will permit of a good grade, and therefore its particular line would be left to the work of survey. From this point it would run down the right bank of Ten-Mile Creek on the most advantageous ground, gradually descending to the South Fork of the Kings River just below the lower one of the three limestone points named Windy Cliff by the Geological Survey; thence up the South Fork to a point nearly opposite Grizzly Creek, where the river is to be crossed and the line continued on comparatively flat ground as far as may be required.

By this route, the road will contain no adverse grades from the first ridge east of the park to the river. The drop in elevation from this ridge to the previously mentioned point on Ten-Mile Creek is 2,200 feet, requiring 6.6 miles of road at six per cent to make the descent. From the Ten-Mile point to the South Fork of the Kings River the difference in elevation is 1,700 feet, requiring, with flattened grade at some rough points, 6 miles of road to bring the line within one mile of Boulder Creek. Thence up the river along the talus earth and rock of the south side on the grade of the stream, which is 100 feet per mile, about 8 miles to the open valley, or beginning of the floor.

Allowing for curvature, the road should be about 7 miles from the park ridge to the Ten-Mile Creek; with the additional mile from park to the top of divide, making 8 miles to the point where the McKay survey diverts. From here to the river proper is another 7 miles, and along the river to the open valley 8 miles. In all, the total distance from the park line to the west end of the floor of the valley proper is 23 or 24 miles.

This route best complies with the conditions named above as prime requisites for the location. Not only will it give an excellent grade from the park to the cañon, but it will form a central line from which roads or trails may be built to points of interest. The Tehipite Cañon may be readily reached by trail. The big trees in the small cañons to the south will be of easy access, and the great rocks and cliffs of the cañon along the road line will be no small item of interest. In fact, such a road will open a part of the Sierra Nevada Mountains of exceeding and unusual beauty. To within about five miles of the river on this route the line would run through timber, after which brush will be encountered until the river is reached, when along the river brush and timber intermingle.

From the examination made by us without actual survey data it appears that the line of road for the first 15 miles will cost not over \$1,350 per mile, or about \$20,000; while the last 8 miles will cost approximately \$25,000. Any other route on the character of ground such as this line would traverse for the first 15 miles,

could not be constructed for less than an average of \$1,350 per mile, so that if the distance be increased by grades in and out of the depressions by a route farther to the south the first cost is but slightly less and the maintenance greater, due to the erosive power of water on a grade.

To locate a road so that it is to cross the deep depressions of the drainage courses is, as written before, but to add distance for the purpose of getting into and out of these depressions, and hence it must be located either below them entirely, as is proposed, or above the heads of the streams which form them. As it is impossible to head these streams and remain inside the boundaries of Fresno County, the only route besides the one chosen must cross the intervening divides of Ten-Mile and Boulder creeks, and these ascensions and descensions require distance to give a proper grade. This route will of necessity start from the same pass or saddle in the divide east of the park and be identical to that point, descending from this point to a crossing of Ten-Mile Creek, on which the highest point possible in Fresno County is 6,000 feet, a drop of 1,200 feet from the saddle to Ten-Mile crossing; thence the road must ascend the divide between Ten-Mile and Boulder, a rise of 1,600 feet, the lowest point being 7,600 feet; thence descending to Boulder Creek, which must be crossed at an altitude of 6,500 feet, a drop of 1,100 feet; thence ascending to the pass above Horse Corral meadows, the lowest point of which is 7,600 feet, a rise of 1,100 feet; thence descending to Kings River Cañon via Lightning Creek, a descent of 3,000 feet, to the floor of the valley at the Cedar Grove Hotel, altitude 4,600 feet.

Thus to reach the cañon adverse grades to the extent of 2,700 feet must be overcome, and these in turn make it necessary to build 29 miles of road to overcome them, not counting road necessary to avoid difficult points of rock, etc. On a return trip from the cañon the adverse grades would be 5,300 feet.

An intermediate route is of course out of the question, as it would need to cross ridges and depressions at even greater differences of level.

In the compilation of the foregoing data we have consulted in connection with the field reconnaissance the topographic maps of the U. S. Geological Survey.

Therefore, so far as our examination goes, we recommend the lower route as outlined as the only route in Fresno County that can in a degree of economy comply with the terms of the Act making the appropriation.

All matters and deductions herewith presented are merely preliminary, and we submit the same from that standpoint. As we have principally dealt with the engineering features for the road, we offer for consideration this report to the Hon. George C. Pardee, Governor of California, the leading member of the commission for the construction of this important work, and your honorable body.

Respectfully,

(Signed) JOHN S. EASTWOOD,
Deputy County Surveyor of Fresno.

(Signed) N. ELLERY,
State Highway Commissioner.

By the terms of the Act it became necessary to obtain from Fresno County an appropriation of \$12,500 to make the State appropriation available. Therefore, Mr. A. M. Drew, who deserves much of the credit of the success of the work to date, and myself, appeared before the Board of Supervisors of Fresno County and, after stating plainly the position of the State in the matter, the Board passed the following resolution:

FRESNO, CAL., May 10, 1906.

Office of the Board of Supervisors of Fresno County, California.

Present, full board.

W. O. Miles, Clerk. By A. D. Ewing, Deputy.

In the matter of allowing claims for the Kings River Cañon Road.

Resolved. That it is the sense of the Board of Supervisors that the bills of the State Commission for the construction of a public road into Kings River Cañon be

allowed and paid to the amount of one third of each bill presented to two thirds paid by the State of California, the amount so appropriated in no case to exceed the sum of \$12,500, work to commence on or after June 1, 1906; said amounts to be expended under the direction of the Board of Supervisors of Fresno County and the State Commission.

The above resolution was passed by the following vote Ayes—Supervisors Burleigh, Mitchell, Beall, Johnson, and Martin. Noes—None. Absent—None.

Attest: A true copy of resolution.

W. O. MILES,

County Clerk and ex-officio
Clerk of the Board of Supervisors.

By A. D. EWING, Deputy.

As all preliminary business incident to the beginning of work had been completed, a surveying party was placed in the field, the first camp being pitched at Huckleberry Meadow near the General Grant National Park. The park being one of the statutory termini of the route, work was commenced July 4, 1906, at the northeast park gate in extension of a good park road. The party consisted of Mr. E. B. Henderson, engineer in charge; W. W. Wooldridge, levelman; F. Pendergast, rodman; J. F. Clewe, cross sections; R. McKee, assistant to Mr. Clewe; R. Bell, head chainman; C. Barnum, rear chainman; A. Drew, transit rodman; M. Blum, stakeman, and C. C. and W. Wood, axmen. The survey was started under my personal supervision, but after getting the work under way I was compelled to leave camp on other business. During my absence, until September 7, 1906, camp was changed once to Ten-Mile Creek, and the survey in that time extended from the northeast gate of the General Grant National Park, on a very easy rising grade, to the summit of the divide near the head of Indian Basin. At this point, about two miles from the starting point, the divide was crossed in a sag and the survey continued along the north slope of a ridge extending toward Ten-Mile Creek until by a gradual descent Ten-Mile Creek was crossed at $9\frac{1}{4}$ miles. A very large proportion of the route is over earth, with perhaps in the foregoing distance $1\frac{1}{2}$ miles of solid rock or boulders, which does not present any difficulties of construction. After crossing Ten-Mile Creek the line was run around by and crossed Tornado Creek, from whence it continued toward the cañon of the South Fork of the Kings River. Upon my arrival in camp, September 7, 1906, two miles of survey had been made beyond Ten-Mile Crossing, thus making an excessive walk for the help. Consequently, the following Sunday, September 9, 1906, camp was removed to Redwood Creek, and I assumed personal charge of the work. We continued the work with the crew reduced by four men, to the ridge known as Horseshoe Bend, where, at the distance of $20\frac{1}{4}$ miles, near Windy Cliffs, work was suspended, on account of the long distance from camp, until next year. In the country traversed perhaps the most difficult of construction is between Lockwood Creek and Redwood Creek, where considerable solid and loose rock could not

be avoided. After crossing Redwood Creek, however, the ground was good, so that the line was switched back for two complete turns to get down to the river, and on to the Horseshoe Bend ridge. The route selected under the provisions of the statute will clearly make the finest scenic road in the whole State. The purpose of the road was to open up the great Kings River Cañon, and by the line now partly surveyed there will be no greater pleasure road.

EEL RIVER IMPROVEMENT WORK.

From the survey made of Eel River during 1903, by this Department, it was seen, and so recommended, that to save the friable alluvium deposit banks, revetment must be resorted to. This plan, however, was changed somewhat by legislative action during 1905, and money was appropriated to build jetties for the rectification of Eel River channel above the town of Fortuna. Accordingly during July 1 to 6, 1905, a local survey was made locating the work, and during that month plans and specifications were drawn with the sole idea of best subserving the interests involved, with the available fund of \$40,000. On August 1, 1905, an advertisement was inserted in a Sacramento daily newspaper calling for bids for the work, with the result that only two bids were received and they were from Humboldt County firms.

Proposals.

	Humboldt Contracting Co.	Mercer-Hodgson Improvement Co.
Rock in finished work, per ton, east side.....	\$3 75	\$3 50
Rock in finished work, per ton, west side	4 75	4 50
Loose brush in finished work, per cord	5 00	5 00
Piles in finished work, each.....	18 00	20 00
Grading down banks, per cubic yard	30	25
Barbed wire entangled in finished work, per 100 lbs.....	7 00	6 50

Both bids appearing too high they were rejected and it was determined to again advertise, in an endeavor to reduce the cost of work. The amount of constructive work outlined in the plans would, under the figures, cost very close to \$80,000. Following the second advertisement, five bids were received, and the lowest, that of the Atlantic, Gulf and Pacific Company, reduced the cost price to \$43,000 for the amount of work outlined:

Bids.

Firms.	Rock East Side, per Ton.	Rock West Side, per Ton.	Concrete, per Yard.	Brush, per Cord.	Piles, Each.	Grad- ing, per Yard.	Wire, per 100 Pounds.
Jenkins & Wells			\$4 75	\$3 50	\$13 00	\$0 20	\$7 50
Healy, Tibbitts & Co.	\$2 85	\$3 75	3 75	5 90	17 40	25	4 60
Mercer-Hodgson Improve- ment Co.	4 25	4 75	10 80	5 00	20 00	25	7 00
Atlantic, Gulf and Pacific Co.			2 25	4 50	10 00	25	7 00
Humboldt Contracting Co.	3 50	4 40	4 15	4 90	16 00	25	6 10

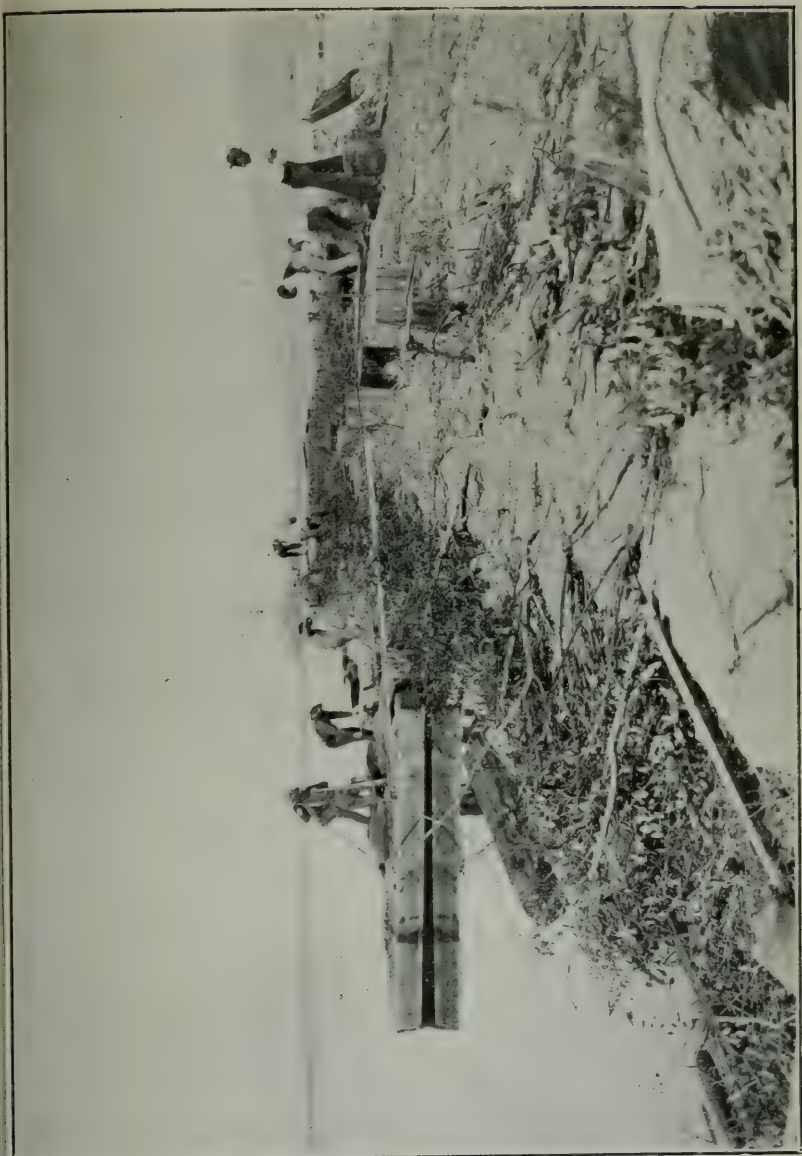


EEL RIVER IMPROVEMENT WORK. SHOWING BANK SLOPE FOR
REVTMENT WORK.

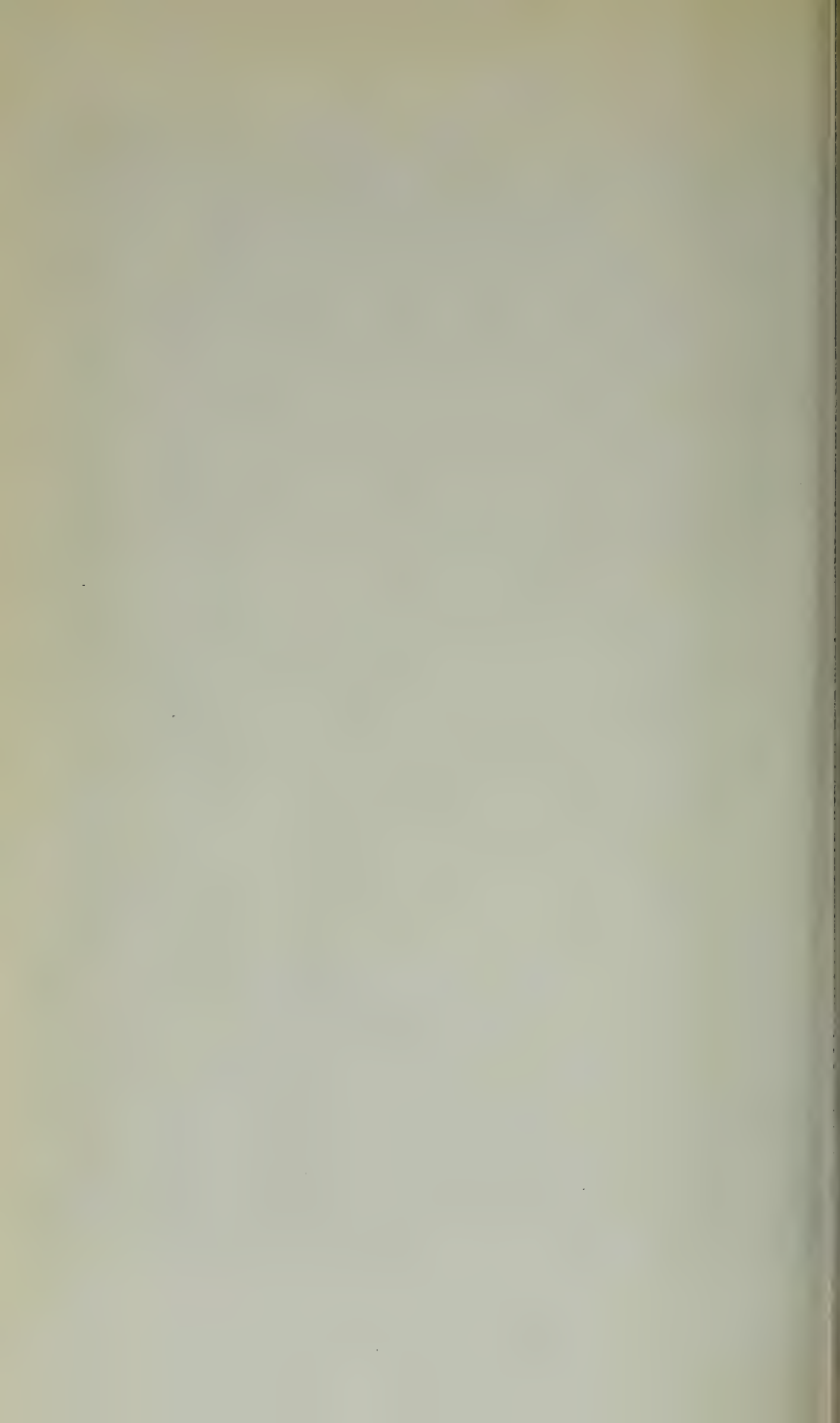


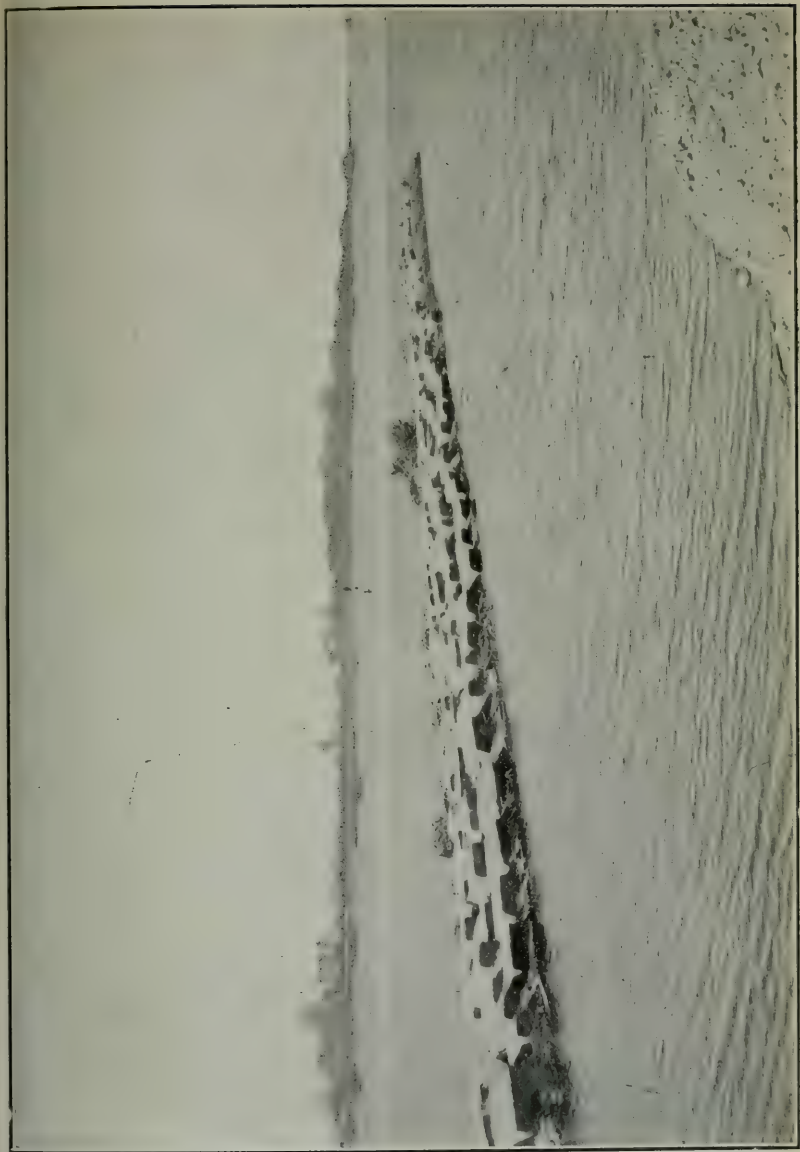
EEL RIVER IMPROVEMENT WORK. SHOWING PILES FOR JETTY WORK.





EEL RIVER PROTECTION. AT WORK CONCRETING WEST JETTY.





EEL RIVER PROTECTION, EAST JETTY.

assist in this work this Department donated some Standard cement, in sacks, for concrete. For this material to go through this winter in the damp atmosphere of that country would ruin it.

Upon completing the contract it was found that the inspector in charge of the work had overrun the appropriation by \$1,241.22 in order to get both jetties completed. This sum, however, can be reduced by a shipment of cement bags, which should bring \$450, and some barrel cement on hand worth \$250, leaving a balance due of \$541.22. Therefore, it is recommended such deficiency be appropriated to complete settlement with the Atlantic, Gulf and Pacific Company of San Francisco.

It is further expressly recommended that the Legislature appropriate about \$5,000 to care for and remedy any damage done the improvement work on Eel River.

GUIDEPOSTS FOR THE DESERT SECTIONS OF CALIFORNIA.

Under the law providing for guideposts in the desert sections of California, an advertisement was inserted in the *San Francisco Chronicle*, August 3, 1905, inviting proposals on guideposts. In response there were received, on August 12, 1905, five bids in the following sums:

The Schaw-Batcher Company, each post complete.....	\$7 50
Pacific Sign and Enameling Company, each post complete.....	8 75
Judson Manufacturing Company, each post complete.....	11 10
Wiet-Goethe Company, each post complete.....	8 23
Jenkins & Wells.....	6 25

These bids were received under the specifications given in the appendix, and upon the bid of \$6.25 per post complete, being the lowest, the contract was awarded Jenkins & Wells.

Numerous communications were exchanged with the Boards of Supervisors of the counties enumerated in the statute, with the result that the following posts were shipped:

Inyo County—January 3, 1906, per J. A. McKenzie, Keeler, 100 posts, 152 sign-boards.

Riverside County—March 10, 1906, per W. V. Covington, Mecca, 36 posts, complete.

Kern County—March 14, 1906, per H. A. Jastro, Bakersfield, 28 posts complete.

Los Angeles County—June 5, 1906, per W. C. Patterson, Los Angeles, 20 posts, complete.

San Bernardino County—July 17, 1906, per J. H. West, 130 posts complete. Daggett, 30; Needles, 50; Victorville, 25; Barnwell, 25.

Ventura County—No posts wanted.

San Diego County—No posts wanted.

The locations of these posts as yet have been returned from only Inyo and Riverside counties.

CONTINGENT APPROPRIATION.

In 1905 the traveling and contingent appropriation of this Department was increased to \$500 per annum. This is inadequate for the purposes intended. The necessary traveling in connection with the work of the State costs considerably more than this appropriation, so if there is to be any collection of data relating to this office, it seems that the recommended appropriation of \$750 per annum in 1905 should be allowed for the traveling and contingent expenses of this office.

MISCELLANEOUS WORK OF THE DEPARTMENT.

In the past two years this Department has been called upon to give advice relative to, and undertake in some cases, county or outside State work. Through requests from the Hon. F. W. Hatch, Superintendent of State Hospitals, I have located sewer and water lines at the Home for Feeble-Minded Children, at Eldridge, and assisted generally in matters of engineering before the Board of Managers of that institution.

Upon request from the Supervisors of Siskiyou County, I visited Yreka and inspected a route into Little Shasta Valley, that county, for a macadam road. It was over adobe soil, of difficult construction, so that we carefully went over the whole scheme to be sure of success in the venture.

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SACRAMENTO, CAL., June 5, 1906.

To HON. GEORGE C. PARDEE, *Governor of California.*

SIR: In compliance with the request of Mr. A. J. Pillsbury, Secretary of the State Board of Examiners, and also that of Dr. F. W. Hatch, Superintendent of State Hospitals, for an examination of the injured and wrecked State buildings damaged on April 18, 1906, I herewith present you with the ascertained facts and some very essential conclusions drawn from such findings. In the light of the very great damage sustained by the State in its buildings, I shall take up in detail the constructive failures and endeavor to make clear the State building situation as now existing.

On May 31, 1906, I visited the State Normal School buildings at San José. The foundation of the main brick building was carefully examined and found unimpaired in the strength existing before the earthquake force destroyed the upper part or superstructure. The fractured walls do not reach into the foundation sufficiently to render them unsuitable for some uses, but the construction used therein is poor. All the mortar binding the bricks together is very weak and does not cover them sufficiently on the inner part of the walls to make a thoroughly good, substantial base. This practice of not completely surrounding each brick with mortar weakens the wall just in the proportion of the voids in the wall. The lateral or horizontal strength of a brick structure depends very largely upon the adhesion

between mortar and brick, so that where such is not complete, shocks or forces acting horizontally are very destructive.

The floors in the main brick building have been generally loosened from their supports by the walls becoming separated through fractures or cracks in the brick-work. Where windows or doors cut the walls, making weak lines in the building, fractures occur from the top to the foundation, thus entirely destroying the strength and bond of the building.

In the matter of patch work in reconstruction, I thoroughly recommend against such practice, as the walls would necessarily be replaced along all the cracks, thus practically giving new walls with the defective and weak places between the new work, meaning that the resistant strength of the building is not much enhanced thereby. It is my earnest belief that a completely new structure should be built of either reinforced concrete or steel, so we may, as thoroughly as possible, safeguard against horizontal forces or sudden shocks.

In its present condition it is dangerous to life and should be summarily condemned.

My examination of the wooden building connected with the main brick building by a corridor revealed the foundation and walls intact. The only damage found was the general cracking and shaking down of the plaster.

From the Normal School I visited the Agnews State Hospital the following day, June 1st. Here the destruction was complete, leaving no work of any value, except perhaps, a very small brick shed or two, and a foundation of one of the cottages constructed, I am told by the Superintendent, by the patient labor. In the main building I found very serious defects in the construction. The mortar was very weak and the walls full of voids occasioned by a lack of mortar. The main building foundation is shattered thoroughly and so weakened as to be of no value for future construction. The same condition of mortar exists in this base, so that should there be no fractures at all it is very dubious if it have any value. Surely for a good, strong modern building of two stories or over it would be such a weak point as to make the whole building unsafe. There is absolutely no economy in weak base or foundation construction, and I therefore recommend strongly against its use.

Only a glance at the upper work or superstructure will convince one of its entire uselessness. Aside from the danger to life at the time of the earthquake, it would have been far better had the whole thing been razed to the ground. It was in this superstructure that I found a most serious and defective construction, and had it been more in line with the bare necessary strength employed in engineering, I think there is no question that a great many of the 112 lives lost might have been saved. The floor joists had a bearing of about two inches in the brick wall and were very insecurely anchored to the walls by iron rods of one to every twelve joists. These rods were held in the wall by one width of brick of four inches, so that the strength value was practically *nil*. Had the joists been given good structural bearing on a base of nearly the whole wall and been well rodded to the brick work every four feet with rods extending through the wall, and had bearing plates, thereby creating as much lateral strength as that form of building could have, instead of the walls crashing in upon inmates and officers of the institution, most of them would have fallen in the line of least resistance—outward. This is exemplified at the Feeble-Minded Home at Glen Ellen, where the floors held and in almost every instance the great number of walls that fell were precipitated outward, with not a single loss of life. The tower of the main building was in such a mass of ruins as to be of little value for examination for strength, therefore I cannot exactly determine its cause of failure without further investigation. All walls are either fractured or shattered completely, with absolutely no value other than the contained brick and casings of windows and doors.

On June 2d, the State Hospital at Ukiah was thoroughly examined and found to be seriously damaged. The steel tower built in and above the administration building so vibrated as to fracture all the walls to such an extent as to render them unfit for use as component parts of the building. The cracks in this building go to the foundation. Here again is found defective mortar and mortar voids in the walls,

CONTINGENT APPROPRIATION.

In 1905 the traveling and contingent appropriation of this Department was increased to \$500 per annum. This is inadequate for the purposes intended. The necessary traveling in connection with the work of the State costs considerably more than this appropriation, so if there is to be any collection of data relating to this office, it seems that the recommended appropriation of \$750 per annum in 1905 should be allowed for the traveling and contingent expenses of this office.

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and also an additional weak foundation, showing in places perceptible settlement. Here also is exemplified the value of a composite structure that failed by lack of uniformity of strength against lateral forces or severe shocks. The vibration of the tall steel tower was not equally taken up by the brick masonry, so that numerous cracks were made, rending the building to its foundation, to such an extent that it must completely come down if a secure and permanent building is desired. The other brick structures at this institution revealed some cracks which greatly weaken them, but as they are practically distinct and separate in construction, with foundation in good shape, they can be reinforced with rods and repaired along the fractures without the loss of the building.

In the ornamental peaks or towers surmounting the building were placed water tanks for water storage. These in all cases examined were found to be very destructive to the building, and at the State Hospital at Ukiah should be discontinued in the use of the water supply. Wherever tanks for storage purposes are required it is recommended that they be separated in some construction of their own, at a suitable and safe distance from all buildings. One tower thus containing a tank with water was badly shattered, and it will be necessary to take it down to the roof. The power chimney was found to be badly cracked a short height above its base. However, this can be remedied by re-setting the brickwork and then surrounding the chimney with a reinforced concrete jacket, at least to the top of the building adjoining.

At Eldridge, the Home for Feeble-Minded received severe damage. Practically all the brick gable ends of the main building were cracked off at the floor line and fell outward. Nearly all ornamentation was precipitated to the ground and the two main ends of the building are badly cracked to the foundation, necessitating rebuilding. Other cracks in the walls in about ten places run down to about the first story, while the foundation, of plain concrete, is in good shape. This building can be replaced to its former dimensions with considerable work, and I believe with good and frequent tie rods, can be restored practically to its former usefulness and strength.

Poor work is found at all points in the brick walls. In places there are exposed vertical joints in such walls where no mortar binding existed for lengths of at least six feet. Again, poor mortar was used, so that the whole structure, even without fractures, was weak.

The Manse, a low brick building of one story, was cracked in a number of places from top to bottom. A wall at the side of a water tank in the rear of the building fell out. This structure, on account of its very low height, can be quite easily repaired.

Two new structures, the hospital and a one-story cottage, were practically uninjured. A few ornaments fell from the peaks, and in the cottage one crack runs from the roof to the base of a window.

Numerous chimneys fell on the main building and Manse, where the slate roofs were damaged locally, although not seriously.

At this institution the plastering is generally destroyed and will necessitate complete replastering.

From Eldridge I went to the Napa State Hospital and on June 4th examined the buildings composing that institution. Here I found the best work and the least damage. The front tower was partially wrecked. As it is built more consistent in materials with the other nearby parts of the building, the damage reached a far less extent than at the Ukiah Hospital. About seven distinct cracks occurred in the outside walls at or near the corners of wings or extensions. They extend from the roof to near the lower windows, where they can not be traced farther.

The foundation of the main building was thoroughly inspected inside and outside, showing a solid, firm base, of good work. It is well battered (that is, slanted on the outside), deep and heavy, giving a substantial bearing area, with no signs of failure. Generally the exterior walls are in good condition, and especially those in the rear of the building, where few openings occur, are true to their original construction.

It was at this institution I found the best mortar. Some is of cement and lime, while in other places excellent cement mortar of good strength and complete adherence to the bricks is found. But in few places were mortar voids located, so that on the whole Napa Hospital remains a substantial structure, and when repaired at the fractures will stand comparatively well against shocks or lateral force.

From my examination of the foregoing buildings I am able to formulate some conclusions which I think should be adhered to in future constructive work, and in the way of improvement offer some suggestions as to future building materials.

Beyond any doubt great care must be exercised in the reparation of all buildings not so damaged as to necessitate their complete reconstruction. All brickwork should be thoroughly bonded with nothing but cement mortar of good quality, and all work should be so tied with iron or steel as to give it the greatest security against shocks. The floor system should be so well tied to the walls as to brace them thoroughly and be of value as a lateral resistant. Tanks used for water storage should be discontinued in use or taken out of the buildings. The composition of the building material should be as uniform as possible. No towers should be used, unless made an integral part of the building, and then only when figured for their proper stability; and in no case should an important building of over two stories be on a brick foundation, but of reinforced concrete, that the walls may be bolted or fastened to the base.

In the face of the present destruction to the State institutions, it appears that good substantial steel or reinforced concrete buildings should be erected wherever necessity requires over two-story structures, and that the materials used therein should be of the best quality. Honest workmanship and superintendence are absolute requirements, if we are to get good and lasting results.

Respectfully,

N. ELLERY,
Engineer and Highway Commissioner.

During 1906 I attended a road meeting at Yuba City and inspected very generally the methods of road oiling, in an endeavor to gain the knowledge necessary to the successful application of oil to roads.

REPORT OF LAKE TAHOE WAGON ROAD COMMISSIONER.

ARTHUR S. LYON, COMMISSIONER.

SMITH FLAT, CAL., November 1, 1906.

*To His Excellency, GEORGE C. PARDEE,
Governor of the State of California.*

SIR: I have the honor to submit to you my biennial report of matters pertaining to the Lake Tahoe Wagon Road, which is situated wholly in El Dorado County, beginning about half a mile east of Smith Flat and running sixty miles easterly to the State line at Lakeside Park.

The Legislature, at its session of 1905, appropriated \$9,200 for salary and maintenance of this State road for two years from July 1, 1905; besides this it appropriated \$6,000 for the purpose of building two permanent bridges, one at Oglesby Cañon, between the twentieth and twenty-first mileposts, and one over Trout Creek, in Lake Valley, within about four miles of the terminus of this State road.

In August, 1905, a contract was let to T. E. Clark of Sacramento, under specifications drawn by the Hon. N. Ellery, State Highway Commissioner, for a reinforced concrete bridge or culvert, for the sum total of \$871 for all concrete work, and to which there was an additional expense of \$706.25 for survey, inspection, and filling (which was made from hard, rocky soil on both sides), making a total cost of \$1,577.25, which, owing to the nature of the place and the sharp curve which had to be eliminated, I consider a very reasonable figure.

Under plans drawn by the State Highway Commissioner, I commenced work on Trout Creek bridge, which is to be a stone arch, on August 28, 1906, and we worked up to October 10, 1906, when we had to stop for this year on account of cold weather. We were able to erect both piers to the spring line, and to get a large quantity of the stone split, which is obtained in close proximity to the work; have also got nearly all the material for finishing stored close by; all at an outlay of \$3,572.40, which leaves a balance of \$851.35 in the special appropriation.

Out of the general maintenance appropriation since my last report on December 1, 1904, I have repaired roadbed by use of scraper, a total of seventy-one days in two years, together with a liberal use of powder and men to remove obstructions; have also put in thirty-four terra

cotta culverts six to eighteen inches in diameter, which cost from \$20 to \$250 apiece, according to the labor required to remove old structures and to get a solid foundation and the length and height of retaining walls to bring the roadbed to its natural grade; also, one 30-inch terra cotta pipe culvert, where it was impossible to get the necessary rock without heavy cost for transportation; also, raised the roadbed about four feet to a natural grade, at a cost of about \$225. I have also put in three stone culverts, well cemented, at an average cost of \$325 each, together with lots of repair work with pick, shovel, and drills, which makes a very decent roadbed, but does not present much gain from year to year, as the first fifteen miles is composed of a light, loose soil, which in summer is very dusty and in winter gets muddy and sticky; the other forty-five miles is a granite formation, with lots of hard ledges and a good many boulders. There are about eight miles of it fairly well turnpiked; the balance has to be closely watched in the fall to prevent it from washing.

During the heavy snow of the past winter, 1905-06, two wooden bridges near the summit on the American River were broken down, and owing to insufficiency of money for permanent work, had to be replaced with wood where rock or concrete would be far better and more lasting.

The past year there has been considerable travel over this road by automobiles, as it is the best outlet for that mode of travel from our neighboring State of Nevada to the coast, where in former years the automobile was an impossibility on these rocky, mountainous roads.

I recommend that the proper authorities see that the general maintenance appropriation be raised to a considerable extent, so that the road can be put and kept in the proper shape for the increased travel that is sure to use this road, both for business purposes and also by those who seek pleasure.

In closing, I wish to extend thanks to your office for the interest you have taken in my work and also to Hon. N. Ellery, State Highway Commissioner, for advice and aid which he has always been in readiness to give toward the improvement and betterment of this highway.

Respectfully submitted.

ARTHUR S. LYON,
Lake Tahoe Wagon Road Commissioner.

APPENDIX A.

SPECIFICATIONS FOR THE CONSTRUCTION OF GRAVELED STREETS, IN THE CITY OF LOS ANGELES.

1. PLANS, ETC.

The work herein provided for is to be done in accordance with the plans, profiles, and cross-sections on file in the office of the City Engineer of the City of Los Angeles, and all work shall, during its progress and on its completion, conform to the lines and levels which may, from time to time, be given by the City Engineer.

2. SUB-GRADE.

Sub-grade for the roadway shall be eight inches, and for cement sidewalks three and one half inches, below the surface of the finished work, unless otherwise shown on the above mentioned plans, profiles or cross-sections.

3. GRADING.

Grading shall include the removal of all earth, stone, loose rock, clay, shale, cement, hardpan, boulders, solid rock, and all other materials that may be encountered in preparing the street, and shall include also all filling, trimming, shaping, picking down, refilling, surfacing, or other work that may be necessary in bringing the surface of the street to the sub-grade or required shape. When mud or other soft material is encountered it shall be taken out and the space filled with good earth or gravel. The contractor, however, shall not be required, in such cases, to excavate the mud or other soft material to a greater depth than two feet below sub-grade.

In places where filling is necessary to bring the street to the required grade, it shall be done with good sound earth. The embankment shall be carried up, of full width, in layers not to exceed one foot in thickness, and the teams shall be made to travel as evenly as possible over the whole surface of each layer, both going and coming. The formation of well-defined ruts is specially prohibited. No material of a spongy nature shall be used for filling. The slopes of embankment shall be two horizontal to one vertical, and shall be trimmed as they are carried up. The space over which fills are to be made shall first be cleared of all brush or timber.

After the block or section has been graded as above specified, the surface shall be rolled, with a roller weighing not less than 250 pounds to the inch width of tire, until the surface is unyielding. Depressions made by rolling shall be leveled up with good earth and again rolled. Such portions of the street that can not be reached by the roller, and all places excavated below sub-grade and refilled, and all pipe trenches and other places that can not be properly compacted by the roller, shall be tamped solid, and in case of wet weather or soft or muddy ground making the use of the roller unsafe or impracticable, the rolling shall not be undertaken until the ground has become sufficiently dry.

The contractor shall notify the superintendent of streets when a block or section has been brought to sub-grade, when the latter will check the elevation of the same, and if the work is found in accordance with the specifications and the grades given, the contractor shall proceed as hereinafter mentioned.

4. SURFACING ROADWAY.

Upon the surface, prepared and brought to sub-grade in the manner above specified, shall be spread in the following described manner: Two layers of good gravel, the bottom layer to have a thickness of five inches and the top layer to have a thickness of three inches, after having been rolled. The first layer, which shall contain no stones larger than two and one half inches in greatest diameter, is to be uniformly spread on the roadway, and well moistened. The gravel shall be well rammed for at least one foot from the gutters, should these be paved, or if the gutters are not paved, then one foot from the curb. The remaining portion of the roadway shall then be rolled with a roller, weighing not less than 250 pounds to the inch width of tire. The rolling of the roadway shall commence at the rammed portion. All depressions must be promptly filled, moistened, and again rolled. The rolling must be continued until the surface will not yield under a roller of the weight above described.

On this surface shall be spread the top layer, which shall be raked free from all stones larger than one inch in greatest diameter. If no gutters are provided, these larger stones shall be raked to the curb and distributed over a strip two feet in width next to the curb. If gutters are provided, then these stones shall be distributed on a strip two feet in width next to the gutter. The top layer of gravel shall then be thoroughly compacted by ramming and rolling in the same manner as specified for the first layer.

Oil shall then be evenly distributed over the entire surface of the roadway in a volume equal to one half ($\frac{1}{2}$) gallon, by measure, per square yard of the street surface.

Clean, sharp sand shall be sprinkled over the entire surface of the roadway until no oil or the residue thereof can be seen.

After a lapse of not less than twelve hours, oil shall again be evenly distributed over the entire surface of the roadway in a volume equal to one half ($\frac{1}{2}$) gallon, by measure, per square yard of the street surface.

The entire surface of the roadway shall again be sprinkled with clean, sharp sand until the oil and the residue thereof is completely absorbed, and then rolled with a roller weighing not less than 250 pounds to the inch width of tire until the surface is unyielding.

The total amount of oil used shall not be less than one gallon per square yard of the street surface. The oil shall be applied at a temperature not less than 150° Fahrenheit.

The oil used shall be crude petroleum and shall answer to the following tests, to wit:

(a) *Specific Gravity.* The specific gravity shall not be lower than 10° nor higher than 11° Baumé.

(b) *Test For Specific Gravity.* All crude petroleum shall be tested for specific gravity, and the gravity thereof shall be determined by the use of "The Westphal Specific Gravity Balance," in conjunction with the accepted scale, hereinafter described, for addition and deduction below or above normal temperature.

(c) *Temperature.* All crude petroleum shall be delivered ready for sprinkling at a temperature of not lower than 150° Fahrenheit or above 190° Fahrenheit, and in determining the quantity of petroleum delivered, the correction and expansion by heat shall be as follows: In all crude petroleum received at any temperature above 60° Fahrenheit an amount equivalent to 0.4 of one per cent for every 10° Fahrenheit shall be subtracted from the observed volume as the correction for expansion by heat. For the purpose of measuring crude petroleum a temperature of 60° shall be deemed normal temperature.

(d) *Asphalt.* All crude petroleum shall contain not less than seventy per cent "D" grade asphalt, California standard.

(e) *Test For Asphalt.* The sample of oil shall be placed in an evaporating dish and heated in a hot-air oven at 400° Fahrenheit, until it is reduced to "D" grade asphalt, California standard. The residue is weighed and the per cent of asphalt calculated.

(f) *Water and Sediment.* All crude petroleum shall be tested for water and sediment.

(g) *Test For Water and Sediment.* The "gasoline test" shall be used to determine the amount of water and sediment. Said test shall consist of equal parts of crude petroleum and 68° Baumé gasoline, mixed in a glass-stoppered glass cylinder and left to stand twenty-four hours; thereupon reading shall be taken and the percentage of water and sediment determined.

(h) *Deductions.* Deductions for water and sediment in crude petroleum will be made in exact proportion to the percentage of such water and sediment found. Deductions for shortage in volume will be made in the exact number of gallons tank wagons are found to be short on delivery.

(i) *Tank Wagons.* All tank wagons used for delivering the crude petroleum must first be submitted to the street superintendent, who shall gauge and stamp into the steel head of said tanks the capacity in gallons said tanks will contain, and no figures of capacity will be accepted other than the official rating given by the street superintendent.

(j) All oil to be used shall be tested by an oil inspector employed by the street superintendent for that purpose.

(k) Oil shall be tested at tanks before delivery upon work, and if same shall not comply with specifications, it shall not be delivered at the work.

5. CULVERTS.

Culverts shall be placed wherever designated on the profiles or plans of the street on file in the office of the City Engineer. They shall be of the character and dimensions shown in the profile or plan and described in the specifications named in the ordinance of intention.

APPENDIX B.

GENERAL SPECIFICATIONS FOR GRADING AND OIL PAVING STREETS WITH CRUDE OIL WITH THE USE OF THE TAMPING ROLLER, IN THE CITY OF SANTA MONICA, CAL.

I.

Contractors shall use the tamping roller approved by the Superintendent of Streets and Board of Trustees of the City of Santa Monica for all work under these specifications.

II.

The streets shall be plowed to a depth of six inches and graded evenly with a crown to conform to the established height at center of street, and properly pulverized with said tamping roller. Said tamping roller shall be weighted from two to three tons, and to form a solid base up to four inches from top.

III.

Where there is no cement or paved gutter, then the gutter three feet wide out from curb shall be done in the following manner: Remove the earth six inches deep below finished grade by the use of a grading machine, leaving earth so removed in the street; then loosen bottom lightly, apply water sufficiently; then apply $1\frac{1}{2}$ gallons of oil to each square yard of surface, evenly; refill three inches of loose earth, and water sufficient; tamp this evenly and solid, by using a wagon or truck with four-inch width of tires, weighted sufficiently to make a solid base; then back fill to grade. Gutters at street intersection, as indicated by plans, shall be of double width and constructed as hereinbefore mentioned.

IV.

When the street is properly graded, pulverized, and tamped solid to within four inches from the top, then apply water sufficient to thoroughly and evenly dampen to a proper consistency, four inches deep; loosen with a cultivator lightly set so as not to disturb sub base; then the oil shall be applied as follows: The street shall be coated evenly with oil at the rate of three fourths of the amount to be used; then plow the oil under four inches deep with a gang plow, commencing at center of street; then harrow diagonally two ways, and then tamp with tamping roller weighted to penetrate four inches evenly and solid to within one and one-half inches of the top; then run a road grader or scarifier over entire surface lightly, to make the street an even grade; then harrow and apply sufficient water; then apply the second coat of one fourth of the amount of oil to be used, evenly spread over entire surface of street; then harrow and tamp with tamping roller evenly and solid to top; then tamp gutters eighteen inches wide out from curb with a wagon or truck weighted with four tons, as hereinbefore specified. The work and material under this section to be done the full width of the street and over the oil base of gutters as specified in Section III of these specifications.

Wherever, upon any street or alley, any cement crosswalks, cement gutters, or any paving and machine work are impracticable, then the same shall be done in same manner by hand work under the direction of the superintendent of streets.

The contractor will be held responsible for all damages to curbs, gutters, crosswalks, flumes, etc., that may be caused by him in the performance of the work. When water or oil is to be applied the condition of the soil shall be subject to the approval of the superintendent of streets. The contractor shall be required to examine all plans for the above work on file in the office of the City Engineer.

V.

The quantity of crude oil to be applied to be two and a half gallons for every square yard of surface of heavy soil, and three gallons for every square yard of light sandy soil, unless otherwise specified, from curb to curb, where there is no gutter, and where there are cement or paved gutters, then from gutter to gutter, and at all intersections of streets and alleys to property line on both sides.

VI.

The oil shall be from 12° to 14° gravity, Baumé test, at a temperature of 60° Fahrenheit, and contain from forty (40) per cent to sixty (60) per cent of "D" grade asphalt, to be subject to the gasoline test for water and foreign matter, and not to contain over two (2) per cent of water or foreign matter, and heated to a temperature sufficient to run freely from a sprinkler or tank; provided, however, that in dry or dusty soil twenty gallons of water must be used every nine square feet of road surface before applying the oil. The contractor shall provide an analysis of oil furnished when called for by the street superintendent.

VII.

To insure the quality and quantity of all oil used under these specifications, the contractor shall deliver said oil into the city's tanks at the corporation yard, there to be tested for gravity, water, and foreign substance, by the street superintendent or his assistant, whose duty it shall be, after said tests are made, to heat, measure, and deliver said oil into such tank wagons as may be used to deliver and spread the oil on the street; and oil so handled at city tanks shall be subject to a charge of _____ cents per barrel, said charge to be paid by the contractor to the City of Santa Monica. A complete record of all these transactions shall be kept by the street superintendent.

VIII.

The contractor shall erect a fence and keep erected a proper barrier along the line of said work and across the ends of same both day and night, and to maintain red lights between sunset and sunrise, and post all legal notices and signals as to the state of the roadway or street during the prosecution of the work.

Reference is hereby made to the general specifications now in force for the grading of streets within the City of Santa Monica, including all ordinances, etc.

IX.

The work shall be performed under the supervision of the City Engineer and street superintendent. Also subject to the approval of the Board of Trustees of the City of Santa Monica, or their authorized agents.

APPENDIX C.

SPECIFICATIONS FOR DESERT GUIDEPOSTS.

KIND OF POST.

All parts shall be galvanized iron except the brass collar containing the penalty clause. All dimensions are shown on the drawing.

SIGNBOARDS.

Each post shall have two signboards. Such boards shall each be reinforced by a 5-inch by 8-inch by $\frac{1}{8}$ -inch galvanized plate. The bolt holes through the galvanized iron signboard shall be drilled or punched in connection with and at the same time as the reinforcing plate.

BOLTS.

The bolts shall be of neatly finished lengths, so that the nuts will not have an excessive length of bolt protruding.

BOLT UNDER BRASS COLLAR.

Under the brass collar there shall be screwed into the pipe or post proper a five-sixteenths inch bolt for the purpose of holding the collar and boards in place vertically.

FITTING AND WORKMANSHIP.

All fittings and all workmanship on the construction of the posts must be first class in every particular.

GENERAL CONDITIONS.

No deviation from the drawing will be allowed without the permission of the State Highway Commissioner.

All posts shall be delivered in a "knocked down" shape and properly prepared for shipment.

Examination of Work. The contractor must furnish all facilities to the State Highway Commissioner, or agent, to examine and determine whether the posts are as specified.

Contractor's Duty. The contractor must abide by and comply with the obvious intent and meaning of these specifications, which shall be construed to include all materials and modes of work necessary to complete the work on the posts herein specified in a thorough and workmanlike manner.

Errors or Omissions. The contractor will not be allowed to take any advantage of any error or omission in these specifications, as full instructions will be given him should any error or omission be discovered.

Disputes, Etc. All work must be done to the satisfaction of the State Highway Commissioner; and all questions and disputes with regard to the intent and interpretation of these specifications shall be referred to him, and his decision thereon shall be final.

Non-Compliance with Specifications. Should any post or posts be made not in accordance with these specifications, the same shall be rejected.

Non-Liability of State. All bills incurred by the contractor for the employment of labor, purchase of material, or any other matter in connection with the work provided for in these specifications, must be paid by said contractor, and the State of California is hereby expressly relieved from any indebtedness or claim due to any person other than the contractor for any amount of money over and above the contract price.

Time of Furnishing Posts. The posts must be delivered in lots to suit, after reasonable notification by the State Highway Commissioner, at any time after the award of the contract, not later than May 1, 1906.

INSTRUCTIONS TO BIDDERS.

Rejection of Bids. The Highway Commissioner reserves the right to reject any and all bids, and to waive any informality in any bid received.

Address for Bids. All bids should be addressed to the State Highway Commissioner, Room 73, State Capitol, Sacramento, California.

Bids, Etc. One copy of the advertisement, the guarantee, and the specifications must be securely attached to each bid, and considered as comprising a part of it.

Check for Cash Bond. Each bid must be accompanied by a certified check in the sum of two hundred and fifty (250) dollars, payable to the order of N. Ellery, State Highway Commissioner, and drawn on some established bank doing business in the State of California. Before awarding the contract, all of said checks deposited by the unsuccessful bidders shall be returned to them by the said N. Ellery, State Highway Commissioner. The check deposited by the successful bidder shall be retained by said N. Ellery, until ten (10) days after the delivery of the posts provided for in the plan and specifications, and their full acceptance by the State Highway Commissioner. Said certified check shall be a cash bond for the faithful performance of the work under the contract, and in case of the violation of the plan and specifications said bond shall be forfeited by said contractor to the State of California, or such part of it as is deemed necessary to insure the State of California against loss.

Form of Bid. All bids shall be upon forms supplied by the office of the Department of Highways.

Time to Make Contract. The bidder to whom the contract under these specifications shall be awarded shall, within five (5) days after notice of such award be given, sign a contract with the State of California for the execution of the work under the terms of the specifications. Failure to do so within said limit of time shall cause forfeiture of the certified check deposited with the bid to the State of California.

Bids for Posts. Each bidder must state in his proposal a specific sum for which he will make and deliver at Sacramento on cars, 300 posts, herein described, and shall further stipulate the price of each additional post above said number and thereafter.

PAYMENT.

After complete inspection and acceptance by the State Highway Commissioner or his authorized agent, the posts will be paid for as delivered at Sacramento, out of the appropriation for the purpose. The inspection shall be made at the shop where made.

APPENDIX D.

FINANCIAL STATEMENT OF THE DEPARTMENT OF HIGHWAYS.

(NOVEMBER 30, 1906.)

Mono Lake Basin Road.

1899—Appropriation (construction).....	\$25,000 00
1906—Expenditures to November 30.....	24,999 95

Balance	\$0 05
---------------	--------

1903—Appropriation (construction).....	\$25,000 00
1906—Expenditures to November 30.....	14,071 58

Balance	\$10,928 42
---------------	-------------

1905—Appropriation (maintenance) fifty-seventh and fifty-eighth fiscal years	\$1,000 00
1906—Expenditures to November 30.....	959 26

Balance	\$40 74
---------------	---------

1905—Expenditures from Touhey bond.....	\$1,000 00
---	------------

Aug. 8—T. Silvester, foreman.....	\$118 00
-----------------------------------	----------

A. Silvester, labor.....	85 50
--------------------------	-------

R. Hunter, labor.....	51 65
-----------------------	-------

A. Allen, labor.....	54 15
----------------------	-------

L. Amiot, labor.....	58 00
----------------------	-------

J. Trotter, labor.....	59 00
------------------------	-------

Team hire.....	57 50
----------------	-------

Chas. Kordrof, labor.....	9 65
---------------------------	------

J. P. Hammond, mdse.....	68 09
--------------------------	-------

Jerome Labraque, vegetables.....	2 50
----------------------------------	------

Joe Scanavino.....	2 50
--------------------	------

T. Silvester, team.....	18 00
-------------------------	-------

J. S. Cain, mdse.....	77 25
-----------------------	-------

Sept. 19—T. Silvester, foreman.....	50 00
-------------------------------------	-------

A. Silvester, labor.....	31 87
--------------------------	-------

R. Hunter, labor.....	25 00
-----------------------	-------

L. Amiot, labor.....	25 00
----------------------	-------

J. Trotter, labor.....	24 00
------------------------	-------

Team of T. Silvester.....	25 50
---------------------------	-------

Chas. Kordrof, labor.....	25 00
---------------------------	-------

Wm. Saulsbury, labor.....	36 00
---------------------------	-------

M. Kinney, labor.....	37 65
-----------------------	-------

941 81

Balance	\$58 19
---------------	---------

Trinity-Humboldt Road.

1903—Appropriation (survey).....	\$1,800 00
1906—Expenditures to November 30.....	1,685 85
Balance	<u>\$114 15</u>

Sonora and Mono Road.

1905—Appropriation (bridges).....	\$20,000 00
1906—Expenditures to November 30.....	6,660 55
Balance	<u>\$13,339 45</u>

1905—Appropriation (maintenance) fifty-seventh and fifty-eighth fiscal years	\$8,000 00
1906—Expenditures to November 30.....	7,546 77
Balance	<u>\$453 23</u>

Alturas and Cedarville Road.

1905—Appropriation (construction).....	\$7,000 00
1906—Expenditures to November 30.....	6,927 67
Balance	<u>\$72 33</u>

Lake Tahoe Wagon Road.

1905—Appropriation (bridges).....	\$6,000 00
1906—Expenditures to November 30.....	5,149 65
Balance	<u>\$850 35</u>

1905—Appropriation (maintenance) fifty-seventh and fifty-eighth fiscal years	\$8,000 00
1906—Expenditures to November 30.....	6,677 30
Balance	<u>\$1,322 70</u>

Kings River Canon Highway.

1905—Appropriation (survey).....	\$25,000 00
1906—Expenditures to November 30.....	2,513 34
Balance	<u>\$22,486 66</u>

Desert Guideposts.

1905—Appropriation	\$5,000 00
1906—Expenditures to November 30.....	2,355 84
Balance	<u>\$2,644 16</u>

Traveling and Contingent.

1905—Appropriation, fifty-seventh and fifty-eighth fiscal years.....	\$1,000 00
1906—Expenditures to November 30.....	585 32
Balance	<u>\$414 68</u>

Printing.

1905—Appropriation, fifty-seventh and fifty-eighth fiscal years.....	\$750 00
1906—Expenditures to November 30.....	22 00
	<hr/>
Balance	\$728 00
(Cost of printing Biennial Report not yet deducted.)	

Kel River Protection.

1903—Appropriation	\$5,000 00
1906—Expenditures to November 30.....	5,000 00
	<hr/>
1905—Appropriation	\$32,000 00
1906—Expenditures to November 30.....	32,000 00
	<hr/>

APPENDIX E.

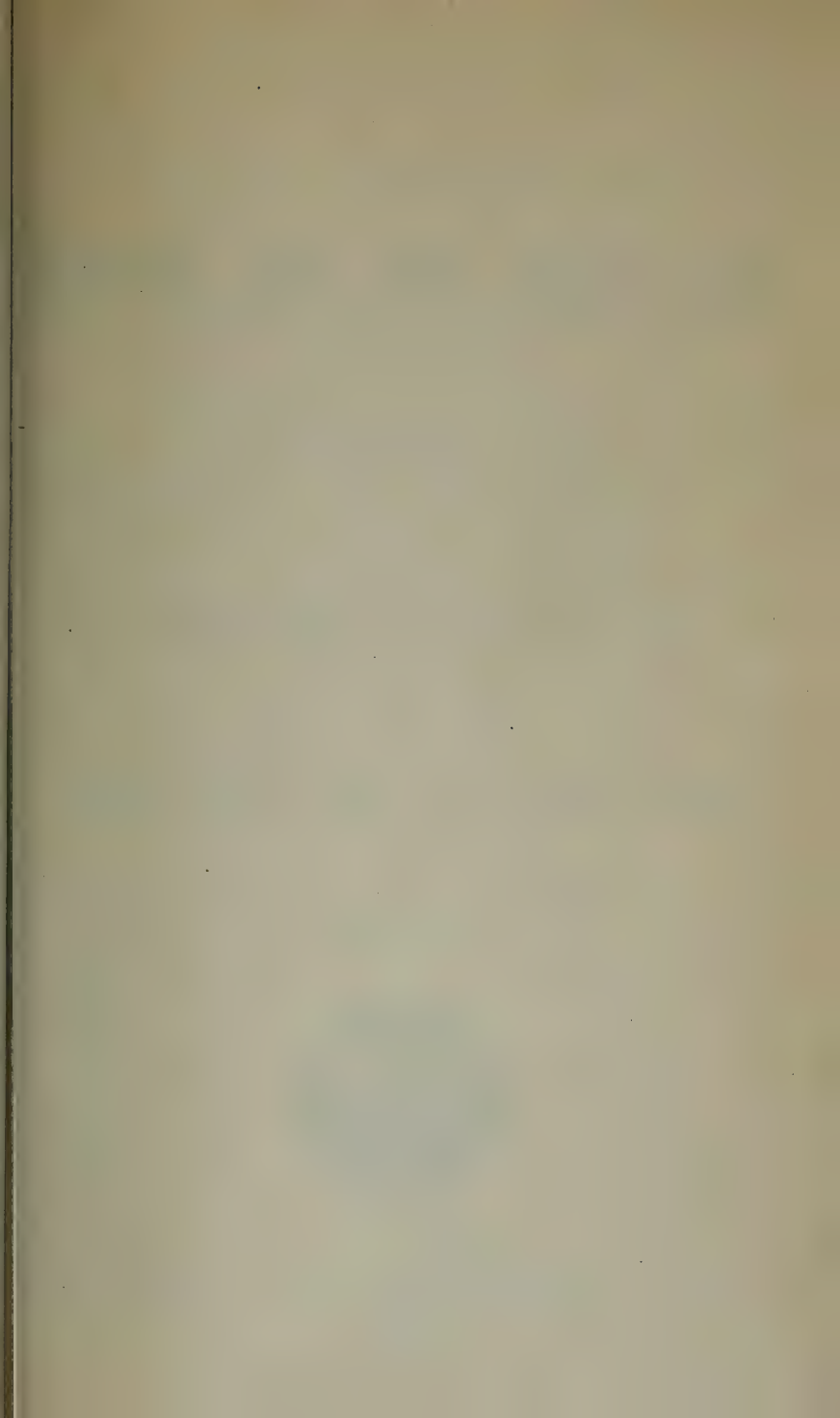
Statement of the Amounts of Taxes Levied in 1905 in the Several Counties of California for County Road Purposes, to be Expended by the Boards of Supervisors during the Fiscal Year 1906-1907.

Counties.	Value of Property Taxed for Road Purposes.	Rate on Each \$100 of Valuation.	Amount.
Alameda	\$28,120,779	\$0.40	\$112,483 12
Alpine	468,385	.40	1,873 54
Amador	5,450,322	.35	19,076 13
Butte	14,847,841	.40	59,391 36
Calaveras	6,085,400	.315	19,169 01
Colusa	11,433,874	.35	40,018 56
Contra Costa	19,331,212	.34	65,726 12
Del Norte	2,903,295	.35	10,161 53
El Dorado	4,261,580	.35	14,915 53
Fresno	28,406,598	.30	85,219 79
Glenn	9,985,730	.25	24,964 33
Humboldt	17,624,063	.40	70,496 25
Inyo	2,265,905	.25	5,664 76
Kern	21,153,000	.24	50,767 20
Kings	6,623,104	.33	21,856 24
Lake	3,015,635	.50	15,078 18
Lassen	5,240,363	.38	19,913 38
Los Angeles	46,965,062	.60	281,790 37
Madera	7,438,381	.32	23,802 82
Marin	8,937,323	.35	31,280 63
Mariposa	2,257,871	.40	9,031 48
Mendocino	10,104,271	.40	40,417 08
Merced	13,977,055	.40	55,908 22
Modoc	4,266,092	.35	14,931 32
Mono	1,236,349	.24	2,967 24
Monterey	15,810,490	.40	63,241 96
Napa	9,208,409	.35	32,229 43
Nevada	5,207,740	.40	20,830 96
Orange	9,889,118	.40	39,556 47
Placer	8,251,323	.40	33,005 29
Plumas	4,222,524	.56	23,646 13
Riverside	7,796,622	.50	38,983 11
Sacramento	16,675,055	.374	62,364 71
San Benito	5,517,224	.33	18,206 84
San Bernardino	13,963,752	.50	69,818 76
San Diego	9,285,726	.60	55,714 36
San Francisco	No expenditures on county roads.		
San Joaquin	23,172,540	.40	92,690 16
San Luis Obispo	11,987,100	.40	47,948 40
San Mateo	15,517,507	.492	76,346 13
Santa Barbara	12,768,798	.40	51,075 19
Santa Clara	33,506,999	.40	134,028 00
Santa Cruz	6,857,666	.45	30,859 50
Shasta	10,418,065	.40	41,672 26
Sierra	1,605,243	.44	7,063 07
Siskiyou	11,282,950	.40	45,131 80
Solano	14,080,046	.40	56,320 18
Sonoma	23,053,700	.35	80,687 95
Stanislaus	13,004,389	.40	52,017 56
Sutter	6,588,234	.35	23,058 82
Tehama	10,486,223	.35	36,701 78
Trinity	2,271,890	.40	9,087 56
Tulare	15,960,910	.35	55,863 19
Tuolumne	6,474,740	.57	36,906 02
Ventura	8,437,522	.40	33,750 09
Yolo	14,560,082	.40	58,240 33
Yuba	4,017,237	.40	16,068 95
Totals	\$634,279,314	-----	\$2,540,019 15

APPENDIX F.

Statement of the Amounts of Taxes Levied in 1906 in the Several Counties of California for County Road Purposes, to be Expended by the Boards of Supervisors during the Fiscal Year 1907-1908.

Counties.	Value of Property Taxed for Road Purposes.	Rate on Each \$100 of Valuation.	Amount.
Alameda	\$29,461,545	\$0.40	\$117,846 18
Alpine	488,314	.55	2,685 73
Amador	4,452,937	.36	16,030 57
Butte	13,976,514	.40	55,906 06
Calaveras	6,396,945	.332	21,237 86
Colusa	11,394,970	.35	39,882 40
Contra Costa	17,644,672	.35	61,756 35
Del Norte	2,947,367	.30	8,842 10
El Dorado	4,361,149	.36	15,700 14
Fresno	30,086,602	.40	120,346 41
Glenn	10,096,380	.30	30,289 14
Humboldt	17,658,599	.40	70,634 40
Inyo	2,530,045	.35	8,855 16
Kern	22,691,169	.25	56,727 92
Kings	6,975,569	.33	23,019 38
Lake	3,215,136	.464	14,918 23
Lassen	5,218,537	.40	20,874 15
Los Angeles	58,955,625	.60	353,733 75
Madera	7,598,854	.37	28,115 76
Marin	9,387,388	.35	32,855 86
Mariposa	2,121,845	.40	8,487 38
Mendocino	9,677,951	.40	38,711 80
Merced	14,371,941	.40	57,487 76
Modoc	4,292,297	.32	13,735 35
Mono	1,042,450	.30	3,127 35
Monterey	16,094,445	.40	64,377 78
Napa	9,597,379	.32	30,711 61
Nevada	5,336,966	.50	26,684 83
Orange	11,121,014	.40	44,484 06
Placer	8,190,990	.40	32,763 96
Plumas	4,294,678	.56	24,050 20
Riverside	9,454,570	.50	47,272 85
Sacramento	16,892,062	.40	67,568 25
San Benito	5,687,440	.33	18,768 55
San Bernardino	17,424,051	.40	69,936 20
San Diego	9,893,862	.60	59,363 17
San Francisco	No expenditures on county roads.		
San Joaquin	25,479,332	.40	101,917 33
San Luis Obispo	12,623,797	.40	50,495 19
San Mateo	16,868,911	.502	84,681 93
Santa Barbara	12,876,160	.40	51,504 64
Santa Clara	35,368,923	.40	141,475 69
Santa Cruz	7,001,800	.45	31,508 10
Shasta	11,486,598	.40	45,946 39
Sierra	1,704,758	.50	8,523 79
Siskiyou	12,254,679	.35	42,891 38
Solano	13,903,314	.40	55,613 26
Sonoma	23,549,263	.36	84,777 35
Stanislaus	13,300,400	.40	53,201 60
Sutter	6,753,936	.35	23,638 78
Tehama	10,827,458	.38	41,144 34
Trinity	2,256,667	.40	9,026 67
Tulare	16,687,132	.40	66,748 53
Tuolumne	6,435,560	.60	38,613 36
Ventura	9,023,682	.40	36,094 73
Yolo	14,769,438	.40	59,077 75
Yuba	4,213,206	.40	16,852 82
Totals	\$668,277,272	-----	\$2,751,522 28



REPORT
ON THE
BUILDING AND LOAN ASSOCIATIONS
OF THE
STATE OF CALIFORNIA

BY THE
BUILDING AND LOAN COMMISSIONERS, IN ACCORDANCE WITH AN ACT
OF THE LEGISLATURE, APPROVED MARCH 21, 1905,

TO

His Excellency GEORGE C. PARDEE, Governor of the State of California

AUGUST 31, 1905



SACRAMENTO
W. W. SHANNON, : : : : SUPERINTENDENT STATE PRINTING
1905

REPORT

OF THE

BUREAU OF BUILDING AND LOAN SUPERVISION.

OFFICE OF THE BUILDING AND LOAN COMMISSIONERS,
SAN FRANCISCO, August 31, 1905.

To HIS EXCELLENCY GEORGE C. PARDEE,
Governor of the State of California,

SIR: Pursuant to the requirements of Section 18 of Chapter DIV, Laws of 1905, approved March 21, 1905, this Bureau succeeded the Board of Commissioners of the Building and Loan Associations, and continued its work without break and in the same manner as though conducted under the continuous operation of an unchanged law, and, pursuant to the requirements of Section 5 of said Act, we submit the Twelfth Annual Report upon the Building and Loan Associations of this State, covering the tabulations of the annual reports of 117 associations whose annual fiscal terms ended between July 1, 1904, and June 30, 1905, both inclusive.

In addition to the 117 associations reporting, three new associations and two that had been restored to the rolls—having previously retired from business—are included among the active associations, and will undoubtedly report at the end of their fiscal terms. The names of 20 associations in liquidation are also carried upon the rolls, thus making a total of 142, or one more than the total at the time of the last annual report.

At the date of the last annual report, the statement was made that if the progress for the year ended June, 1904, continued for another year the previous loss in volume of assets would have been fully recovered.

Notwithstanding the obstacles that have beset the natural progress, the tabulations of the 117 associations reporting show assets of \$22,586,871.87. "High-water mark" has been reached, and \$794,948.06 added to the assets reported by 151 associations in 1897—the highest previous volume—and this in the face of the retirement, or voluntary or forced liquidation, of nine associations that in 1904 reported assets in excess of \$760,000. The real gain for the fiscal year just ended then becomes upward of \$2,000,000, as related to the 117 associations reporting.

The loans in force have increased \$1,566,995.46, and the reported borrowers now number 15,951, as against 15,205 in 1904—a gain of 746.

The shares in force now number 620,941—an increase of 5,628—held by 55,055 different shareholders—a slight decrease.

New homes to the number of 2,455—an increase of 17 over 1904—have been erected by members and borrowers; thus increasing the aggregate of homes reported as constructed by or for members or shareholders to the respectable number of 23,459.

The percentage of “net profits” to average of loans in force for the year shows an increase from 6.47 in 1904 to 6.71 in 1905; and at the same time the apparent cost of conducting the business of all the associations, as shown by the disbursements for salaries, taxes, and miscellaneous expenses, is only 3.48 per cent, as against 3.89 for 1904. The changes in both instances are for the better, and materially affect the percentage of expenses to income, reducing this from 37.54 to 34.19.

The real estate holdings have been materially decreased during the year, the number of separate pieces held being 99 less than one year ago. The percentage of assets invested in real estate is only 4.13, as against 5.12 at date of last report. Of the local associations, exactly one half did not possess any real estate at the date of making their last annual reports; while the other half—53 in number—own a fraction less than one third of all.

Of the 11 associations, other than the purely locals, one only was without realty of any kind. The associations appear to be honestly endeavoring to relieve themselves of the incubus of their realty holdings. Mistaken zeal in attempting to increase the volume of their loans, and carelessness on the part of the persons charged with making the appraisements of property offered as security for loans, are unquestionably the main factors that have been responsible for the acquisition of a very large percentage of the realty holdings of the associations. Great care is a necessary factor in successful loaning upon real estate security. Values are continually changing, being influenced by local conditions, which often materially affect both the local and general demand, and if the appraiser be ignorant of these conditions he invites disaster, unless the moral hazard be unexceptionable.

The reserve and undivided profits show a material increase in volume during the past year. The laws of most of the Eastern States provide for a substantial reserve fund, and for its maintenance and expenditure. In this regard the laws of this State are defective. A material reserve protects the persistent member, operates to equalize dividends that may justly be apportioned to participating shares, and adds largely to the standing of, and confidence in, any association that is so fortunate as to have persisted in its accumulation.

Since the last report it has become necessary to report one building and loan association and one coöperative home association to the

Attorney-General as insolvent, and therefore unsafe, as the result of illegal loans, and loans on illegal and insufficient securities, and of irregular methods and practices. The former is in process of liquidation by its board of directors, under order of the Superior Court, while the latter has been enjoined from the transaction of any business; but otherwise the proceedings are still pending.

Since the annual report for 1897 no attempt has been made to separate the several classes of associations, but all have been combined in one general tabulation.

Because of the friction developed in the attempt to secure the passage of needed amendments to the laws during the late session of the Legislature, it was deemed best to separate the tabulations of the report for the past fiscal year in such manner as to show the operations of the local associations under a subdivision by themselves, and to place all other associations in a second subdivision; to make all calculations complete for each subdivision, and also for both combined.

The first subdivision comprises the purely "local" associations—that is, those associations that do a purely local business within the immediate vicinity of the city or town where their principal office is located; that exact only a nominal membership fee, pay all expenses from earnings, and do not employ agents to solicit business.

The second subdivision comprises all associations that employ agents, both local and traveling, to secure business, and that charge a membership fee, or its equivalent, of \$1, or more, per share. As scarcely any two of these associations operate upon the same plan as to all classes of installment stock, and because of the fact that the shares issued in the earlier days of several are governed by different rules, and are subject to conditions that differ in many respects from those that may attach to the shares now being issued, it has been deemed best to specify each association of this subdivision, and designate the particular features that attach to it. These associations are:

Fidelity, Los Angeles.

Premium, \$2 per share. Expense fund.

Protective, Los Angeles.

Premium, \$1 per share on classes D and G.

Expense fund. Classes A, B, and C discontinued.

Provident, Los Angeles.

Maturity reserve, \$2 per share. Expense fund.

State Mutual, Los Angeles.

Membership fee, \$1 per share. Net dividend. Expenses paid from earnings.

Union Mutual, Los Angeles.

Premium, \$1 per share. Net dividend. Expenses paid from earnings.

State of California Mutual, San Diego.

Membership fee, \$1 per share. Expenses paid from earnings.

California Home, San Francisco.

Class A—Membership fee, \$1. Expense fund. Issue discontinued.

All other classes—All expenses paid from earnings.

Continental, San Francisco.

Membership fee, \$1 per share.

Classes A, E, and G—Expense fund. Issue of these discontinued.

Class F—Net dividend. Full dues credited.

Pacific States, San Francisco.

Membership fee, \$1 per share.

Class A—Expense fund. Issue discontinued.

Class C—Net dividend. Full dues credited.

Phoenix, San Francisco.

Classes A and G M—Withdrawal fee, \$2 per share. Expense fund. Issue discontinued.

Class G P—Membership fee, \$1 per share. Net dividend. Full dues credited.

Renters, San Francisco.

Class A—Membership fee, \$1 per share. Expense fund. Full dues, less membership fee, are always withdrawable.

By the term "expense fund" is meant that provision of the by-laws which permits and requires a specific number of cents per share to be deducted from each monthly payment for dues, to be used in the payment of expenses of operation. Wherever this condition exists, the balance of each monthly payment is termed and designated as "loan fund" or "loan fund dues."

This deduction for expenses is permitted to all associations formed under the laws as they existed prior to March 31, 1891; and in *Provident Mutual B. & L. Association vs. Davis et al.*, 143 Cal. 253, the provisions of the by-laws of an association formed under the law of 1891, providing for a similar charge, were held to be valid.

Because of the inability of the average shareholder to comprehend the necessity for, and peculiar operation of, this deduction, it has been the cause of much friction, and very many of these associations are discontinuing its use as to all shares now being issued, but as to shares issued under its operation the deduction is being continued under the original contract.

During the past year several Eastern organizations, some incorporated and some not incorporated, being simply partnerships, have entered this State for the transaction of a business which is similar, in most of its features, to that of a building and loan association; but they are not building and loan associations, because they are not formed under the building and loan laws of the States from which they come. They do not sell shares of stock, but in lieu thereof they sell "contracts." These contracts, in most cases, participate in the profits in a manner similar to the shares of a building and loan association; but the holders are not shareholders, neither are they members, they are simply "investors." The funds accumulated from the payments by these investors upon the contracts held by them are loaned solely to contract-holders—investors—in the same general manner as the funds accumulated by the building and loan associations from the sale of their shares and the periodical payments made by the shareholders

are loaned only to such shareholders or members. Because of the similarity of business transacted, this office held that all such organizations, whether incorporated or not, were subject to supervision and license by this office, and that they were also subject to the provisions of Section 645 of the Civil Code, and must make the deposit required therein to be made with the State Controller or Secretary of State. To this latter feature they made strenuous objection, claiming that, as they were not actually building and loan associations, they were not subject to laws provided for the government of building and loan associations other than such as were purely supervisory in character. The whole question was submitted to the Attorney-General for his interpretation of the laws, and under date of July 17th last he advised this office as follows:

Under the law of this State, as it stands at present, the definition of a "building and loan association" seems to include every company which is doing business on the plan of accumulating savings and lending money to its members or investors out of the accumulated savings of other members or investors. Now if these foreign companies, to which you refer, sell contracts or other evidences of indebtedness which are to mature at some future time, and these contracts are to be paid out of the accumulated savings of all the contract-holders, and loans are made from the funds accruing from these contracts, in the manner and system adopted by building and loan associations, although they do not issue certificates of stock or membership, these companies come within the provision of the law requiring a deposit. I am of opinion your Board would be justified in taking proceedings against any company doing business on the accumulated savings plan, to require them to put up the deposit required by Section 645.

So far as we are advised, every company or corporation that would be subject to the provisions of the laws above cited has ceased the transaction of business in this State and retired.

The following opinion, in condensed form, was received from the Attorney-General, under date of June 1, 1905, and duly promulgated to the several associations:

Your favor of April 10, 1905, received. You state the following proposition for consideration by this office:

"The passage of the new Commissioner Act and amendment 638a of the Civil Code makes it necessary for us to have an opinion from your office as to the effect which 638a will have upon the various building and loan associations of the State. * * * There are three grades or classes of associations to be considered, viz.: Associations formed prior to the law of 1891; * * * associations formed under the law of 1891; * * * corporations formed under the general laws, dealing in investment certificates in lieu of shares of stock, and through the agency of these certificates, doing a business similar to building and loan associations. * * *"

Your first question, in short, is as follows: "Is there any Act, other than those relating to supervision alone, applicable to and enforceable against any building and loan association formed prior to the passage of the law of 1891 (March 31, 1891)?"

The law of 1891 makes it entirely optional with associations formed prior thereto, as to whether they shall continue their existence under the provisions of the law of 1891. (See Sec. 646, C. C.)

The conditions of withdrawal, as they were provided by the by-laws of these associations formed prior to the Act of 1891, can not be interfered with by subsequent legislation. (See *McNamara vs. Oakland Building and Loan Association*, 136 Cal. 336; *Holyoke Building and Loan Association vs. Lewis*, 1 Colo. App. 127, 27 Pac. Rep. 872.)

This brings us to your next question: "Does Section 638a apply to associations formed prior to the passage of the Act of 1891?"

All associations formed prior to the Act of 1891, which did not elect to continue business under the Act of 1891, are *not* affected by its provisions. As Section 638a is an amendment to the Act of 1891, it does not apply to corporations which did not so elect. (See Sec. 646, C. C.; *McNamara vs. Oakland Building and Loan Association*, *supra*.) This case is sufficiently pointed as to all associations formed prior to 1891 and which did not elect to continue their existence under the Act of 1891; but there remains a large class of associations to which your inquiry is also pertinent, viz.: associations formed prior to 1891, which elected to continue their existence under the Act of 1891, and associations formed since the Act of 1891, but prior to the passage of Section 638a. How does Section 638a affect these classes of associations?

* * * The right of withdrawal and the conditions of withdrawal are still left to be regulated by the by-laws of the associations. (See Sec. 633, C. C.)

* * * If certain conditions are attached to the right of withdrawal, these conditions enter into and become a part of the contract of the stockholder, and any change of these conditions by subsequent legislation impairs a vested right. (See *Holyoke Building and Loan Association vs. Lewis*, *supra*; *Heimholke vs. National Savings, Loan and Building Association*, 59 N. W. Rep. 1050.)

The law governing in such a case is that in force at the time the charter was granted and under which it was granted. (See *Endlich on Building Associations*, Sec. 104.)

It follows, therefore, that Section 638a has no application to members who, before said Section 638a went into effect, came into associations formed under the Act of 1891 or electing to do business thereunder.

Does it apply to members who purchase stock, since the approval of Section 638a, in these associations existing before the approval of Section 638a?

I am of the opinion that said section does *not* apply to such members either. * * * The only solution of the matter is to restrict the operation of Section 638a to all associations formed after it went into effect. This I believe to have been the intention of the Legislature.

The next question is: "Does Section 638a apply to corporations formed under the general laws, but which, while they are not building and loan associations, are doing a business similar to such associations?"

No corporation formed under the general laws has purposes similar to those formed under the Act of 1891. (See Sec. 633, C. C.)

Any corporation which lacks this purpose, and has not set it forth in its articles, is not governed by any of the provisions of the Act of 1891, consequently not by Section 638a, an amendment thereto. (See *Vercontere vs. Golden State Land Co.*, 116 Cal. 410; *Bateman vs. Colgan*, 111 Cal. 580; and Sec. 403, C. C.)

I am of the opinion that Section 638a has no application to corporations formed under general laws.

The foregoing opinions became advisable as the natural result of the passage of the law creating this Bureau as the successor of the Board of Commissioners of the Building and Loan Associations, but with increased powers and increased responsibilities; and also because of the passage of the new Section 638a of the Civil Code.

The Act creating this Bureau is unquestionably superior in every particular to that which it succeeded. It is direct and definite in text and terms, and places the responsibility for its enforcement upon the officials charged with the administration of its provisions. Thus far its operation has fully realized the expectations of those responsible for its passage. The officers of corporations more directly interested in and affected by it express their confidence in it, and feel that its proper administration will be of great benefit to all associations, and to their investors and borrowers.

STATUS OF ASSOCIATIONS.

Total roll June 1, 1904—Active.....	127	
Liquidating.....	14	141
New Associations.....		3
Bankers Loan and Trust Company—San Francisco.		
Federal Safe Deposit Company—San Francisco.		
Mutual Building and Loan Association—Long Beach.		
Restored to Roll.....	2	
American Loan and Trust Company—San Francisco.		
Escondido Building and Loan Association—Escondido.		
Retired.....	146	4
Golden Rule—San Francisco.		
Pacific Coast Loan—San Francisco.		
Standard Loan and Trust Company—San Francisco.		
Home Investment—Redlands.		
	142	
Active and reporting.....	117	
Restorations and new associations not reporting.....	5	122
Liquidating.....		20
Imperial—Los Angeles.		
San Diego Savings and Loan—San Diego.		
Union—Sacramento.		
Occidental—Sacramento.		
Yerba Buena—San Francisco.		
Homeseekers—San Francisco.		
Mutual Savings Fund—San Francisco.		
California Guarantee—San Francisco.		
Capital—San Francisco.		
Excelsior—San Francisco.		
National Home—San Francisco.		
Ætna—San Francisco.		
Atlas—San Francisco.		
Pacific Coast Savings—San Francisco.		
Guardian—Vallejo.		
Mutual—Fort Bragg.		
People's—Oakland.		
Oakland—Oakland.		
Western—Los Angeles.		
Ukiah Mutual—Ukiah.		
Total roll June 30, 1905.....		142

DISTRIBUTION BY COUNTIES—ACTIVE ROLL.

Counties.	Ass'ns.	Counties.	Ass'ns.
Alameda.....	10	San Bernardino.....	3
Fresno.....	1	San Diego.....	4
Humboldt.....	1	San Francisco.....	53
Kern.....	2	San Luis Obispo.....	1
Los Angeles.....	14	San Joaquin.....	2
Marin.....	3	San Mateo.....	2
Merced.....	1	Santa Barbara.....	2
Mendocino.....	1	Santa Clara.....	6
Napa.....	1	Solano.....	1
Orange.....	4	Sonoma.....	3
Placer.....	1	Tulare.....	2
Riverside.....	1	Ventura.....	1
Sacramento.....	2		

Counties, 25. Associations, 122.

ASSOCIATIONS AND ASSETS.

The annual reports, for the several fiscal years since the formation of the first Commission, present the following variations in the total number of associations on the roll, the number reporting at the dates of the several annual reports, and the assets, as shown by the tabulations:

Annual Report for—	Total Roll.	No. Reporting.	Assets.
1894	146	137	\$20,820,082 18
1895	153	144	21,500,520 01
1896	153	147	21,470,309 86
1897	155	151	21,791,928 81
1898	157	148	20,721,226 72
1899	159	151	20,825,454 24
1900	157	148	18,935,883 76
1901	153	138	17,881,576 70
1902	151	138	18,199,867 58
1903	146	133	19,863,852 02
1904	141	126	21,306,042 32
1905	142	117	22,586,871 87

ASSETS AND LIABILITIES.

ASSETS.

	Locals.	Other Ass'ns.	Totals.
Loans	\$10,676,930 01	\$10,200,710 00	\$20,877,640 01
Arrearages	128,471 06	100,201 65	228,672 71
Cash on hand	226,533 27	128,809 50	355,342 77
Real estate	311,913 88	630,814 02	942,727 90
Other assets	38,046 63	144,441 85	182,488 48
	<u>\$11,381,894 85</u>	<u>\$11,204,977 02</u>	<u>\$22,586,871 87</u>

LIABILITIES.

	Locals.	Other Ass'ns.	Totals.
Installment stock	\$6,411,697 03	\$5,066,605 60	\$11,478,302 63
Earnings apportioned	1,496,592 63	1,186,536 11	2,683,128 74
Paid-up and prepaid stock	977,372 32	3,092,053 19	4,069,425 51
Dividends unpaid	38,279 18	149,092 40	187,371 58
Advance payments	72,064 23	79,575 07	151,639 30
Overdrafts and bills payable	1,614,214 52	725,600 40	2,339,814 92
Reserve and undivided profits	301,466 80	493,186 95	794,653 75
Unearned premiums	25,826 26	-----	25,826 26
Other liabilities	444,381 88	412,327 30	856,709 18
	<u>\$11,381,894 85</u>	<u>\$11,204,977 02</u>	<u>\$22,586,871 87</u>

The larger portion of "other liabilities" is for "loans due but incomplete"; that is, loans that have been granted but on which the payments have not yet been completed.

RECEIPTS AND DISBURSEMENTS.

RECEIPTS.			
	Locals.	Other Ass'ns.	Totals.
Balance from last report	\$179,456 37	\$183,723 57	\$363,179 94
Installment stock—dues	1,872,532 08	2,303,221 84	4,175,753 87
Paid-up and prepaid stock	434,873 59	1,176,840 05	1,611,713 64
Interest received	805,876 53	830,625 21	1,636,501 74
Premiums received	66,382 87	182,831 05	249,213 92
Fines received	5,963 56	4,700 33	10,663 89
Fees received	3,277 92	75,057 80	78,335 72
Loans repaid	2,900,352 43	2,980,976 45	5,881,328 88
Overdrafts and bills payable	1,543,440 85	547,272 78	2,090,713 63
All other receipts	254,721 48	706,539 10	961,260 58
Aggregate	\$8,066,877 63	\$8,991,788 18	\$17,058,665 81

DISBURSEMENTS.			
	Locals.	Other Ass'ns.	Totals.
Overdrafts and bills payable	\$1,157,119 02	\$371,452 50	\$1,528,571 52
Loans on mortgages and stock	3,689,668 16	3,780,068 34	7,469,736 50
Interest paid	86,644 79	40,261 15	126,905 94
Dues repaid—installment stock	1,722,118 72	1,881,272 80	3,603,391 52
Profits repaid—installment stock	415,229 97	302,720 45	717,950 42
Paid-up and prepaid stock	302,182 18	1,133,470 09	1,435,652 27
Dividends repaid on same	31,354 26	173,607 55	204,961 81
Salaries	111,142 27	111,329 14	222,471 41
Taxes	132,314 62	92,875 94	225,190 56
Other expenses	38,384 09	214,473 29	252,857 38
All other disbursements	154,186 28	761,447 43	915,633 71
Balance on hand and in bank	226,533 27	128,809 50	355,342 77
Aggregate	\$8,066,877 63	\$8,991,788 18	\$17,058,665 81

STATISTICAL INFORMATION.

	Locals.	Others.	All Ass'ns.
Number of members—Male and Societies	12,021	26,422	38,443
Female	5,789	10,823	16,612
Totals	17,810	37,245	55,055
Number of borrowers	7,351	8,600	15,951
Number of mortgage loans for year	2,517	2,334	4,851
Number of stock loans for year	696	1,472	2,168
Number of pieces of property owned	192	262	454
Number of new homes built	1,140	1,315	2,455
Total number of homes reported built	-----	-----	23,459
Shares in force last report	176,973	438,340	615,313
Shares issued since last report	45,603	116,778	162,381
Shares surrendered and matured	37,966	118,787	156,753
Shares in force, this report	184,610	436,331	620,941
Number of associations owning real estate	53	10	63
Number of associations not owning real estate	53	1	54
Net profits for year	\$552,470 47	\$793,783 04	\$1,346,254 51
Real estate owned	311,913 88	630,814 02	942,727 90
Appraised value of real estate	444,238 00	962,326 00	1,406,564 00
Reserve and undivided profits	301,466 80	493,186 95	794,653 75

PREMIUM PLANS.

	Locals.	Others.	All Ass'ns.
Installment plan.....	46	7	53
Gross plan.....	3	---	3
Gross and Installment plans.....	7	---	7
No premium.....	50	4	54
	<u>106</u>	<u>11</u>	<u>117</u>

SYSTEMS OF DISTRIBUTION OF PROFITS.

	Locals.	Others.	All Ass'ns.
Dexter rule (compound interest)	76	9	85
Partnership rule (simple interest).....	23	1	24
Wrigley rule	6	---	6
Third Dividend rule	1	1	2
	<u>106</u>	<u>11</u>	<u>117</u>

NEW LOANS AND LOANS REPAID.

The local associations report that loans to the amount of \$2,900,352.43 have been repaid during the last fiscal year. This sum is 21.36 per cent of all loans that have been in force in these associations during the year.

All other associations report repayments amounting to \$2,980,976.45, which is 22.31 per cent of all loans that have been in force in these associations during the same period.

Combining the two classes of associations, we find that 21.90 per cent of all loans have been repaid during the year.

During the same period 7,019 new loans, mortgage and stock, have been made to borrowing members, covering an aggregate of \$7,469,736.50. Of these, the locals report the making of 3,213 loans, amounting to \$3,689,668.16, which amount is 34.56 per cent of the loans outstanding in these associations. All other associations report 3,806 new loans, amounting to \$3,780,068.34, or the equivalent of 37.06 per cent of their outstanding loans.

The percentage of all associations is 35.78 of new loans, to loans outstanding at the close of their respective fiscal years.

COMPARATIVE STATEMENT.

	Loans Repaid.	New Loans.
Local associations.....	21.36%	34.56%
All other associations	22.31	37.06
Average of all	21.90	35.78
Average in 1904.....	26.46	44.05

INTEREST AND PREMIUM.

During the past fiscal year it appears that the collections for interest on loans have been \$1,636,501.74, and for premium, which is but another name for interest, \$249,213.92, or a total of \$1,885,715.66, which sum is 9.38 per cent of the average of all loans in force during the year. Of this sum, the locals report the collection of \$872,259.40, or an equivalent of 8.48 per cent of their average loans in force; while other associations report the collection of \$1,013,456.26, or 10.34 per cent of their average loans.

The summary for comparison is:

	On Average of Loans.
Locals.....	8.48%
All other associations.....	10.34
Average of all.....	9.38
Average in 1904.....	9.03

By reference to former reports it will be observed that the average percentage of collections shown above, 9.38, exceeds the average for 1899, 9.33 per cent, which is the highest average heretofore reported for this State.

NET PROFITS FOR THE YEAR.

In the preparation of the blank forms to be used by associations for making their annual reports to this office, a Profit and Loss account was, one year ago, added to the form heretofore used. By this means the exact status of the profits and losses, and the apportionment to the various classes of stock, are so arranged as to be readily available for statistical purposes, and permit of greater accuracy than under the former method.

The net profits (income in excess of actual expense) of the local associations, as tabulated from their reports for their fiscal years, appear to be \$552,470.47, which sum is 5.37 per cent on the actual working capital of these associations—the average amount of loans in force for the year. Based on the average amount paid in upon stock, plus the accumulated profits apportioned, the percentage is 6.26.

The tabulated reports of all other associations show their net profits to have been \$793,783.04, a sum equal to 8.09 per cent of their average loans, and 8.69 per cent of their average stock and apportioned profits.

The combined net profits of all the associations amount to 6.71 per cent of the average loans, and 7.50 per cent of the average of stock paid in, plus apportioned profits.

The showing for comparison is as follows:

	To Average Loans.	To Average Investment.
Locals.....	5.37%	6.26%
All other associations.....	8.09	8.69
Average of all classes.....	6.71	7.50
Average of all for 1904.....	6.47	7.02

SALARIES, TAXES, AND OTHER EXPENSES.

The expenses of the associations, as represented by the disbursements on account of salaries, taxes, and miscellaneous expenses, appear to have been as follows:

	Locals.	Others.	All Ass'ns.
For salaries.....	\$111,142 27	\$111,329 14	\$222,471 41
For taxes.....	132,314 62	92,875 94	225,190 56
For other expenses.....	38,384 09	214,473 29	252,857 38
	<u>\$281,840 98</u>	<u>\$418,678 37</u>	<u>\$700,519 35</u>

These amounts, when reduced to a basis of percentage on the average loans in force, show the ratio of expenses for these purposes to be:

	Locals.	Others.	All Ass'ns.
For salaries	1.08%	1.13%	1.10 $\frac{7}{10}$
For taxes	1.29	.95	1.12 $\frac{1}{10}$
For other expenses .....	.37	2.18	1.25 $\frac{3}{10}$
Totals	2.74	4.26	3.48 $\frac{7}{10}$
Average for 1904			3.89

EARNING POWER.

Except as the expenses of operation may be varied by the deductions made on account of "Expense Fund," on the earlier classes of stock in force in certain associations, other than locals, the sum of the percentages of the net profit, and of the expenditure for salaries, taxes, and other expenses, will very closely approximate the earning power of the loans. The ratio of the "expense portion" to the sum of the two then becomes practically the percentage of expenses of operation to income.

Bringing these elements together and making the necessary calculations produce the following:

	Net Profits.	Expenses.	Earning Power.	Expense Percentage.
Locals	5.37%	2.74%	8.11%	33.78
Other associations	8.09	4.26	12.35	34.49
All classes	6.71	3.48 $\frac{7}{10}$	10.19 $\frac{7}{10}$	34.19
Average for 1904	6.47	3.89	10.36	37.54

COÖPERATIVE HOME ASSOCIATIONS.

At the close of the fiscal year ending in June, 1904, there were seven Coöperative Home Associations transacting business in this State. Of these, one transferred its business and retired, and one has been reported to the Attorney-General as insolvent; two have been formed, both since the beginning of the year 1905, and whose reports do appear in the tabulations for the current report. The assets and liabilities appear in the aggregate, as follows:

ASSETS.		LIABILITIES.	
Loans	\$285,351 27	Capital stock	\$3,955 75
Cash on hand	23,327 23	Due on contracts	292,300 77
Real estate	899 75	Reserve fund	5,427 82
Other assets	4,752 41	Profit and loss	9,121 15
		Equalization fund	1,926 31
		Bills payable	827 25
		Other liabilities	771 61
Total assets	\$314,330 66	Total liabilities	\$314,330 66
Contracts in force at last report			3,544
Contracts issued since last report			687
Contracts lapsed			1,305
Contracts withdrawn			99
Contracts in force—Matured			320
Unmatured			2,507
			2,827

The cost of conducting the business appears to have been:

For salaries	\$9,373 56
For office expenses.....	9,090 08
For commissions and traveling expenses	1,050 77
Or a total of	<u>\$19,514 41</u>

These associations are the outgrowth of the "Bowkett" and "Starr-Bowkett" associations of England, but upon a plan that is supposed to be permanent instead of terminating. They are based upon the idea that "time" takes the place of "interest," both as regards the borrower and the investor; and the investor is presumed to become a borrower of the matured value of his contract, at some period during its life, or prior to maturing to its full par value.

The original plans have been materially changed, in an endeavor to meet the requirements of modern business methods; nevertheless they have not attained any great degree of popularity, mainly because the contributions of prospective borrowers have to be depended upon to produce the capital with which their loans are to be made. In these modern times any financial institution, in order to be a success, must be practical and alive to the requirements of business. There must be investing capital, otherwise the sphere of loaning is naturally very circumscribed. To get this, ways and means must be provided to compensate the investors. To provide income for this purpose, the borrowers must pay for their accommodation in the same manner as in other institutions. Changes along this line are gradually being effected, with the result that the plan is more closely approaching that of the original (so called) national building and loan associations.

As an appendix to this report there will be found, in condensed form, the "Assets and Liabilities" and the "Receipts and Disbursements" of each association reporting, and whose statement has entered into the calculations presented for consideration; also, as regards the serial associations, there will be found at the bottom of each such statement a schedule of the "Dues paid," "Book value" and "Surrender value" of a single share at each age from 12 to 120 months, in annual periods, where there are series in force of the ages indicated. These reports are arranged alphabetically by cities and towns, thereby avoiding the necessity of a separate index.

All of which is respectfully submitted.

D. W. FIELD,
C. M. SHORTRIDGE,
Commissioners.

J. L. FIELDS,
Secretary.

STATEMENT OF RECEIPTS ON ACCOUNT OF LICENSE FEES AND ASSESSMENT FOR EXPENSES.

FOR TWELVE MONTHS ENDING JUNE 30, 1905.

Association.	Location.	Amount.
Alameda Building and Loan Association	Alameda	\$69 68
California Building-Loan Association	Alameda	35 10
Columbian Mutual Building and Loan Association	Alameda	25 68
Encinal Building-Loan Association	Alameda	15 52
Savings Loan and Building Association	Anaheim	12 77
People's Mutual Building and Loan Association	Bakersfield	24 51
Benicia Building and Loan Association	Benicia	19 78
Homestead Loan Association	Berkeley	104 08
Covina Mutual Building and Loan Association	Covina	10 00
Mutual Loan and Investment Society	Fort Bragg	10 00
Fortuna Building and Loan Association	Fortuna	10 00
Mutual Building and Loan Association	Fresno	25 14
Healdsburg Mutual Building and Loan Association	Healdsburg	10 00
Kern County Mutual Building and Loan Association	Kern	14 87
Fraternl Mutual Building and Loan Association	Los Angeles	10 20
Home Investment Building and Loan Association	Los Angeles	15 46
Metropolitan Loan Association	Los Angeles	68 84
Southern California Loan Association	Los Angeles	80 28
Fidelity Savings and Loan Association	Los Angeles	121 85
State Mutual Building and Loan Association	Los Angeles	408 22
Union Mutual Building and Loan Association	Los Angeles	53 05
Provident Mutual Building and Loan Association	Los Angeles	423 16
Protective Savings Mutual Building and Loan Ass'n	Los Angeles	110 46
State of California Mutual Building and Loan Ass'n	Los Angeles	10 00
Mutual Building and Loan Association	Long Beach	14 40
Los Gatos Building and Loan Association	Los Gatos	10 00
Merced Mutual Building and Loan Association	Merced	17 62
Napa Building and Loan Association	Napa	32 70
Newcastle Building and Loan Association	Newcastle	10 00
Home Security Loan Society	Oakland	48 66
Brooklyn Investment and Loan Association	East Oakland	10 62
Cosmopolitan Mutual Building and Loan Association	East Oakland	70 54
West Oakland Mutual Loan Association	West Oakland	10 00
People's Mutual Building and Loan Association	Ontario	35 16
Magnolia Mutual Building and Loan Association	North Ontario	14 12
Orange Building and Loan Association	Orange	33 92
Palo Alto Mutual Building and Loan Association	Palo Alto	63 78
Mutual Building and Loan Association	Pasadena	41 88
Los Angeles County Mutual Building and Loan Ass'n	Pasadena	80 81
Petaluma Mutual Loan Association	Petaluma	12 21
Pleasanton Mutual Building and Loan Association	Pleasanton	10 00
Mutual Building and Loan Association	Pomona	47 38
San Mateo County Building and Loan Association	Redwood City	63 10
Riverside County Mutual Building and Loan Ass'n	Riverside	15 19
Germania Building and Loan Association	Sacramento	54 06
Sacramento Building and Loan Association	Sacramento	54 72
Santa Fé Building and Loan Association	San Bernardino	78 52

STATEMENT OF RECEIPTS—CONTINUED.

Association.	Location.	Amount.
San Diego Building and Loan Association	San Diego	\$95 56
Silver Gate Building and Loan Association	San Diego	27 12
Acme Building and Loan Association	San Francisco	10 00
Ætna Mutual Building and Loan Association	San Francisco	10 00
Alliance Building and Loan Association	San Francisco	10 00
Atlas Building and Loan Association	San Francisco	10 00
Alta Building and Loan Association	San Francisco	10 00
Argonaut Mutual Building and Loan Association	San Francisco	11 26
Bay City Building and Loan Association	San Francisco	11 98
Cal. Mutual Savings Fund Loan and Building Ass'n	San Francisco	14 10
City Building and Loan Association	San Francisco	11 74
Citizens' Building and Loan Association	San Francisco	127 06
Columbia Building and Loan Association	San Francisco	10 00
Commercial Loan and Trust Company	San Francisco	27 20
Economy Building and Loan Association	San Francisco	25 14
Eintracht Spar und Bau Verein	San Francisco	10 00
El Dorado Loan Association	San Francisco	10 00
Empire Building and Loan Association	San Francisco	12 78
Eureka Building and Loan Association	San Francisco	15 46
Fairmount Loan Association	San Francisco	17 82
Fidelity Building and Loan Association	San Francisco	33 74
Franklin Savings and Building Association	San Francisco	22 42
Germania Building and Loan Association	San Francisco	28 27
Golden West Building and Loan Association	San Francisco	10 00
Globe Mutual Building and Loan Association	San Francisco	35 94
Granite Mutual Building and Loan Association	San Francisco	10 00
Home Mutual Building and Loan Association	San Francisco	54 80
Householders' Building and Loan Association	San Francisco	10 00
Humboldt Building and Loan Association	San Francisco	22 31
Inter-Nos Building and Loan Association	San Francisco	19 08
Italian-Swiss Mutual Loan Association	San Francisco	20 68
Mechanics Building and Loan Association	San Francisco	19 06
Mission Home and Loan Association	San Francisco	20 72
Mission Improved Building and Loan Association	San Francisco	10 00
Monarch Mutual Building and Loan Association	San Francisco	12 43
Occidental Loan Association	San Francisco	12 56
Pacific Loan Association	San Francisco	11 52
Provident Mutual Loan Association	San Francisco	25 14
Progress Mutual Loan Association	San Francisco	15 26
Prudence Building and Loan Association	San Francisco	17 84
Richmond Mutual Building and Loan Association	San Francisco	10 00
Safety Mutual Building and Loan Association	San Francisco	36 02
San Francisco Mutual Loan Association	San Francisco	10 00
San Francisco and Oakland Mutual Loan Association	San Francisco	18 72
San Francisco Home Mutual Loan Association	San Francisco	10 00
Triumph Loan Association	San Francisco	10 16
Union Loan Association	San Francisco	10 00
Western Loan Association	San Francisco	15 38
West Shore Mutual Loan Association	San Francisco	10 00
California Home Building-Loan Company	San Francisco	46 99
Continental Building and Loan Association	San Francisco	1,705 05
Pacific States Savings, Loan and Building Company	San Francisco	362 83
Renters Loan and Trust Company	San Francisco	562 11
Phoenix Savings, Building and Loan Association	San Francisco	735 98
Standard Loan and Trust Company	San Francisco	181 22
Bankers Loan and Trust Company	San Francisco	26 15

STATEMENT OF RECEIPTS—CONTINUED.

Association.	Location.	Amount.
Federal Safe Deposit Company	San Francisco	\$10 00
American Loan and Security Company	San Francisco	10 00
Nucleus Building and Loan Association	San José	17 96
Mutual Building and Loan Association	San José	33 80
San José Building and Loan Association	San José	33 50
San Luis Building and Loan Association	San Luis Obispo	39 10
San Mateo Building and Loan Association	San Mateo	22 04
Marin County Mutual Building and Loan Association	San Rafael	66 50
Home Mutual Building and Loan Association	Santa Ana	57 76
Orange County Mutual Building and Loan Association	Santa Ana	10 00
Loan and Building Association	Santa Barbara	93 02
Santa Barbara Mutual Building and Loan Association	Santa Barbara	38 12
Santa Paula Building and Loan Association	Santa Paula	21 67
Santa Rosa Building and Loan Association	Santa Rosa	41 66
Sausalito Mutual Loan Association	Sausalito	11 76
Tamalpais Mutual Building and Loan Association	Sausalito	10 00
San Joaquin Valley Building and Loan Association	Stockton	55 88
Stockton Land, Loan and Building Association	Stockton	146 54
Tulare Building and Loan Association	Tulare	10 00
Visalia Building and Loan Association	Visalia	44 10
Mutual Building and Loan Association (new)	Long Beach	4 00
Bankers' Loan and Trust Company (new)	San Francisco	4 00
Federal Safe Deposit Co. (new)	San Francisco	3 00
American Loan and Security Co. (restored)	San Francisco	1 00
Total Building and Loan Associations		\$7,976 40

Coöperative Home Associations.

Chicago Home	Los Angeles	\$20 00
Coöperative Homebuilders	Los Angeles	136 40
Oakland Home	Oakland	33 80
San Francisco Coöperative Home	San Francisco	29 40
Savers and Builders	San Francisco	10 00
Colonial Home	San Francisco	10 00
Homebuilders' Security	San Francisco	10 00
Total Coöperative Home Associations		249 60
Aggregate		\$8,226 00
Deposited with State Treasurer		\$8,226 00

STATE OF CALIFORNIA, }
CITY AND COUNTY OF SAN FRANCISCO. } ss.

J. L. Fields, Secretary for the Building and Loan Commissioners, being first duly sworn, deposes and says that the foregoing is a correct statement of the receipts for the fiscal year ended June 30, 1905, and of the disposition thereof.

J. L. FIELDS.

Subscribed and sworn to before me, this 31st day of August, 1905.

D. W. FIELD,
Commissioner.

APPENDIX.

REPORTS OF BUILDING AND LOAN ASSOCIATIONS.

ALPHABETICALLY ARRANGED BY CITIES AND TOWNS.

REPORTS OF BUILDING AND LOAN ASSOCIATIONS.

No. 1—ALAMEDA.

ALAMEDA BUILDING AND LOAN ASSOCIATION.

(Incorporated March 9, 1876.)

FREDERICK H. CLARK, Secretary.

C. C. VOLBERG, President.

Fiscal year ends March 31, 1905.

No. of series, none.

No. of shares, 3,419.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$248,229 92	Installment stock—dues	\$144,591 10
Arrearages	687 63	Earnings apportioned	33,739 91
On interest	\$687 63	Overdrafts and bills payable	57,251 77
Cash on hand and in bank	2,171 04	Reserve and undivided profits	8,813 05
Other assets	289 37	Other liabilities	6,982 13
Total assets	\$251,377 96	Total liabilities	\$251,377 96
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$1,212 92	Overdrafts and bills payable	\$63,628 95
Installment stock—dues	36,202 45	Loans on mortgages and stock	74,529 33
Interest received	18,390 01	Interest paid	2,021 25
Fines received	87 54	Dues repaid — installment	
Fees received	19 50	stock	26,694 48
Loans repaid	65,841 60	Profits repaid — installment	
Overdrafts and bills payable	60,802 65	stock	10,194 66
All other receipts	5,369 06	Salaries	2,100 00
Total receipts	\$187,925 73	Taxes	3,455 72
		Other expenses	636 73
		All other disbursements	2,493 57
		Balance on hand and in bank	2,171 04
		Total disbursements	\$187,925 73

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Dayton plan.

Dividend—5½ per cent.

Book value—Dues plus dividend.

Withdrawal value—Book value less 2 per cent.

No. 2—ALAMEDA.

CALIFORNIA BUILDING-LOAN ASSOCIATION.

(Incorporated February 9, 1888.)

CHAS. E. NAYLOR, Secretary.

GEO. E. PLUMMER, President.

Fiscal year ends February 28, 1905.

No. of series, 15.

No. of shares, 1,886.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$181,430 56	Installment stock—dues	\$83,647 40
Arrearages	453 07	Earnings apportioned	27,429 17
On shares	\$136 90	Overdrafts and bills payable	65,459 24
On interest	255 07	Reserve and undivided profits	2,146 80
On premiums	24 55	Other liabilities	5,195 84
On fines, etc	36 55		
Cash on hand and in bank	17 00		
Real estate owned	1,931 82		
Other assets	46 00		
Total assets	\$183,878 45	Total liabilities	\$183,878 45

<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Installment stock—dues	\$13,881 90	Overdrafts and bills payable	\$14,310 18
Interest received	12,633 78	Loans on mortgages and stock	105,534 64
Premiums received	422 50	Interest paid	2,049 41
Fines received	154 95	Dues repaid — installment	
Loans repaid	35,628 11	stock	4,107 70
Overdrafts and bills payable	65,429 24	Profits repaid — installment	
All other receipts	5,078 28	stock	688 17
		Salaries	1,500 00
		Taxes	2,632 60
		Other expenses	875 86
		All other disbursements	1,513 20
		Balance on hand and in bank	17 00
Total receipts	\$133,228 76	Total disbursements	\$133,228 76

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
8	120	\$120 00	\$174 00	\$174 00
10	108	108 00	151 74	151 74
12	96	96 00	130 56	127 10
14	84	84 00	111 46	105 17
16	72	72 00	91 44	85 60
18	60	60 00	73 50	68 10
20	48	48 00	56 64	53 76
22	36	36 00	48 60	39 24
24	24	24 00	26 16	25 44
26	12	12 00	12 54	12 36

No. 3—ALAMEDA.

COLUMBIAN MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated July 17, 1893.)

H. K. STARKWEATHER, Secretary.

JAMES K. LYNCH, President.

Fiscal year ends July 31, 1904.

No. of series, 26.

No. of shares, 1,205.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$97,938 72	Installment stock—dues	\$60,522 90
Arrearages	1,426 39	Earnings apportioned	18,899 07
On shares	\$894 15	Advance payments	1,439 20
On interest	484 89	Reserve and undivided profits	380 89
On premiums	21 50	Other liabilities	20,041 49
On fines, etc.	25 85		
Cash on hand and in bank	1,717 14		
Other assets	201 30		
Total assets	\$101,283 55	Total liabilities	\$101,283 55
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$181 36	Overdrafts and bills payable	\$11,100 90
Installment stock—dues	10,356 35	Loans on mortgages and stock	34,264 03
Interest received	6,413 61	Interest paid	538 21
Premiums received	628 55	Dues repaid — installment	
Fines received	100 20	stock	4,642 80
Fees received	27 20	Profits repaid — installment	
Loans repaid	33,522 82	stock	889 20
All other receipts	5,460 68	Salaries	949 00
		Taxes	1,336 60
		Other expenses	335 75
		All other disbursements	917 14
		Balance on hand and in bank	1,717 14
Total receipts	\$56,690 77	Total disbursements	\$56,690 77

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
1	132	\$132 00	\$190 52	\$190 52
3	120	120 00	164 62	164 62
5	108	108 00	142 71	142 71
7	96	96 00	122 30	119 67
10	84	84 00	103 65	101 64
14	72	72 00	86 14	84 96
18	60	60 00	69 81	69 00
22	48	48 00	54 27	53 76
25	36	36 00	39 57	39 24
27	24	24 00	25 67	25 44
30	12	12 00	12 40	12 36

No. 4—ALAMEDA.

ENCINAL BUILDING-LOAN ASSOCIATION.

(Incorporated December 8, 1888.)

E. MINOR SMITH, Secretary.

FRANK OTIS, President.

Fiscal year ends December 31, 1904.

No. of series, 21.

No. of shares, 776.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$54,395 10	Installment stock—dues	\$34,434 00
Arrearages	600 71	Earnings apportioned	8,620 26
On shares	\$196 60	Advance payments	165 00
On interest	353 26	Overdrafts and bills payable	13,001 84
On premiums	50 85	Reserve and undivided profits	1,357 29
Real estate owned	2,800 00	Other liabilities	433 27
Other assets	215 85		
Total assets	\$58,011 66	Total liabilities	\$58,011 66
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Installment stock—dues	\$7,702 30	Overdrafts and bills payable	\$14,086 07
Interest received	4,265 15	Loans on mortgages and stock	12,038 45
Premiums received	203 25	Interest paid	503 63
Fees received	11 00	Dues repaid—installment	9,812 00
Loans repaid	13,566 37	stock	3,043 35
Overdrafts and bills payable	13,301 84	Profits repaid—installment	780 00
All other receipts	2,808 50	stock	1,345 82
		Salaries	194 54
		Taxes	54 55
		Other expenses	
		All other disbursements	
Total receipts	\$41,858 41	Total disbursements	\$41,858 41

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
10	132	\$132 00	\$183 20	\$180 20
11	126	126 00	171 33	167 91
14	108	108 00	138 88	136 11
16	96	96 00	119 14	116 76
18	84	84 00	100 91	98 90
20	72	72 00	83 87	82 20
22	60	60 00	67 85	66 50
24	48	48 00	52 88	51 83
26	36	36 00	38 63	37 86
28	24	24 00	25 12	24 87
30	12	12 00	12 29	12 17

No. 5—ANAHEIM.

SAVINGS, LOAN AND BUILDING ASSOCIATION.

(Incorporated January 8, 1889.)

FRED A. BACKS, JR., Secretary.

JOHN P. ZEYN, President.

Fiscal year ends April 30, 1905.

No. of series, 11.

No. of shares, 1,291.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$46,634 84	Installment stock—dues	\$33,372 00
Arrearages	1,385 94	Earnings apportioned	9,338 88
On shares	\$575 25	Advance payments	50 10
On interest	761 74	Overdrafts and bills payable	5,900 00
On premiums	22 10	Reserve and undivided profits	284 11
On fines, etc.	26 85	Other liabilities	350 00
Cash on hand and in bank	1,274 31		
Total assets	\$49,295 09	Total liabilities	\$49,295 09

<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$2,170 76	Overdrafts and bills payable	\$3,100 00
Installment stock—dues	7,833 25	Loans on mortgages and stock	26,720 00
Interest received	3,161 70	Interest paid	141 48
Premiums received	491 85	Dues repaid — installment	
Fines received	57 05	stock	4,237 50
Fees received	22 50	Profits repaid — installment	
Loans repaid	14,690 00	stock	1,366 16
Overdrafts and bills payable	9,000 00	Salaries	250 00
All other receipts	147 75	Taxes	416 89
		Other expenses	68 52
		Balance on hand and in bank	1,274 31
Total receipts	\$37,574 86	Total disbursements	\$37,574 86

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Valuc.
6	132	\$66 00	\$100 86	\$100 86
7	120	60 00	88 01	88 81
8	108	54 00	76 10	71 68
9	96	48 00	64 97	60 73
10	84	42 00	54 62	50 83
11	72	36 00	45 02	41 86
12	60	30 00	36 14	33 68
13	48	24 00	27 92	25 96
14	36	18 00	20 24	18 90
15	24	12 00	13 00	12 20
16	12	6 00	6 26	6 02

No. 6—BAKERSFIELD.

PEOPLE'S MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated January 27, 1892.)

F. W. ROBINSON, Secretary.

W. S. TEVIS, President.

Fiscal year ends January 24, 1905.

No. of series, 8.

No. of shares, 2,436.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$101,600 00	Installment stock—dues	\$66,124 80
Arrearages	58 71	Earnings apportioned	18,765 87
On shares	\$21 60	Advance payments	140 95
On interest	18 00	Overdrafts and bills payable	13,807 44
On premiums	12 60	Reserve and undivided profits	1,001 85
On fines, etc.	6 51	Other liabilities	1,817 80
Total assets	\$101,658 71	Total liabilities	\$101,658 71
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Installment stock—dues	\$18,221 10	Overdrafts and bills payable	\$5,829 38
Interest received	5,382 84	Loans on mortgages and stock	44,182 20
Premiums received	3,757 25	Interest paid	477 95
Fines received	100 86	Dues repaid — installment	
Fees received	50 00	stock	10,486 20
Loans repaid	26,200 00	Profits repaid — installment	
Overdrafts and bills payable	13,807 44	stock	4,479 60
All other receipts	310 90	Salaries	1,020 00
Total receipts	\$67,830 41	Taxes	1,073 17
		Other expenses	202 01
		All other disbursements	79 90
		Total disbursements	\$67,830 41

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
6	96	\$57 60	\$90 19	\$90 00
7	84	50 40	73 53	68 00
8	72	43 20	59 08	54 00
9	60	36 00	46 33	42 00
10	48	28 80	35 07	32 00
11	36	21 60	24 97	23 00
12	24	14 40	15 89	14 75
13	12	7 20	7 58	7 45

No. 7--BENICIA.

BENICIA BUILDING AND LOAN ASSOCIATION.

(Incorporated January 11, 1883.)

ALEXANDER ROBINSON, Secretary.

CHARLES STEWART, President.

Fiscal year ends January 31, 1905.

No. of series, 19.

No. of shares, 987.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$69,037 50	Installment stock—dues	\$46,146 00
Arrearages	6,076 00	Earnings apportioned	11,705 52
On shares	\$3,491 00	Advance payments	14 00
On interest	2,585 00	Overdrafts and bills payable	12,800 00
Cash on hand and in bank	2,128 72	Reserve and undivided profits	334 11
Other assets	2,788 46	Unearned premiums	8,856 20
		Other liabilities	174 85
Total assets	\$80,030 68	Total liabilities	\$80,030 68
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$106 36	Overdrafts and bills payable	\$4,626 49
Installment stock—dues	11,246 00	Loans on mortgages and stock	19,762 50
Interest received	4,179 75	Interest paid	1,112 30
Premiums received	3,952 50	Dues repaid — installment	
Fees received	17 80	stock	5,628 00
Loans repaid	15,600 00	Profits repaid — installment	
Overdrafts and bills payable	1,730 00	stock	853 09
All other receipts	4,322 24	Salaries	720 00
		Taxes	1,322 67
		Other expenses	153 88
		All other disbursements	4,847 00
		Balance on hand and in bank	2,128 72
Total receipts	\$41,154 65	Total disbursements	\$41,154 65

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
11	120	\$120 00	\$182 08	\$178 99
12	108	108 00	156 81	154 37
14	96	96 00	133 45	129 70
16	84	84 00	111 85	106 28
18	72	72 00	91 88	85 91
20	60	60 00	73 42	67 38
22	48	48 00	56 35	51 33
24	36	36 00	40 56	37 37
26	24	24 00	25 97	24 39
28	12	12 00	12 48	12 00

No. 8—SAN FRANCISCO.

HOMESTEAD LOAN ASSOCIATION.

(Incorporated March 23, 1886.)

FREDERICK H. CLARK, Secretary.

GEORGE LEONARD, President.

Fiscal year ends March 31, 1905.

No. of series, 81.

No. of shares, 5,119.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$342,909 55	Installment stock—dues	\$202,643 60
Arrearages	2,741 93	Earnings apportioned	52,934 16
On shares	\$1,344 70	Paid-up and prepaid stock—capital	31,000 00
On interest	1,397 23	Paid-up and prepaid stock—dividends	162 38
Cash on hand and in bank	3,998 92	Advance payments	5,671 40
Real estate owned	11,012 50	Overdrafts and bills payable	45,000 00
Other assets	384 52	Reserve and undivided profits	5,945 88
		Other liabilities	17,690 00
Total assets	\$361,047 42	Total liabilities	\$361,047 42
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$7,566 91	Overdrafts and bills payable	\$43,000 00
Installment stock—dues	41,167 10	Loans on mortgages and stock	160,387 39
Paid-up and prepaid stock	43,125 00	Interest paid	2,561 91
Interest received	25,342 18	Dues repaid — installment stock	14,283 69
Fines received	160 04	Profits repaid — installment stock	10,315 71
Fees received	62 55	Paid-up and prepaid stock—capital	30,050 00
Loans repaid	102,537 18	Salaries	2,724 00
Overdrafts and bills payable	58,000 00	Taxes	3,328 44
All other receipts	2,058 79	Other expenses	1,228 83
		All other disbursements	8,140 86
Total receipts	\$280,019 75	Balance on hand and in bank	3,998 92
		Total disbursements	\$280,019 75

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
19	120	\$120 00	\$172 07	\$169 01
21	108	108 00	147 58	144 47
23	96	96 00	125 28	122 39
25	84	84 00	105 27	102 76
27	72	72 00	86 92	84 87
38	60	60 00	70 02	68 13
50	48	48 00	54 24	52 68
62	36	36 00	39 47	38 61
74	24	24 00	25 52	25 01
86	12	12 00	12 28	12 24

No. 9—COVINA.

COVINA MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated March 7, 1899.)

J. H. MATTHEWS, Secretary.

J. D. REED, President.

Fiscal year ends February 28, 1905.

No. of series, 11.

No. of shares, 554.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$16,900 00	Installment stock—dues	\$12,837 00
Arrearages	19 60	Earnings apportioned	3,140 36
On shares	\$7 00	Overdrafts and bills payable	1,500 00
On interest	7 00	Reserve and undivided profits	36 15
On premiums	5 60	Other liabilities	90
Cash on hand and in bank	529 13		
Other assets	65 68		
Total assets	\$17,514 41	Total liabilities	\$17,514 41
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$1,179 53	Overdrafts and bills payable	\$250 00
Installment stock—dues	3,524 50	Loans on mortgages and stock	4,400 00
Interest received	983 50	Interest paid	18 65
Premiums received	786 80	Dues repaid — installment	
Fees received	15 80	stock	3,893 00
Loans repaid	2,000 00	Profits repaid — installment	
Overdrafts and bills payable	1,750 00	stock	580 04
All other receipts	165 66	Salaries	180 00
		Taxes	498 37
		Other expenses	56 60
		Balance on hand and in bank	529 13
Total receipts	\$10,405 79	Total disbursements	\$10,405 79

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
1	72	\$36 00	\$46 00	\$42 57
2	64	32 00	41 00	37 95
4	48	24 00	28 88	26 94
6	34	17 00	19 52	18 49
8	23	11 50	12 85	12 13
10	12	6 00	6 50	6 20

No. 10—FORT BRAGG.

MUTUAL LOAN AND INVESTMENT SOCIETY.

(Incorporated October 14, 1889.)

JOHN E. WELLER, Secretary.

ERI HUGGINS, President.

Fiscal year ends December 31, 1904.

No. of series, none.

No. of shares, 367.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$17,447 66	Installment stocks—dues	\$5,434 20
Arrearages	381 30	Earnings apportioned	770 97
On interest	\$341 40	Paid-up and prepaid stock—capital	6,300 00
On premiums	39 90	Paid-up and prepaid stock—dividends	243 85
Cash on hand and in bank	406 58	Reserve and undivided profits	50 39
Other assets	3,841 84	Unearned premiums	400 00
		Other liabilities	8,877 97
Total assets	\$22,077 38	Total liabilities	\$22,077 38
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$1,430 35	Loans on mortgages and stock	\$7,645 00
Installment stock—dues	2,457 95	Dues repaid — installment stock	2,766 50
Paid-up and prepaid stock	1,950 00	Profits repaid — installment stock	769 07
Interest received	1,034 48	Paid-up and prepaid stock—dividends	146 25
Premiums received	42 90	Salaries	300 00
Fees received	6 00	Taxes	363 45
Loans repaid	9,725 45	Other expenses	343 35
All other receipts	4,514 24	All other disbursements	8,421 17
		Balance on hand and in bank	406 58
Total receipts	\$21,161 37	Total disbursements	\$21,161 37

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Dayton plan.

Dividend—6 per cent.

Book value—Dues plus dividend.

Withdrawal value—Same as book value.

No. 11—FORTUNA.

FORTUNA BUILDING AND LOAN ASSOCIATION.

(Incorporated April 30, 1899.)

CHAS. A. FRIEDENBACH, Secretary.

C. A. EASTMAN, President.

Fiscal year ends May 31, 1905.

No. of series, 13.

No. of shares, 479.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$19,130 00	Installment stock—dues	\$16,719 00
Arrearages	95 78	Earnings apportioned	2,747 33
On shares	\$43 00	Advance payments	5 00
On interest	17 27	Reserve and undivided profits	76
On premiums	22 80	Other liabilities	70 00
On fines, etc.	12 71		
Cash on hand and in bank	316 31		
Total assets	\$19,542 09	Total liabilities	\$19,542 09
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$1,868 37	Loans on mortgages and stock	\$4,950 00
Installment stock—dues	6,067 00	Interest paid	18 00
Interest received	1,097 11	Dues repaid — installment	
Premiums received	551 40	stock	6,952 50
Fines received	64 64	Profits repaid — installment	
Fees received	16 90	stock	1,466 55
Loans repaid	4,200 00	Salaries	120 00
All other receipts	244 76	Taxes	234 27
		Other expenses	49 55
		All other disbursements	3 00
		Balance on hand and in bank	316 31
Total receipts	\$14,110 18	Total disbursements	\$14,110 18

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
20	72	\$72 00	\$89 95	\$87 70
22	60	60 00	72 45	69 34
24	48	48 00	55 96	52 97
26	36	36 00	40 36	38 18
28	24	24 00	25 87	24 70
30	12	12 00	12 47	12 20

No. 12—FRESNO.

MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated March 17, 1892.)

A. V. LISENBY, Secretary.

W. T. MATTINGLY, President.

Fiscal year ends March 1, 1905.

No. of series, 21.

No. of shares, 1,375.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$93,379 32	Installment stock—dues	\$48,851 60
Arrearages	326 10	Earnings apportioned	13,620 60
On shares	\$122 10	Overdrafts and bills payable	31,000 00
On interest	147 00	Reserve and undivided profits	3,463 54
On premiums	57 00	Other liabilities	3,760 91
Cash on hand and in bank	5,791 23		
Other assets	1,200 00		
Total assets	\$100,696 65	Total liabilities	\$100,696 65
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$3,029 47	Overdrafts and bills payable	\$5,000 00
Installment stock—dues	13,024 20	Loans on mortgages and stock	34,713 64
Interest received	7,867 97	Interest paid	1,106 67
Premiums received	1,446 50	Dues repaid — installment	15,882 40
Fines received	17 90	stock	
Fees received	15 50	Profits repaid — installment	7,269 36
Loans repaid	32,258 38	stock	
Overdrafts and bills payable	15,000 00	Salaries	1,010 00
All other receipts	180 00	Taxes	1,875 03
		Other expenses	191 59
		Balance on hand and in bank	5,791 23
Total receipts	\$72,839 92	Total disbursements	\$72,839 92

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
7	120	\$120 00	\$190 70	\$190 70
9	108	108 00	163 77	162 00
11	96	96 00	138 98	136 75
13	84	84 00	116 20	112 75
15	72	72 00	95 57	92 25
17	60	60 00	76 30	73 25
19	48	48 00	58 39	55 75
21	36	36 00	41 76	39 50
23	24	24 00	26 54	25 50
25	12	12 00	12 67	12 00

No. 13—HEALDSBURG.

HEALDSBURG MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated December 31, 1894.)

E. B. Snook, Secretary.

JOHN FAVOUR, President.

Fiscal year ends December 31, 1904.

No. of series, 20.

No. of shares, 772.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$48,150 00	Installment stock—dues.....	\$32,751 00
Arrearages	68 60	Earnings apportioned	15,586 48
On shares	\$17 50	Advance payments	57 00
On interest	17 50	Overdrafts and bills payable..	109 43
On premiums	14 00	Reserve and undivided profits	25 72
On fines, etc.	19 60	Other liabilities	100 00
Cash on hand and in bank ..	180 15		
Other assets	230 88		
Total assets	\$48,629 63	Total liabilities	\$48,629 63
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$342 96	Overdrafts and bills payable..	\$500 00
Installment stock—dues.....	5,079 50	Loans on mortgages and stock	2,550 00
Interest received	2,926 00	Interest paid	52 40
Premiums received	2,112 80	Dues repaid — installment	
Fines received	65	stock	6,610 50
Fees received	6 70	Profits repaid — installment	
Loans repaid	4,150 00	stock	3,504 72
Overdrafts and bills payable..	109 43	Salaries	400 00
All other receipts	201 49	Taxes	1,112 26
		Other expenses	19 50
		Balance on hand and in bank	180 15
Total receipts	\$14,929 53	Total disbursements	\$14,929 53

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
1.....	120	\$60 00	\$95 37	Dues plus profits as per by-laws.
3.....	108	54 00	81 40	
5.....	96	48 00	68 80	
7.....	84	42 00	57 40	
9.....	72	36 00	46 89	
11.....	60	30 00	37 31	
13.....	48	24 00	28 51	
15.....	36	18 00	20 41	
17.....	24	12 00	13 00	
19.....	12	6 00	6 25	

No. 14—KERN.

KERN COUNTY MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated July 29, 1901.)

V. E. WILSON, Secretary.

J. F. DUGAN, President.

Fiscal year ends December 31, 1904.

No. of series, none.

No. of shares, 1,462.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$32,000 00	Installment stock—dues	\$21,246 16
Cash on hand and in bank	2,258 46	Earnings apportioned	2,216 12
		Paid-up and prepaid stock—capital	2,500 00
		Overdrafts and bills payable	8,000 00
		Reserve and undivided profits	296 18
Total assets	\$34,258 46	Total liabilities	\$34,258 46
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$1,664 85	Overdrafts and bills payable	\$1,800 00
Installment stock—dues	15,814 29	Loans on mortgages and stock	19,100 00
Paid-up and prepaid stock	1,600 00	Interest paid	197 87
Interest received	2,801 80	Dues repaid — installment stock	7,966 05
Fines received	11 55	Profits repaid — installment stock	578 58
Loans repaid	2,900 00	Paid-up and prepaid stock—capital	1,200 00
Overdrafts and bills payable	9,000 00	Paid-up and prepaid stock—dividends	105 75
		Salaries	230 00
		Taxes	260 41
		Other expenses	95 37
		Balance on hand and in bank	2,258 46
Total receipts	\$33,792 49	Total disbursements	\$33,792 49

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Dayton plan.

Book value—Dues plus 10 per cent dividends.

Withdrawal value—Same as book value.

No. 15—LOS ANGELES.

FRATERNAL MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated April 17, 1895.)

HERBERT J. GOUDGE, Secretary.

WILLIAM MEEK, President.

Fiscal year ends May 15, 1905.

No. of series, 27.

No. of shares, 843.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$36,325 00	Installment stock—dues	\$27,370 50
Arrearages	1,185 55	Earnings apportioned	9,666 06
On shares	\$520 50	Advance payments	156 30
On interest	444 00	Overdrafts and bills payable	3,000 00
On premiums	221 05	Reserve and undivided profits	295 22
Cash on hand and in bank	2,896 03	Other liabilities	13 50
Other assets	95 00		
Total assets	\$40,501 58	Total liabilities	\$40,501 58

<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$1,405 47	Overdrafts and bills payable	\$5,000 00
Installment stock—dues	5,283 50	Loans on mortgages and stock	2,850 00
Interest received	2,456 35	Interest paid	513 17
Premiums received	1,049 55	Dues repaid — installment stock	7,095 50
Fines received	5 00	Profits repaid — installment stock	1,424 89
Loans repaid	10,375 00	Salaries	300 00
All other receipts	511 77	Taxes	566 38
		Other expenses	148 50
		All other disbursements	292 17
		Balance on hand and in bank	2,896 03
Total receipts	\$21,086 64	Total disbursements	\$21,086 64

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
1	120	\$60 00	\$91 31	\$83 48
4	108	54 00	78 51	72 38
9	84	42 00	55 58	52 18
13	72	36 00	45 57	43 18
15	60	30 00	36 51	34 88
19	48	24 00	28 13	26 75
22	36	18 00	20 30	19 15
31	18	9 00	9 57	9 28
33	12	6 00	6 26	6 13

No. 16—LOS ANGELES.

HOME INVESTMENT BUILDING AND LOAN ASSOCIATION.

(Incorporated August 21, 1888.)

W. A. BONYNGE, Secretary.

J. B. NEWTON, President.

Fiscal year ends September 30, 1904.

No. of series, 20.

No. of shares, 839.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$80,925 00	Installment stock—dues	\$49,098 00
Arrearages	964 51	Earnings apportioned	15,026 45
On shares	\$388 00	Advance payments	855 00
On interest	576 51	Overdrafts and bills payable	16,500 00
Cash on hand and in bank	1,126 69	Reserve and undivided profits	974 30
Other assets	192 55	Other liabilities	755 00
Total assets	\$83,208 75	Total liabilities	\$83,208 75
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$3,846 90	Overdrafts and bills payable	\$51,000 00
Installment stock—dues	10,051 00	Loans on mortgages and stock	33,163 00
Interest received	7,988 15	Interest paid	1,482 13
Fines received	373 13	Dues repaid — installment	
Loans repaid	32,705 00	stock	9,881 00
Overdrafts and bills payable	47,500 00	Profits repaid — installment	
All other receipts	27 40	stock	3,516 88
Total receipts	\$102,491 58	Salaries	872 50
		Taxes	1,142 61
		Other expenses	193 52
		All other disbursements	113 25
		Balance on hand and in bank	1,126 69
		Total disbursements	\$102,491 58

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
11	120	\$120 00	\$179 04	\$176 09
13	108	108 00	155 04	150 69
17	84	84 00	103 99	103 00
19	72	72 00	86 72	83 78
21	60	60 00	70 55	67 91
23	48	48 00	54 72	53 04
25	36	36 00	39 79	38 64
27	24	24 00	25 69	25 27
29	12	12 00	12 39	12 29

No. 17—LOS ANGELES.

METROPOLITAN LOAN ASSOCIATION.

(Incorporated July 30, 1886.)

ISAAC NORTON, Secretary.

CHAS. SEYLER, President.

Fiscal year ends June 30, 1905.

No. of series, 17.

No. of shares, 3,392.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$252,000 00	Installment stock—dues	\$182,118 00
Arrearages	160 00	Earnings apportioned	57,094 98
On shares	\$79 00	Advance payments	160 00
On interest	81 00	Reserve and undivided profits	8,699 49
Cash on hand and in bank	21,156 32	Other liabilities	28,560 00
Real estate owned	3,316 15		
Total assets	\$276,632 47	Total liabilities	\$276,632 47
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$1,415 14	Overdrafts and bills payable	\$16,800 00
Installment stock—dues	42,180 00	Loans on mortgages and stock	60,616 92
Interest received	19,820 42	Interest paid	328 86
Premiums received	4,075 00	Dues repaid — installment	
Fines received	259 95	stock	56,229 00
Fees received	46 90	Profits repaid — installment	
Loans repaid	114,850 00	stock	25,222 10
Overdrafts and bills payable	7,800 00	Salaries	2,595 00
All other receipts	101 05	Taxes	3,637 02
		Other expenses	557 09
		All other disbursements	3,406 15
		Balance on hand and in bank	21,156 32
Total receipts	\$190,548 46	Total disbursements	\$190,548 46

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
11.	120	\$120 00	\$191 51	\$191 51
12.	108	108 00	161 81	151 05
13.	96	96 00	135 79	125 84
15.	84	84 00	112 72	104 10
17.	72	72 00	92 10	85 06
19.	60	60 00	73 40	68 04
21.	48	48 00	56 29	52 14
23.	36	36 00	40 59	37 83
25.	24	24 00	26 00	24 40
27.	12	12 00	12 50	12 05

No. 18—LOS ANGELES.

SOUTHERN CALIFORNIA LOAN ASSOCIATION.

(Incorporated March 11, 1887.)

JULIUS H. MARTIN, Secretary.

C. E. DONNATIN, President.

Fiscal year ends August 31, 1904.

No. of series, 21.

No. of shares, 4,265.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$400,599 00	Installment stock—dues	\$235,783 00
Arrearages	915 00	Earnings apportioned	72,008 07
On shares	\$915 00	Paid-up and prepaid stock—capital	80,400 00
Cash on hand and in bank	6,344 67	Advance payments	982 00
Other assets	506 30	Reserve and undivided profits	5,974 85
		Other liabilities	13,217 05
Total assets	\$408,364 97	Total liabilities	\$408,364 97
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Installment stock—dues	\$50,524 00	Overdrafts and bills payable	\$1,585 02
Paid-up and prepaid stock	28,400 00	Loans on mortgages and stock	100,157 75
Interest received	34,566 94	Dues repaid — installment stock	50,895 00
Fees received	52 20	Profits repaid — installment stock	12,819 70
Loans repaid	103,904 00	Paid-up and prepaid stock—capital	32,400 00
All other receipts	714 65	Paid-up and prepaid stock—dividends	4,347 36
		Salaries	2,127 00
		Taxes	6,072 44
		Other expenses	872 60
		All other disbursements	540 25
		Balance on hand and in bank	6,344 67
Total receipts	\$218,161 79	Total disbursements	\$218,161 79

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
11.....	120	\$120 00	\$181 20	\$181 20
13.....	108	108 00	154 76	154 76
15.....	96	96 00	131 02	131 02
17.....	84	84 00	109 44	103 08
19.....	72	72 00	89 96	82 77
21.....	60	60 00	72 15	67 29
23.....	48	48 00	55 44	51 72
25.....	36	36 00	40 18	38 09
27.....	24	24 00	25 80	24 90
29.....	12	12 00	12 45	12 20

No. 19—LOS ANGELES.

FIDELITY SAVINGS AND LOAN ASSOCIATION.

(Incorporated January 23, 1891.)

G. H. WADLEIGH, Secretary.

C. C. BOYNTON, President.

Fiscal year ends December 31, 1904.

No. of series, none.

No. of shares, 12,174.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$237,700 00	Installment stock—dues	\$112,025 60
Arrearages	138 55	Earnings apportioned	22,858 84
On interest	\$138 55	Paid-up and prepaid stock—capital	76,800 00
Cash on hand and in bank	5,902 78	Paid-up and prepaid stock—dividends	1,202 65
Real estate owned	5,500 00	Overdrafts and bills payable	16,000 00
Other assets	653 72	Reserve and undivided profits	17,118 53
		Other liabilities	3,889 43
Total assets	\$249,895 05	Total liabilities	\$249,895 05
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$7,241 88	Overdrafts and bills payable	\$25,000 00
Installment stock—dues	78,583 09	Loans on mortgages and stock	111,402 34
Paid-up and prepaid stock	31,500 00	Interest paid	1,424 40
Interest received	12,457 97	Dues repaid — installment stock	33,779 60
Premiums received	14,918 43	Profits repaid — installment stock	3,680 35
Fines received	247 11	Paid-up and prepaid stock—capital	9,300 00
Fees received	591 64	Paid-up and prepaid stock—dividends	3,613 90
Loans repaid	54,390 00	Salaries	1,500 00
Overdrafts and bills payable	15,000 00	Taxes	2,923 71
All other receipts	206 65	Other expenses	8,082 64
		All other disbursements	8,527 05
		Balance on hand and in bank	5,902 78
Total receipts	\$215,136 77	Total disbursements	\$215,136 77

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

	Age, in Months.	Total Dues per Share.	Loan Fund Dues per Share.	Book Value per Share.	Withdrawal Value.
Class "B," 70c. dues.	59	\$41 30	\$35 37	\$51 04	\$51 04
	47	32 90	27 81	37 05	37 05
	35	24 50	20 25	24 90	24 90
	24	16 80	13 32	15 25	15 25
	12	8 40	5 76	6 11	6 11

Other classes pro rata.

No. 20—LOS ANGELES.

PROTECTIVE SAVINGS MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated January 2, 1896.)

WM. G. BLEWETT, Secretary.

FERD. K. RULE, President.

Fiscal year ends February 28, 1905.

No. of series, none.

No. of shares, 10,286.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$418,134 49	Installment stock—dues	\$133,883 79
Arrearages	5,226 04	Earnings apportioned	19,744 72
On shares	\$1,631 65	Paid-up and prepaid stock—capital	258,933 14
On interest	1,652 52	Paid-up and prepaid stock—dividends	2,489 22
On premiums	1,652 58	Advance payments	1,665 01
On fines, etc.	289 29	Overdrafts and bills payable	42,000 00
Cash on hand and in bank	5,406 12	Reserve and undivided profits	146 55
Real estate owned	26,153 71	Other liabilities	2,598 11
Other assets	6,540 18		
Total assets	\$461,460 54	Total liabilities	\$461,460 54

<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$3,421 73	Overdrafts and bills payable	\$15,210 33
Installment stock—dues	31,069 60	Loans on mortgages and stock	63,577 87
Paid-up and prepaid stock	109,002 62	Interest paid	2,886 54
Interest received	18,191 75	Dues repaid — installment stock	32,379 52
Premiums received	18,191 76	Profits repaid — installment stock	6,447 14
Fines received	410 59	Paid-up and prepaid stock—capital	153,223 15
Fees received	14 40	Paid-up and prepaid stock—dividends	16,565 06
Loans repaid	123,776 92	Salaries	4,249 92
All other receipts	19,017 81	Taxes	3,195 23
		Other expenses	10,243 73
		All other disbursements	9,712 57
		Balance on hand and in bank	5,406 12
Total receipts	\$323,097 18	Total disbursements	\$323,097 18

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Age, in Months.		Total Dues per Share.	Loan Fund Dues per Share.	Book Value per Share.	Withdrawal Value.
Class "D." Dues 60c. per month.	96	\$57 60	\$46 92	\$65 91	Loan fund dues plus three fourths of profits.
	84	50 40	40 68	56 13	
	72	43 20	34 44	45 09	
	60	36 00	28 20	36 12	
	48	28 80	22 32	27 78	
	36	21 60	16 56	19 57	
	24	14 40	10 80	12 16	
	12	7 20	5 04	5 34	

No. 21—LOS ANGELES.

PROVIDENT MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated October 14, 1895.)

G. H. WADLEIGH, Secretary.

L. W. BLINN, President.

Fiscal year ends October 31, 1904.

No. of series, 36.

No. of shares, 40,769.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$1,180,229 70	Installment stock—dues	\$536,874 78
Arrearages	2,190 65	Earnings apportioned	243,993 81
On interest	\$2,190 65	Paid-up and prepaid stock—capital	285,600 00
Cash on hand and in bank	19,773 93	Paid-up and prepaid stock—dividends	6,041 00
Real estate owned	6,600 00	Overdrafts and bills payable	81,550 00
Other assets	6,121 26	Reserve and undivided profits	36,056 17
		Other liabilities	24,799 78
Total assets	\$1,214,915 54	Total liabilities	\$1,214,915 54
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$2,992 12	Overdrafts and bills payable	\$113,600 00
Installment stock—dues	204,980 64	Loans on mortgages and stock	392,815 32
Paid-up and prepaid stock	149,800 00	Interest paid	6,594 16
Interest received	62,450 81	Dues repaid — installment stock	62,504 94
Premiums received	71,234 67	Profits repaid — installment stock	25,746 58
Fines and fees received	1,418 04	Paid-up and prepaid stock—capital	80,600 00
Loans repaid	183,456 71	Paid-up and prepaid stock—dividends	14,573 07
Overdrafts and bills payable	73,000 00	Salaries	4,500 00
All other receipts	24,124 18	Taxes	7,236 66
		Other expenses	22,083 67
		All other disbursements	23,428 84
		Balance on hand and in bank	19,773 93
Total receipts	\$773,457 17	Total disbursements	\$773,457 17

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

CLASS B; DUES, 70c.

Serial No.	Age, in Months.	Total Dues per Share.	Loan Fund Dues per Share.	Book Value per Share.	Withdrawal Value.
9	84	\$58 80	\$51 12	\$88 46	\$88 46
13	72	50 40	43 56	69 22	69 22
17	60	42 00	36 00	52 63	52 63
21	48	33 60	28 44	38 34	38 34
25	36	25 20	20 88	26 01	26 01
29	24	16 80	13 32	15 38	15 38
33	12	8 40	5 76	6 22	6 22

No. 22—LOS ANGELES.

STATE MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated June 20, 1889.)

C. J. WADE, Secretary.

W. G. COCHRAN, President.

Fiscal year ends December 31, 1904.

No. of series, none.

No. of shares, 40,822.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$1,371,319 50	Installment stock—dues	\$440,643 95
Arrearages	1,396 15	Earnings apportioned	77,015 45
On interest	\$1,208 40	Paid-up and prepaid stock—capital	740,060 00
On fines, etc.	187 75	Paid-up and prepaid stock—dividends	84,646 20
Cash on hand and in bank	32,760 55	Advance payments	252 60
Other assets	7,571 60	Overdrafts and bills payable	25,000 00
		Reserve and undivided profits	37,268 90
		Other liabilities	8,160 70
Total assets	\$1,413,047 80	Total liabilities	\$1,413,047 80
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$31,499 51	Overdrafts and bills payable	\$22,500 00
Installment stock—dues	257,682 55	Loans on mortgages and stock	456,373 30
Paid-up and prepaid stock	127,800 00	Interest paid	2,957 03
Interest received	112,937 49	Dues repaid — installment stock	207,922 90
Fines and fees received	8,135 10	Profits repaid — installment stock	31,006 05
Loans repaid	430,952 70	Paid-up and prepaid stock—capital	148,725 00
Overdrafts and bills payable	2,500 00	Paid-up and prepaid stock—dividends	38,556 45
All other receipts	5,564 42	Salaries	10,521 77
		Taxes	28 20
		Other expenses	15,491 27
		All other disbursements	10,229 25
		Balance on hand and in bank	32,760 55
Total receipts	\$977,071 77	Total disbursements	\$977,071 77

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Age, in Months.	Total Dues per Share, Less Ad. Fee, \$1.00.	Loan Fund Dues per Share.	Book Value per Share.	Withdrawal Value.
114	\$67 40	\$67 40	\$97 29	\$97 29
108	63 80	63 80	90 00	90 00
96	56 60	56 60	76 45	76 45
84	49 40	49 40	64 05	64 05
72	42 20	42 20	52 71	52 71
60	35 00	35 00	42 17	42 17
48	27 80	27 80	32 57	32 57
36	20 60	20 60	23 04	23 04
24	13 40	13 40	14 41	14 41
12	6 20	6 20	6 41	6 41

No. 23—LOS ANGELES.

UNION MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated October 8, 1891.)

H. STURDEVANT, Secretary.

W. H. MATHER, President.

Fiscal year ends October 31, 1904.

No. of series, 40.

No. of shares, 4,348.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$131,364 68	Installment stock—dues	\$68,094 75
Arrearages	7,423 36	Earnings apportioned	2,919 17
On shares	\$4,553 51	Paid-up and prepaid stock—capital	64,800 00
On interest	2,639 92	Paid-up and prepaid stock—dividends	55 77
On premiums	261 75	Overdrafts and bills payable	13,800 00
On fines, etc.	68 18	Reserve and undivided profits	9,297 00
Cash on hand and in bank	3,995 24	Other liabilities	5,749 38
Real estate owned	5,859 97		
Other assets	16,072 82		
Total assets	\$164,716 07	Total liabilities	\$164,716 07
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$3,320 60	Overdrafts and bills payable	\$5,000 00
Installment stock—dues	23,176 64	Loans on mortgages and stock	37,858 86
Paid-up and prepaid stock	6,200 00	Interest paid	696 98
Interest received	10,939 81	Dues repaid — installment stock	26,660 90
Premiums received	1,075 63	Profits repaid — installment stock	3,788 39
Fines received	85 25	Paid-up and prepaid stock—capital	11,650 00
Fees received	57 25	Paid-up and prepaid stock—dividends	3,289 29
Loans repaid	51,770 26	Salaries	2,580 00
Overdrafts and bills payable	6,000 00	Taxes	298 53
All other receipts	5,973 86	Other expenses	7,997 10
		All other disbursements	4,784 01
		Balance on hand and in bank	3,995 24
Total receipts	\$108,599 30	Total disbursements	\$108,599 30

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Loan Fund Dues per Share.	Book Value per Share.	Withdrawal Value.
13	120	\$72 00	\$67 20	\$85 48	Varies with age.
17	108	64 80	61 20	65 10	
21	96	57 60	54 80	56 00	
25	84	50 40	48 80	50 48	
29	72	43 20	42 80	44 58	
33	60	36 00	35 60	36 98	
37	48	28 80	28 40	29 50	
41	36	21 60	21 60	22 50	
45	24	14 40	14 40	14 60	
49	12	7 20	7 20	7 20	

No. 24—LOS GATOS.

LOS GATOS BUILDING AND LOAN ASSOCIATION.

(Incorporated April 27, 1889.)

A. BERRYMAN, Secretary.

A. G. WILLIAMS, President.

Fiscal year ends April 30, 1905.

No. of series, 8.

No. of shares, 127.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$12,650 00	Installment stock—dues	\$7,764 00
Arrearages	43 35	Earnings apportioned	2,526 43
On shares	\$35 00	Advance payments	16 50
On interest	5 85	Overdrafts and bills payable	3,000 00
On premiums	2 50	Reserve and undivided profits	78 71
Cash on hand and in bank	739 29	Other liabilities	47 00
Total assets	\$13,432 64	Total liabilities	\$13,432 64
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$1,241 20	Loans on mortgages and stock	\$1,850 00
Installment stock—dues	1,507 50	Interest paid	169 01
Interest received	849 65	Dues repaid — installment	
Premiums received	341 50	stock	4,212 50
Fines received	20 95	Profits repaid — installment	
Fees received	4 55	stock	2,103 75
Loans repaid	4,500 00	Salaries	210 00
Overdrafts and bills payable	1,000 00	Taxes	142 96
All other receipts	2 00	Other expenses	35 95
		All other disbursements	3 89
		Balance on hand and in bank	739 29
Total receipts	\$9,467 35	Total disbursements	\$9,467 35

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
3	132	\$132 00	\$200 00	6
4	108	108 00	151 00	3 to 6
5	96	96 00	129 18	Dues plus 3 to 6
6	72	72 00	89 32	per cent.
7	48	48 00	55 22	
8	36	36 00	40 06	
9	24	24 00	25 84	
10	12	12 00	12 49	

No. 25—MERCED.

MERCED MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated June 22, 1891.)

M. D. Wood, Secretary.

W. E. LANDRUM, President.

Fiscal year ends June 30, 1905.

No. of series, 10.

No. of shares, 894.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$49,950 00	Installment stock—dues	\$39,528 00
Arrearages	288 25	Earnings apportioned	8,122 19
On shares	\$200 00	Reserve and undivided profits	45 71
On interest	62 05	Unearned premiums	6,298 41
On fines, etc.	26 20		
Cash on hand and in bank	3,756 06		
Total assets	\$53,994 31	Total liabilities	\$53,994 31
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Installment stock—dues	\$10,901 00	Overdrafts and bills payable	\$3,037 60
Interest received	3,245 80	Loans on mortgages and stock	6,600 00
Premiums received	1,188 00	Interest paid	70 32
Fines received	14 70	Dues repaid — installment	
Fees received	12 10	stock	2,365 00
Loans repaid	2,400 00	Profits repaid — installment	
		stock	356 80
		Salaries	360 00
		Taxes	829 45
		Other expenses	121 37
		All other disbursements	265 00
		Balance on hand and in bank	3,756 06
Total receipts	\$17,761 60	Total disbursements	\$17,761 60

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
7	120	\$120 00	\$176 28	\$156 30
8	108	108 00	151 72	137 43
9	96	96 00	129 27	119 28
10	84	84 00	108 52	101 85
11	72	72 00	89 29	85 14
12	60	60 00	71 63	69 15
13	48	48 00	55 26	53 88
14	36	36 00	39 75	39 33
15	24	24 00	25 70	25 50
16	12	12 00	12 43	12 39

No. 26—NAPA.

NAPA BUILDING AND LOAN ASSOCIATION.

(Incorporated April 22, 1886.)

T. N. MOUNT, Secretary.

E. D. BEARD, President.

Fiscal year ends May 16, 1905.

No. of series, 11.

No. of shares, 1,799.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$83,335 00	Installment stock—dues	\$71,659 00
Arrearages	20 35	Earnings apportioned	12,945 32
On shares	\$8 00	Reserve and undivided profits	21 96
On interest	10 50	Other liabilities	797 00
On fines, etc.	1 85		
Cash on hand and in bank	1,917 93		
Other assets	150 00		
Total assets	\$85,423 28	Total liabilities	\$84,423 28
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$2,812 03	Overdrafts and bills payable	\$10,200 00
Installment stock—dues	22,087 00	Loans on mortgages and stock	25,032 75
Interest received	6,901 17	Interest paid	102 16
Premiums received	31 45	Dues repaid — installment	9,007 00
Fines received	53 51	stock	
Loans repaid	17,940 00	Profits repaid — installment	1,369 35
All other receipts	230 98	stock	480 00
		Salaries	1,703 71
		Taxes	176 15
		Other expenses	67 09
		All other disbursements	1,917 93
		Balance on hand and in bank	
Total receipts	\$50,056 14	Total disbursements	\$50,056 14

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
10	125	\$125 00	\$187 72	Dues plus 5 per cent.
11	113	113 00	162 32	
12	101	101 00	138 67	
13	89	89 00	116 78	
14	77	77 00	96 65	
15	65	65 00	78 23	
16	53	53 00	61 65	
17	41	41 00	45 96	
18	29	29 00	31 43	
19	17	17 00	17 81	
20	5	5 00	5 07	

No. 27—NEWCASTLE.

NEWCASTLE BUILDING AND LOAN ASSOCIATION.

(Incorporated May 23, 1889.)

• ED. KATZENSTEIN, Secretary.

C. H. KELLOGG, President.

Fiscal year ends May 26, 1905.

No. of series, 10.

No. of shares, 336.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$20,700 00	Installment stock—dues	\$19,488 00
Arrearages	275 15	Earnings apportioned	6,517 64
On shares	\$122 00	Advance payments	43 00
On interest	110 55	Reserve and undivided profits	18 01
On premiums	26 00		
On fines, etc.	16 60		
Cash on hand and in bank	4,341 50		
Real estate owned	700 00		
Other assets	50 00		
Total assets	\$26,066 65	Total liabilities	\$26,066 65
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$1,791 60	Overdrafts and bills payable	\$1,750 00
Installment stock—dues	3,887 90	Loans on mortgages and stock	2,000 00
Interest received	1,874 22	Interest paid	141 65
Premiums received	487 85	Dues repaid — installment	
Fines received	8 10	stock	950 00
Fees received	2 80	Profits repaid — installment	
Loans repaid	2,150 00	stock	458 75
All other receipts	63 00	Salaries	214 50
		Taxes	373 57
		Other expenses	35 50
		Balance on hand and in bank	4,341 50
Total receipts	\$10,265 47	Total disbursements	\$10,265 47

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
7	120	\$120 00	\$183 50	\$177 15
8	108	108 00	159 43	154 29
9	96	96 00	136 64	132 57
10	84	84 00	115 11	108 89
11	72	72 00	94 86	88 00
12	60	60 00	75 87	67 93
13	48	48 00	58 16	52 06
14	36	36 00	41 71	37 71
15	24	24 00	26 54	24 50
16	12	12 00	12 63	12 03

No. 28—OAKLAND.

HOME SECURITY LOAN SOCIETY.

(Incorporated December 20, 1875.)

C. P. HOAG, Secretary.

C. W. KINSEY, President.

Fiscal year ends June 30, 1905.

No. of series, none.

No. of shares, 2,140.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock.....	\$211,542 27	Installment stock—dues.....	\$73,090 51
Arrearages.....	2,072 76	Earnings apportioned.....	17,444 11
On interest.....	\$2,029 41	Paid-up and prepaid stock—	
On premiums.....	43 35	capital.....	65,903 00
Cash on hand and in bank....	3,987 75	Paid-up and prepaid stock—	
Real estate owned.....	9,231 81	dividends.....	7,984 23
Other assets.....	564 10	Advance payments.....	16 85
		Overdrafts and bills payable.....	48,836 64
		Reserve and undivided profits.....	704 10
		Other liabilities.....	13,419 25
Total assets.....	\$227,398 69	Total liabilities.....	\$227,398 69

<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Installment stock—dues.....	\$14,788 14	Overdrafts and bills payable.....	\$14,671 64
Paid-up and prepaid stock.....	38,943 00	Loans on mortgages and stock.....	62,072 92
Interest received.....	21,390 37	Interest paid.....	2,584 59
Fines and fees received.....	240 66	Dues repaid — installment	
Loans repaid.....	96,082 84	stock.....	37,769 10
Overdrafts and bills payable.....	6,473 93	Profits repaid — installment	
All other receipts.....	5,087 95	stock.....	9,483 34
		Paid-up and prepaid stock—	
		capital.....	34,125 00
		Paid-up and prepaid stock—	
		dividends.....	2,061 40
		Salaries.....	2,622 00
		Taxes.....	4,403 05
		Other expenses.....	1,740 37
		All other disbursements.....	7,485 73
		Balance on hand and in bank.....	3,987 75
Total receipts.....	\$183,006 89	Total disbursements.....	\$183,006 89

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Dayton plan.

Dividend 1904-05—5 per cent.

Book value—Dues plus dividend.

Withdrawal value—Book value less 2 per cent.

No. 29—EAST OAKLAND.

BROOKLYN INVESTMENT AND LOAN ASSOCIATION.

(Incorporated October 14, 1889.)

J. A. WEBSTER, Secretary.

C. H. DALY, President.

Fiscal year ends October 20, 1904.

No. of series, 37.

No. of shares, 1,006½.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$47,085 95	Installment stock—dues.....	\$23,122 20
Arrearages	1,295 00	Earnings apportioned	5,858 33
On shares	\$481 60	Advance payments	13 50
On interest	786 15	Overdrafts and bills payable.....	20,300 00
On premiums	27 25	Reserve and undivided profits	2,004 58
Cash on hand and in bank	324 82	Other liabilities	153 16
Real estate owned	2,550 00		
Other assets	196 00		
Total assets.....	\$51,451 77	Total liabilities	\$51,451 77
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Installment stock—dues.....	\$4,041 95	Overdrafts and bills payable.....	\$17,417 70
Interest received	3,374 98	Loans on mortgages and stock	11,072 25
Premiums received	90 35	Interest paid	1,027 21
Fines received	4 55	Dues repaid — installment	5,298 50
Loans repaid	8,396 78	stock	1,891 82
Overdrafts and bills payable..	19,400 00	Profits repaid — installment	892 50
All other receipts	4,353 25	stock	872 09
		Salaries	293 07
		Taxes	571 90
		Other expenses	324 82
		All other disbursements	
		Balance on hand and in bank	
Total receipts.....	\$39,661 86	Total disbursements.....	\$39,661 86

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
19.....	120	\$60 00	\$78 40	Dues plus 4½%.
23.....	108	54 00	68 56	
27.....	96	48 00	59 28	
33.....	78	39 00	46 23	
39.....	60	30 00	34 16	
43.....	48	24 00	26 60	
47.....	36	18 00	19 50	
51.....	24	12 00	12 66	
55.....	12	6 00	6 16	

No. 30—EAST OAKLAND.

COSMOPOLITAN MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated August 4, 1879.)

W. S. GOULD, Secretary.

D. SYMMES, President.

Fiscal year ends July 31, 1904.

No. of series, 23.

No. of shares, 3,531½.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$174,055 24	Installment stock—dues	\$103,217 35
Arrearages	5,799 24	Earnings apportioned	17,288 40
On shares	\$2,198 81	Advance payments	36,084 97
On interest	3,346 98	Overdrafts and bills payable	34,300 00
On premiums	3 45	Reserve and undivided profits	2,002 27
On fines, etc.	250 00	Other liabilities	5,390 13
Cash on hand and in bank	5,677 07		
Real estate owned	11,633 92		
Other assets	1,117 65		
Total assets	\$198,283 12	Total liabilities	\$198,283 12

<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$3,332 98	Overdrafts and bills payable	\$45,300 00
Installment stock—dues	50,800 27	Loans on mortgages and stock	71,104 57
Interest received	14,645 93	Interest paid	3,985 70
Premiums received	119 11	Dues repaid — installment	
Fines received	1 75	stock	35,553 75
Loans repaid	65,688 97	Profits repaid — installment	
Overdrafts and bills payable	36,300 00	stock	4,005 89
All other receipts	6,500 43	Salaries	2,292 50
		Taxes	3,814 71
		Other expenses	696 90
		All other disbursements	4,958 35
		Balance on hand and in bank	5,677 07
Total receipts	\$177,389 44	Total disbursements	\$177,389 44

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
30	132	\$132 00	\$178 58	\$176 25
32	120	120 00	156 22	154 40
34	108	108 00	135 92	131 73
36	96	96 00	117 21	111 90
38	84	84 00	99 55	94 10
40	72	72 00	83 30	78 78
42	60	60 00	67 74	63 87
44	48	48 00	52 91	50 45
46	36	36 00	38 72	37 36
48	24	24 00	25 17	24 58
50	12	12 00	12 28	12 14

No. 31—WEST OAKLAND.

WEST OAKLAND MUTUAL LOAN ASSOCIATION.

(Incorporated July 21, 1875.)

A. SEABORO, Secretary.

C. A. MALM, President.

Fiscal year ends August 31, 1904.

No. of series, 13.

No. of shares, 504.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$32,981 69	Installment stock—dues	\$35,395 50
Arrearages	941 60	Earnings apportioned	5,807 80
On shares	\$403 00	Advance payments	27 00
On interest	361 00	Reserve and undivided profits	1,108 95
On premiums	1 20	Other liabilities	100 00
On fines, etc.	176 40		
Cash on hand and in bank	7,836 33		
Real estate owned	306 57		
Other assets	373 06		
Total assets	\$42,439 25	Total liabilities	\$42,439 25
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$7,373 90	Loans on mortgages and stock	\$2,200 00
Installment stock—dues	6,338 00	Interest paid	5 00
Interest received	2,346 33	Dues repaid — installment	
Premiums received	227 00	stock	14,040 00
Fines received	54 00	Profits repaid — installment	
Loans repaid	11,318 66	stock	3,162 92
All other receipts	1,467 84	Salaries	900 00
		Taxes	665 64
		Other expenses	299 01
		All other disbursements	16 83
		Balance on hand and in bank	7,836 33
Total receipts	\$29,125 73	Total disbursements	\$29,125 73

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
15.....	156	\$156 00	\$198 91	\$194 93
16.....	144	144 00	179 39	175 80
17.....	132	132 00	160 23	157 03
18.....	120	120 00	142 50	139 65
19.....	108	108 00	125 87	123 35
20.....	96	96 00	110 20	108 00
21.....	84	84 00	95 00	93 10
22.....	72	72 00	80 23	78 63
23.....	60	60 00	65 78	64 47
24.....	48	48 00	51 73	50 70
25.....	36	36 00	38 14	37 38
26.....	24	24 00	24 94	24 44
27.....	12	12 00	12 25	12 12

No. 32—ONTARIO.

PEOPLE'S MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated June 24, 1891.)

I. S. MILLER, Secretary.

A. P. HARWOOD, President.

Fiscal year ends May 31, 1905.

No. of series, none.

No. of shares, 4,007.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$140,305 00	Installment stock—dues	\$74,873 19
Cash on hand and in bank	1,386 45	Earnings apportioned	4,647 91
Real estate owned	8,564 52	Overdrafts and bills payable	67,582 54
		Reserve and undivided profits	781 98
		Other liabilities	2,370 35
Total assets	\$150,255 97	Total liabilities	\$150,255 97

<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Installment stock—dues	\$36,425 61	Overdrafts and bills payable	\$18,864 06
Interest received	9,526 09	Loans on mortgages and stock	27,550 53
Fines received	309 20	Interest paid	3,905 39
Loans repaid	19,434 64	Dues and profits repaid—in-	
Overdrafts and bills payable	21,559 72	stallment stock	28,222 67
All other receipts	284 47	Salaries	900 00
		Other expenses	174 11
		All other disbursements	6,536 52
		Balance on hand and in bank	1,386 45
Total receipts	\$87,539 73	Total disbursements	\$87,539 73

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Dayton plan.

Dividend last year— $7\frac{1}{4}$ per cent.

Book value—Dues plus dividend.

Withdrawal value—Book value less 1 per cent.

No. 33—ORANGE.

ORANGE BUILDING AND LOAN ASSOCIATION.

(Incorporated September 17, 1887.)

D. R. COLLINGS, Secretary.

D. C. PIXLEY, President.

Fiscal year ends October 30, 1904.

No. of series, 10.

No. of shares, 1,677.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$124,225 00	Installment stock - dues	\$87,634 50
Arrearages	596 40	Earnings apportioned	28,024 22
On shares	\$233 13	Advance payments	459 10
On interest	212 12	Overdrafts and bills payable	7,900 00
On premiums	86 10	Reserve and undivided profits	253 81
On fines, etc.	65 05	Other liabilities	4,070 00
Cash on hand and in bank	3,403 12		
Other assets	117 11		
Total assets	\$128,341 63	Total liabilities	\$128,341 63
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$1,210 69	Overdrafts and bills payable	\$9,000 00
Installment stock—dues	19,943 65	Loans on mortgages and stock	48,755 00
Interest received	6,724 81	Interest paid	519 89
Premiums received	2,722 18	Dues repaid — installment stock	4,213 00
Fines received	189 46	Profits repaid — installment stock	1,418 56
Fees received	72 63	Salaries	462 50
Loans repaid	23,675 00	Taxes	113 15
Overdrafts and bills payable	13,400 00	Other expenses	174 57
All other receipts	148 62	All other disbursements	27 25
		Balance on hand and in bank	3,403 12
Total receipts	\$68,087 04	Total disbursements	\$68,087 04

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
2	114	\$114 00	\$172 71	\$158 97
3	102	102 00	147 14	135 85
4	90	90 00	124 68	114 28
5	78	78 00	103 56	94 61
6	66	66 00	83 83	76 70
7	54	54 00	65 79	59 89
8	42	42 00	49 05	44 82
9	30	30 00	33 60	30 72
10	18	18 00	19 36	18 14
11	6	6 00	6 15	6 00

No. 34—PALO ALTO.

PALO ALTO MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated November 14, 1892.)

MARSHALL BLACK, Secretary.

D. L. SLOAN, President.

Fiscal year ends November 30, 1904.

No. of series, 32.

No. of shares, 3,199.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$239,100 00	Installment stock—dues	\$67,095 30
Arrearages	923 40	Earnings apportioned	18,808 09
On shares	\$923 40	Paid-up and prepaid stock—capital	51,200 00
Cash on hand and in bank	1,306 25	Advance payments	2,289 90
Other assets	491 05	Overdrafts and bills payable	69,472 00
		Reserve and undivided profits	1,766 75
		Other liabilities	31,188 66
Total assets	\$241,820 70	Total liabilities	\$241,820 70

<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$95 50	Overdrafts and bills payable	\$8,245 00
Installment stock—dues	21,774 80	Loans on mortgages and stock	140,319 30
Paid-up and prepaid stock	35,000 00	Interest paid	3,067 57
Interest received	16,193 93	Dues repaid — installment stock	12,219 30
Premiums received	823 25	Profits repaid — installment stock	3,014 50
Fees received	125 90	Paid-up and prepaid stock—capital	5,800 00
Loans repaid	73,000 00	Paid-up and prepaid stock—dividends	1,531 15
Overdrafts and bills payable	27,753 00	Salaries	1,499 20
All other receipts	6,632 66	Taxes	1,734 64
		Other expenses	431 13
		All other disbursements	2,231 00
		Balance on hand and in bank	1,306 25
Total receipts	\$181,399 04	Total disbursements	\$181,399 04

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
4	120	\$120 00	\$200 00	\$200 00
6	105	105 00	165 25	165 25
7	96	96 00	144 96	126 72
10	84	84 00	120 48	107 52
14	72	72 00	98 11	84 91
18	60	60 00	78 06	70 50
22	48	48 00	59 73	53 76
26	36	36 00	42 58	39 24
30	24	24 00	26 94	25 44
34	12	12 00	12 70	12 36

No. 35—PASADENA.

LOS ANGELES COUNTY MUTUAL BUILDING AND LOAN
ASSOCIATION.

(Incorporated February 16, 1899.)

ISAAC SPRINGER, Secretary.

SOLON BRIGGS, President.

Fiscal year ends December 31, 1904.

No. of series, none.

No. of shares, 8,081.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$128,890 00	Installment stock—dues	\$62,026 83
Arrearages	287 65	Earnings apportioned	8,144 45
On interest	\$287 65	Paid-up and prepaid stock—capital	44,750 00
Cash on hand and in bank	4,762 27	Paid-up and prepaid stock—dividends	1,138 29
Other assets	506 60	Overdrafts and bills payable	10,293 54
		Reserve and undivided profits	1,162 00
		Other liabilities	6,931 41
Total assets	\$134,446 52	Total liabilities	\$134,446 52
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$1,625 39	Overdrafts and bills payable	\$33,500 00
Installment stock—dues	65,068 96	Loans on mortgages and stock	54,847 14
Paid-up and prepaid stock	11,700 00	Interest paid	982 35
Interest received	8,752 89	Dues repaid — installment stock	48,581 60
Fines received	10 20	Profits repaid — installment stock	1,322 20
Fees received	25	Paid-up and prepaid stock—capital	11,700 00
Loans repaid	51,163 22	Paid-up and prepaid stock—dividends	2,124 38
Overdrafts and bills payable	21,793 54	Salaries	1,540 00
All other receipts	111 13	Taxes	11 52
		Other expenses	830 17
		All other disbursements	23 95
		Balance on hand and in bank	4,762 27
Total receipts	\$160,225 58	Total disbursements	\$160,225 58

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Dayton plan.

Dues—50 cents per share per month.

Dividend 1904—10 per cent.

Book value—Dues and dividend.

Withdrawal value—Same as book value.

No. 36—PASADENA.

MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated July 20, 1892.)

R. H. PINNEY, Secretary.

A. K. NASH, President.

Fiscal year ends June 30, 1905.

No. of series, 15.

No. of shares, 4,503.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$151,523 20	Installment stock—dues	\$43,621 10
Arrearages	516 90	Earnings apportioned	9,693 50
On shares	\$184 50	Paid-up and prepaid stock—capital	81,602 00
On int. and premiums	309 05	Paid-up and prepaid stock—dividends	10,037 10
On fines, etc.	23 35	Advance payments	269 55
Cash on hand and in bank	3,967 96	Overdrafts and bills payable	4,990 70
Real estate owned	95 45	Reserve and undivided profits	6,796 96
Other assets	907 40		
Total assets	\$157,010 91	Total liabilities	\$157,010 91
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$3,775 91	Overdrafts and bills payable	\$14,405 00
Installment stock—dues	18,450 95	Loans on mortgages and stock	70,043 00
Paid-up and prepaid stock	33,547 00	Dues repaid — installment stock	16,595 46
Interest received	13,994 80	Profits repaid — installment stock	6,887 22
Fines and fees received	1,001 15	Paid-up and prepaid stock—capital	29,977 00
Loans repaid	58,069 80	Salaries	2,717 00
Overdrafts and bills payable	17,895 70	Other expenses	1,705 30
All other receipts	1,777 23	All other disbursements	2,214 60
Total receipts	\$148,512 54	Balance on hand and in bank	3,967 96
		Total disbursements	\$148,512 54

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Plan—Serial and Dayton combined.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
7	120	\$60 00	\$94 47	\$91 02
9	108	54 00	80 34	77 70
11	96	48 00	67 68	65 71
13	84	42 00	56 31	54 87
15	72	36 00	46 00	43 50
17	60	30 00	36 71	34 02
19	48	24 00	28 18	26 09
21	36	18 00	20 27	19 13

Dayton stock—Book value, dues plus dividend; Withdrawal value, same as book value.

No. 37.—PETALUMA.

PETALUMA MUTUAL LOAN ASSOCIATION.

(Incorporated September, 1889.)

F. A. CROMWELL, Secretary.

F. H. DENMAN, President.

Fiscal year ends September 30, 1904.

No. of series, 10.

No. of shares, 550.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$30,630 00	Installment stock—dues	\$26,034 00
Arrearages	644 25	Earnings apportioned	5,411 21
On shares	\$194 10	Reserve and undivided profits	48 91
On interest	208 10	Other liabilities	280 05
On premiums	142 05		
On fines, etc.	100 00		
Cash on hand and in bank	499 92		
Total assets	\$31,774 17	Total liabilities	\$31,774 17
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$5,292 36	Overdrafts and bills payable	\$3,000 00
Installment stock—dues	6,848 40	Loans on mortgages and stock	15,225 00
Interest received	2,060 55	Interest paid	72 85
Premiums received	61 50	Dues repaid — installment	
Fines received	143 55	stock	5,178 50
Loans repaid	8,600 00	Profits repaid — installment	
Overdrafts and bills payable	3,000 00	stock	1,211 23
All other receipts	5 05	Salaries	420 00
		Taxes	307 31
		Other expenses	96 60
		Balance on hand and in bank	499 92
Total receipts	\$26,011 41	Total disbursements	\$26,011 41

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
5	144	\$144 00	\$198 24	Dues plus 4 percent.
6	132	132 00	176 05	
7	120	120 00	155 46	
8	108	108 00	135 80	
9	96	96 00	117 40	
12	60	60 00	67 93	
13	48	48 00	52 98	
14	36	36 00	38 80	
15	24	24 00	25 26	
16	12	12 00	12 32	

No. 38—PLEASANTON.

PLEASANTON MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated March 1, 1895.)

THOS. H. SILVER, Secretary.

WILLIAM HENRY COPE, President.

Fiscal year ends March 22, 1905.

No. of series, 17.

No. of shares, 415.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$16,650 00	Installment stock—dues	\$15,408 00
Cash on hand and in bank	1,772 05	Earnings apportioned	3,014 05
Total assets	\$18,422 05	Total liabilities	\$18,422 05
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$274 84	Loans on mortgages and stock	\$1,400 00
Installment stock—dues	5,219 00	Interest paid	4 75
Interest received	1,048 00	Dues repaid — installment	
Premiums received	523 00	stock	4,619 00
Fees received	28 20	Profits repaid — installment	
Loans repaid	2,200 00	stock	1,111 51
Total receipts	\$9,293 04	Salaries	75 00
		Taxes	288 83
		Other expenses	21 90
		Balance on hand and in bank	1,772 05
		Total disbursements	\$9,293 04

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
1	120	\$120 00	\$175 78	Book value less 1 per cent of profits.
2	108	108 00	152 65	
4	96	96 00	129 96	
8	72	72 00	89 93	
10	60	60 00	72 25	
12	48	48 00	55 69	
14	36	36 00	40 23	
16	24	24 00	25 82	
18	12	12 00	12 42	

No. 39—POMONA.

MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated December 24, 1892.)

C. I. LORBEER, Secretary.

J. T. BRADY, President.

Fiscal year ends December 31, 1904.

No. of series, 21.

No. of shares, 4,738.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$170,405 00	Installment stock—dues.....	\$71,553 00
Arrearages.....	541 85	Earnings apportioned.....	16,645 08
On shares.....	\$305 00	Paid-up and prepaid stock—	
On interest.....	125 55	capital.....	80,500 00
On premiums.....	62 30	Advance payments.....	242 00
On fines, etc.....	49 00	Reserve and undivided profits	850 07
Cash on hand and in bank.....	3,144 30	Other liabilities.....	6,850 00
Real estate owned.....	2,034 10		
Other assets.....	514 90		
Total assets.....	\$176,640 15	Total liabilities.....	\$176,640 15
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report.....	\$2,667 40	Overdrafts and bills payable.....	\$6,000 00
Installment stock—dues.....	23,654 00	Loans on mortgages and stock	53,093 40
Paid-up and prepaid stock.....	76,200 00	Interest paid.....	109 23
Interest received.....	9,542 05	Dues repaid — installment	
Premiums received.....	4,853 10	stock.....	18,596 50
Fines received.....	91 40	Profits repaid — installment	
Fees received.....	210 60	stock.....	7,360 76
Loans repaid.....	23,230 00	Paid-up and prepaid stock—	
Overdrafts and bills payable.....	6,000 00	capital.....	49,900 00
All other receipts.....	322 50	Paid-up and prepaid stock—	
		dividends.....	3,670 20
		Salaries.....	1,637 50
		Taxes.....	2,784 86
		Other expenses.....	312 15
		All other disbursements.....	162 15
		Balance on hand and in bank	3,144 30
Total receipts.....	\$146,771 05	Total disbursements.....	\$146,771 05

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
5.....	120	\$60 00	\$90 23	\$90 23
7.....	108	54 00	77 37	71 62
9.....	96	48 00	65 63	61 16
11.....	84	42 00	55 01	51 87
13.....	72	36 00	45 35	43 10
15.....	60	30 00	36 37	34 84
17.....	48	24 00	28 00	27 04
19.....	36	18 00	20 23	19 67
21.....	24	12 00	12 98	12 73
23.....	12	6 00	6 24	6 18

No. 40--REDWOOD CITY.

SAN MATEO COUNTY BUILDING AND LOAN ASSOCIATION.

(Incorporated May 8, 1890.)

GEO. W. LOVIE, Secretary.

P. P. CHAMBERLIN, President.

Fiscal year ends May 31, 1905.

No. of series, 40.

No. of shares, 3,131.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$218,125 78	Installment stock--dues	\$129,668 70
Arrearages	2,095 90	Earnings apportioned	46,303 31
On shares	\$602 80	Advance payments	169 91
On interest	1,443 10	Overdrafts and bills payable	40,673 70
On premiums	50 00	Reserve and undivided profits	3,347 60
Cash on hand and in bank	104 55	Other liabilities	573 00
Other assets	410 05		
Total assets	\$220,736 28	Total liabilities	\$220,736 28
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Installment stock--dues	\$28,065 60	Overdrafts and bills payable	\$16,775 18
Interest received	20,854 08	Loans on mortgages and stock	76,448 20
Premiums received	1,185 95	Interest paid	1,886 49
Fines received	41 85	Dues repaid -- installment stock	28,107 10
Fees received	151 75	Profits repaid -- installment stock	14,589 74
Loans repaid	52,166 24	Salaries	1,637 50
Overdrafts and bills payable	39,673 76	Taxes	3,690 32
All other receipts	1,968 10	Other expenses	388 70
		All other disbursements	479 55
		Balance on hand and in bank	104 55
Total receipts	\$144,107 33	Total disbursements	\$144,107 33

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
11	120	\$120 00	\$188 12	\$163 30
15	108	108 00	161 46	142 37
19	96	96 00	136 95	122 63
23	84	84 00	114 41	104 00
27	72	72 00	93 68	86 42
31	60	60 00	74 62	69 84
35	48	48 00	57 10	54 20
39	36	36 00	40 98	39 44
43	24	24 00	26 17	25 52
47	12	12 00	12 55	12 26

No. 41—RIVERSIDE.

RIVERSIDE MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated April 5, 1901.)

M. S. BOWMAN, Secretary.

W. B. CLANCY, President.

Fiscal year ends April 30, 1905.

No. of series, none.

No. of shares, 1,581.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$59,650 00	Installment stock—dues	\$14,588 16
Cash on hand and in bank	3,106 10	Earnings apportioned	1,750 88
Other assets	75 46	Paid-up and prepaid stock— capital	44,600 00
		Paid-up and prepaid stock— dividends	1,517 64
		Reserve and undivided profits	339 41
		Other liabilities	35 47
Total assets	\$62,831 56	Total liabilities	\$62,831 56
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$1,625 33	Loans on mortgages and stock	\$21,240 00
Installment stock—dues	9,432 90	Dues repaid — installment stock	5,505 25
Paid-up and prepaid stock	15,200 00	Profits repaid — installment stock	219 01
Interest received	4,586 19	Paid-up and prepaid stock— capital	1,700 00
Loans repaid	3,680 00	Paid-up and prepaid stock— dividends	2,136 58
All other receipts	41 72	Salaries	612 61
		Taxes	15 19
		Other expenses	31 40
		Balance on hand and in bank	3,106 10
Total receipts	\$34,566 14	Total disbursements	\$34,566 14

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Dayton plan.

Dividend—7 per cent.

Book value—Dues plus dividend.

Withdrawal value—Same as book value.

No. 42—SACRAMENTO.

GERMANIA BUILDING AND LOAN ASSOCIATION.

(Incorporated December 31, 1872.)

H. J. GOETHE, Secretary.

CHARLES SCHMITT, President.

Fiscal year ends December 31, 1904.

No. of series, 15.

No. of shares, 2,703.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$199,135 65	Installment stock—dues	\$169,692 00
Arrearages	4,878 77	Earnings apportioned	37,777 85
On interest	\$4,878 77	Advance payments	52 55
Cash on hand and in bank	12,737 51	Overdrafts and bills payable	19,000 00
Real estate owned	16,020 00	Reserve and undivided profits	6,999 53
Other assets	750 00		
Total assets	\$233,521 93	Total liabilities	\$233,521 93
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$2,655 41	Overdrafts and bills payable	\$16,350 00
Installment stock—dues	36,784 00	Loans on mortgages and stock	99,362 91
Interest received	9,397 50	Interest paid	504 58
Loans repaid	103,663 32	Dues repaid — installment stock	60,637 00
Overdrafts and bills payable	33,750 00	Profits repaid — installment stock	4,208 31
All other receipts	31,992 58	Salaries	2,700 00
		Taxes	1,429 55
		Other expenses	2,281 98
		All other disbursements	18,030 97
		Balance on hand and in bank	12,737 51
Total receipts	\$218,242 81	Total disbursements	\$218,242 81

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
8	144	\$144 00	\$181 85	Dues plus profits fixed by Directors.
9	132	132 00	167 10	
10	120	120 00	147 70	
11	108	108 00	129 61	
12	96	96 00	112 59	
13	84	84 00	96 33	
14	72	72 00	80 70	
15	60	60 00	65 93	
16	48	48 00	51 71	
17	36	36 00	38 05	
19	24	24 00	24 89	
21	12	12 00	12 22	

No. 43—SACRAMENTO.

SACRAMENTO BUILDING AND LOAN ASSOCIATION.

(Incorporated August 26, 1874.)

FRANK HICKMAN, Secretary.

J. H. ARNOLD, President.

Fiscal year ends August 31, 1904.

No. of series, none.

No. of shares, 2,937.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$175,530 29	Installment stock—dues	\$143,960 95
Arrearages	1,963 30	Earnings apportioned	37,687 34
On interest	\$1,963 30	Overdrafts and bills payable	125 90
Real estate owned	22,183 40	Reserve and undivided profits	17,666 85
Other assets	351 75	Other liabilities	587 70
Total assets	\$200,028 74	Total liabilities	\$200,028 74

<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Installment stock—dues	\$31,748 00	Overdrafts and bills payable	\$2,210 19
Interest received	13,143 33	Loans on mortgages and stock	51,761 00
Loans repaid	51,147 17	Interest paid	781 78
Overdrafts and bills payable	125 90	Dues repaid — installment stock	33,071 00
All other receipts	2,208 23	Profits repaid — installment stock	7,443 16
		Salaries	1,500 00
		Taxes	1,106 21
		Other expenses	478 04
		All other disbursements	21 25
Total receipts	\$98,372 63	Total disbursements	\$98,372 63

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
17	132	\$132 00	\$185 97	Full book value.
18	120	120 00	162 88	
19	108	108 00	141 43	
20	96	96 00	121 39	
21	84	84 00	102 60	
22	72	72 00	85 25	

Dayton Plan—Dividend, 5 per cent; book value, dues plus dividend: withdrawal value, same as book value.

No. 44—SAN BERNARDINO.

SANTA FÉ BUILDING AND LOAN ASSOCIATION.

(Incorporated January 8, 1890.)

JOHN FLAGG, Secretary.

J. F. PARKER, President.

Fiscal year ends December 31, 1904.

No. of series, 10.

No. of shares, 3,926.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$228,095 00	Installment stock—dues	\$135,458 00
Arrearages	1,026 20	Earnings apportioned	36,049 46
On shares	\$456 00	Paid-up and prepaid stock—	
On interest	508 65	capital	41,850 00
On fines, etc.	61 55	Overdrafts and bills payable	1,862 28
Other assets	299 60	Reserve and undivided profits	1,859 36
		Other liabilities	12,341 70
Total assets	\$229,420 80	Total liabilities	\$229,420 80
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$2,131 31	Loans on mortgages and stock	\$72,886 40
Installment stock—dues	42,996 00	Dues repaid — installment	
Paid-up and prepaid stock	13,700 00	stock	22,770 00
Interest received	16,811 20	Profits repaid — installment	
Fines received	164 15	stock	6,810 60
Loans repaid	38,251 10	Paid-up and prepaid stock—	
Overdrafts and bills payable	1,862 28	capital	9,600 00
		Paid-up and prepaid stock—	
		dividends	2,323 60
		Salaries	1,078 00
		Taxes	56 63
		Other expenses	321 81
		All other disbursements	69 00
Total receipts	\$115,916 04	Total disbursements	\$115,916 04

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
4	120	\$120 00	\$201 39	\$201 39
5	108	108 00	164 94	164 94
6	96	96 00	139 17	134 46
7	84	84 00	116 08	109 66
8	72	72 00	94 98	88 08
9	60	60 00	75 58	69 30
10	48	48 00	57 72	52 86
11	36	36 00	41 36	38 68
12	24	24 00	26 35	25 67
13	12	12 00	12 69	12 35

No. 45—SAN DIEGO.

SAN DIEGO BUILDING AND LOAN ASSOCIATION.

(Incorporated July 14, 1885.)

THEO. FINTZELBERG, Secretary.

A. BLOCHMAN, President.

Fiscal year ends July 1, 1904.

No of series, 14.

No. of shares, 4,784.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$267,412 00	Installment stock—dues	\$225,763 00
Arrearages	605 60	Earnings apportioned	47,303 76
On shares	\$317 00	Advance payments	2,187 95
On interest	255 60	Reserve and undivided profits	5,239 23
On premiums	14 40	Other liabilities	150 00
On fines, etc.	18 60		
Cash on hand and in bank	10,951 34		
Real estate owned	1,300 00		
Other assets	375 00		
Total assets	\$280,643 94	Total liabilities	\$280,643 94
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$208 04	Overdrafts and bills payable	\$2,000 00
Installment stock—dues	57,382 00	Loans on mortgages and stock	115,245 00
Interest received	22,557 26	Interest paid	204 58
Premiums received	452 55	Dues repaid — installment	24,223 00
Fines received	135 61	stock	
Fees received	125 50	Profits repaid — installment	4,090 63
Loans repaid	75,225 00	stock	
All other receipts	8,319 00	Salaries	1,380 00
Total receipts	\$164,404 96	Taxes	5,817 33
		Other expenses	361 50
		All other disbursements	131 58
		Balance on hand and in bank	10,951 34
		Total disbursements	\$164,404 96

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
7	131	\$131 00	\$196 76	\$168 62
8	119	119 00	171 68	149 74
9	107	107 00	147 94	131 58
10	95	95 00	126 42	114 14
11	83	83 00	106 46	97 42
12	71	71 00	87 81	81 42
13	59	59 00	70 31	66 15
14	47	47 00	54 06	51 52
15	35	35 00	38 89	37 49
16	30	30 00	32 84	31 82
17	24	24 00	25 81	25 16
18	18	18 00	19 02	18 64
19	12	12 00	12 44	12 28
20	6	6 00	6 10	6 06

No. 46—SAN DIEGO.

SILVER GATE BUILDING AND LOAN ASSOCIATION.

(Incorporated May 22, 1890.)

H. P. Wood, Secretary.

W. M. HERBERT, President.

Fiscal year ends May 31, 1905.

No. of series, 18.

No. of shares, 1,337.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$69,778 00	Installment stock—dues	\$47,862 00
Arrearages	358 35	Earnings apportioned	8,698 09
On shares	\$210 00	Overdrafts and bills payable	14,000 00
On interest	148 35	Reserve and undivided profits	67 76
Cash on hand and in bank	1,481 50	Other liabilities	990 00
Total assets	\$71,617 85	Total liabilities	\$71,617 85
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$610 62	Overdrafts and bills payable	\$9,000 00
Installment stock—dues	16,390 00	Loans on mortgages and stock	32,640 00
Interest received	5,251 40	Interest paid	724 98
Premiums received	24	Dues repaid — installment	7,645 00
Fines received	2 25	stock	672 69
Fees received	37 00	Profits repaid — installment	385 00
Loans repaid	7,434 00	stock	895 00
Overdrafts and bills payable	21,500 00	Salaries	85 77
All other receipts	2,437 33	Taxes	132 90
Total receipts	\$53,662 84	Other expenses	1,481 50
		Balance on hand and in bank	
		Total disbursements	\$53,662 84

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
4	120	\$120 00	\$167 71	\$150 00
5	108	108 00	144 92	132 30
7	93	93 00	119 53	111 01
8	81	81 00	100 41	94 66
9	72	72 00	86 82	82 80
11	60	60 00	70 10	67 50
13	48	48 00	54 56	52 80
15	36	36 00	39 76	38 70
17	24	24 00	25 81	25 20
19	12	12 00	12 50	12 30

No. 47—SAN DIEGO.

STATE OF CALIFORNIA MUTUAL BUILDING AND LOAN
ASSOCIATION.

(Incorporated March 8, 1888.)

J. D. FERREE, Secretary.

D. C. COLLIER, JR., President.

Fiscal year ends February 28, 1905.

No. of series, none.

No. of shares, 2,836.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$39,765 05	Installment stock—dues	\$9,997 23
Arrearages	1,819 21	Earnings apportioned	3,657 29
On shares	\$1,063 00	Paid-up and prepaid stock—	
On interest	756 21	capital	23,444 18
Cash on hand and in bank	1,312 94	Overdrafts and bills payable	8,400 00
Real estate owned	3,899 75	Reserve and undivided profits	1,498 25
Other assets	600 00	Other liabilities	400 00
Total assets	\$47,396 95	Total liabilities	\$47,396 95
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$3,855 19	Overdrafts and bills payable	\$600 00
Installment stock—dues	3,861 74	Loans on mortgages and stock	36,202 76
Paid-up and prepaid stock	1,979 85	Interest paid	540 00
Interest and premiums		Dues repaid — installment	
received	4,157 63	stock	2,060 50
Fines received	136 60	Profits repaid — installment	
Fees received	3,906 00	stock	2,681 37
Loans repaid	44,915 75	Paid-up and prepaid stock—	
All other receipts	6,328 61	capital	8,785 99
		Paid-up and prepaid stock—	
		dividends	4,300 89
		Salaries	1,475 00
		Taxes	60 05
		Other expenses	3,878 86
		All other disbursements	7,243 01
		Balance on hand and in bank	1,312 94
Total receipts	\$69,141 37	Total disbursements	\$69,141 37

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Dayton plan.

Dividend—5 per cent.

Book value—Dues plus dividend.

Withdrawal value—Dues plus three fourths of profits, less membership fee.

No. 48—SAN FRANCISCO.

ACME BUILDING AND LOAN ASSOCIATION.

(Incorporated March 14, 1891.)

OSCAR HEYMAN, Secretary.

D. DAVIS, President.

Fiscal year ends March 16, 1905.

No. of series, 18.

No. of shares, 373.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$57,973 47	Installment stock—dues	\$17,953 40
Arrearages	1,138 15	Earnings apportioned	3,984 47
On shares	\$609 30	Paid-up and prepaid stock—	
On interest	493 25	capital	15,000 00
On premiums	35 60	Overdrafts and bills payable	19,137 01
Cash on hand and in bank	545 66	Reserve and undivided profits	3,760 19
Real estate owned	1,709 32	Other liabilities	1,759 95
Other assets	228 42		
Total assets	\$61,595 02	Total liabilities	\$61,595 02

<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$1,769 98	Overdrafts and bills payable	\$2,265 00
Installment stock—dues	5,070 00	Interest paid	1,887 40
Interest received	5,903 18	Dues repaid — installment	
Premiums received	241 25	stock	23,483 10
Fines received	24 05	Profits repaid — installment	
Loans repaid	18,202 49	stock	243 96
All other receipts	2,139 91	Salaries	900 00
		Taxes	520 47
		Other expenses	335 65
		All other disbursements	3,169 62
		Balance on hand and in bank	545 66
Total receipts	\$33,350 86	Total disbursements	\$33,350 86

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
9	120	\$120 00	\$156 02	\$138 00
12	102	102 00	127 46	114 78
13	96	96 00	118 43	107 20
15	84	84 00	100 98	92 49
17	72	72 00	84 15	78 05
19	60	60 00	68 18	64 09
21	48	48 00	53 12	50 56
23	36	36 00	38 96	37 48
25	24	24 00	25 44	24 72
27	6	6 00	6 10	6 05

No. 49—SAN FRANCISCO.

ALLIANCE BUILDING AND LOAN ASSOCIATION.

(Incorporated October 13, 1890.)

JULIUS CALMANN, Secretary.

G. H. UMBSSEN, President.

Fiscal year ends September 30, 1904.

No. of series, 14.

No. of shares, 250.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$19,562 45	Installment stock—dues	\$18,260 40
Arrearages	717 50	Earnings apportioned	2,719 30
On shares	\$698 00	Paid-up and prepaid stock—capital	4,000 00
On interest	19 50	Reserve and undivided profits	2,363 51
Cash on hand and in bank	1,724 27	Unearned premiums	406 36
Real estate owned	6,032 85	Other liabilities	337 50
Other assets	50 00		
Total assets	\$28,087 07	Total liabilities	\$28,087 07
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$2,611 99	Loans on mortgages and stock	\$2,412 50
Installment stock—dues	2,757 40	Dues repaid — installment stock	6,968 00
Interest received	1,499 45	Profits repaid — installment stock	21 78
Premiums received	345 00	Salaries	720 00
Fees received	1 00	Taxes	275 74
Loans repaid	1,737 55	Other expenses	197 50
All other receipts	3,367 40	Balance on hand and in bank	1,724 27
Total receipts	\$12,319 79	Total disbursements	\$12,319 79

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
5	144	\$144 00	\$184 08	\$164 04
8	126	126 00	153 43	139 71
11	108	108 00	126 80	117 40
13	96	96 00	110 66	103 33
17	72	72 00	80 04	76 02
19	60	60 00	65 22	62 61
21	48	48 00	51 34	49 67
23	36	36 00	37 90	36 95
25	18	18 00	18 45	18 22
26	12	12 00	12 20	12 10

No. 50—SAN FRANCISCO.

ALTA BUILDING AND LOAN ASSOCIATION.

(Incorporated February 3, 1891.)

A. J. MILLER, Secretary.

W. E. MILES, President.

Fiscal year ends February 28, 1905.

No. of series, 1.

No. of shares, 5.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Cash on hand and in bank.....	\$165 50	Installment stock—dues	\$165 00
		Reserve and undivided profits	50
Total assets.....	\$165 50	Total liabilities	\$165 50
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$105 50	Balance on hand and in bank	\$165 50
Installment stock—dues.....	60 00		
Total receipts.....	\$165 50	Total disbursements.....	\$165 50

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
13.....	33	\$33 00	\$33 00	.....

No. 51—SAN FRANCISCO.

ARGONAUT MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated January 31, 1891.)

E. GUNZBURGER, Secretary.

E. MESSENGER, Vice-President.

Fiscal year ends February 12, 1905.

No. of series, 11.

No. of shares, 558.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock ..	\$65,235 50	Installment stock—dues	\$30,348 00
Arrearages	5,019 25	Earnings apportioned	7,553 32
On shares	\$2,012 00	Advance payments	216 20
On interest	2,113 85	Overdrafts and bills payable ..	30,693 48
On premiums	893 40	Reserve and undivided profits ..	6,370 79
Real estate owned	4,857 80	Other liabilities	82 50
Other assets	151 74		
Total assets	\$75,264 29	Total liabilities	\$75,264 29
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Installment stock—dues	\$7,287 20	Overdrafts and bills payable ..	\$4,003 89
Interest received	4,475 03	Loans on mortgages and stock ..	18,442 65
Premiums received	1,439 30	Interest paid	1,886 89
Fines received	22 00	Dues repaid — installment ..	21,351 00
Fees received	14 30	Profits repaid — installment ..	6,442 28
Loans repaid	14,060 00	Salaries	1,067 50
Overdrafts and bills payable ..	27,693 48	Taxes	473 50
All other receipts	3,438 88	Other expenses	440 61
		All other disbursements	4,321 87
Total receipts	\$58,430 19	Total disbursements	\$58,430 19

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
4	132	\$132 00	\$184 09	\$173 67
5	120	120 00	162 55	151 91
6	108	108 00	142 03	131 82
7	96	96 00	122 52	113 24
8	84	84 00	103 98	95 98
9	72	72 00	86 45	79 94
10	60	60 00	70 06	65 03
11	48	48 00	54 63	51 31
12	36	36 00	39 94	37 97
13	24	24 00	25 71	24 85
14	12	12 00	12 45	12 23

No. 52—SAN FRANCISCO.

BAY CITY BUILDING AND LOAN ASSOCIATION.

(Incorporated May 9, 1889.)

EMIL GUNZBURGER, Secretary.

H. LEVY, Vice-President.

Fiscal year ends May 22, 1905.

No. of series, 10.

No. of shares, 579.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$61,536 90	Installment stock—dues	\$26,532 00
Arrearages	3,447 55	Earnings apportioned	5,824 53
On shares	\$2,355 00	Advance payments	391 50
On interest	769 05	Overdrafts and bills payable	24,312 55
On premiums	323 50	Reserve and undivided profits	8,578 37
Other assets	732 11	Other liabilities	77 61
Total assets	\$65,716 56	Total liabilities	\$65,716 56

<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Installment stock—dues	\$7,933 00	Overdrafts and bills payable	\$18,512 85
Interest received	5,453 00	Loans on mortgages and stock	12,624 20
Premiums received	1,591 75	Interest paid	1,388 85
Fees received	15 50	Dues repaid — installment	
Loans repaid	15,100 00	stock	4,230 00
Overdrafts and bills payable	8,812 55	Profits repaid — installment	
All other receipts	1,629 06	stock	942 45
		Salaries	1,250 00
		Taxes	538 62
		Other expenses	281 23
		All other disbursements	766 66
Total receipts	\$40,534 86	Total disbursements	\$40,534 86

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
7	120	\$120 00	\$164 21	\$153 16
8	108	108 00	143 57	132 90
9	96	96 00	123 30	113 75
10	84	84 00	104 51	96 30
11	72	72 00	86 90	80 20
12	60	60 00	70 55	65 27
13	48	48 00	54 92	51 47
14	36	36 00	40 09	38 05
15	24	24 00	25 91	24 95
16	12	12 00	12 52	12 26

No. 53—SAN FRANCISCO.

CALIFORNIA MUTUAL SAVINGS FUND, LOAN AND
BUILDING ASSOCIATION.

(Incorporated March 26, 1887.

WM. E. LUTZ, Secretary.

E. L. HEAD, President.

Fiscal year ends March 31, 1905.

No. of series, 19.

No. of shares, 832.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$80,211 91	Installment stock—dues	\$33,874 76
Arrearages	285 00	Earnings apportioned	10,959 12
On shares	\$120 00	Advance payments	180 65
On interest	120 00	Overdrafts and bills payable	14,458 29
On premiums	45 00	Reserve and undivided profits	2,561 51
Real estate owned	7,010 80	Unearned premiums	3,300 00
		Other liabilities	22,173 38
Total assets	\$87,507 01	Total liabilities	\$87,507 71

<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$34 88	Overdrafts and bill payable	\$9,640 75
Installment stock—dues	8,007 20	Loans on mortgages and stock	30,500 00
Interest received	4,423 06	Interest paid	578 45
Premiums received	373 75	Dues repaid — installment	
Fines received	12 50	stock	9,306 00
Fees received	28 70	Profits repaid — installment	
Loans repaid	20,501 60	stock	2,138 81
Overdrafts and bills payable	19,458 29	Salaries	845 00
All other receipts	502 38	Taxes	243 63
		Other expenses	89 72
Total receipts	\$53,342 36	Total disbursements	\$53,342 36

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
17	120	\$120 00	\$181 77	Dues plus 4 per cent per annum to 80 per cent of profits.
19	108	108 00	157 10	
21	96	96 00	134 26	
23	84	84 00	112 91	
25	72	72 00	92 68	
27	60	60 00	73 95	
29	48	48 00	56 72	
31	36	36 00	40 80	
33	24	24 00	26 13	
35	12	12 00	12 55	

No. 54—SAN FRANCISCO.

CITY BUILDING AND LOAN ASSOCIATION.

(Incorporated March 26, 1891.)

J. M. ELLIS, Secretary.

A. H. LISSAK, President.

Fiscal year ends March 31, 1905.

No. of series, 12.

No. of shares, 615.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$57,254 61	Installment stock—dues	\$33,579 60
Arrearages	1,517 90	Earnings apportioned	7,729 08
On shares	\$1,040 50	Overdrafts and bills payable	17,364 87
On interest	406 90	Reserve and undivided profits	344 96
On premiums	56 50	Other liabilities	90 00
Cash on hand and in bank	248 00		
Other assets	88 00		
Total assets	\$59,108 51	Total liabilities	\$59,108 51

<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$294 49	Overdrafts and bills payable	\$19,880 88
Installment stock—dues	6,388 70	Loans on mortgages and stock	16,162 50
Interest received	4,110 28	Interest paid	1,126 48
Premiums received	555 50	Dues repaid — installment	
Fines received	48 40	stock	8,280 64
Fees received	7 15	Profits repaid — installment	
Loans repaid	17,251 89	stock	2,454 61
Overdrafts and bills payable	17,364 87	Salaries	1,240 00
All other receipts	4,151 26	Taxes	595 14
		Other expenses	116 99
		All other disbursements	67 30
		Balance on hand and in bank	248 00
Total receipts	\$50,172 54	Total disbursements	\$50,172 54

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
5	132	\$132 00	\$179 52	Dues plus 85 per cent of profits.
6	120	120 00	157 76	
7	108	108 00	138 36	
8	96	96 00	120 25	
9	84	84 00	102 79	
10	72	72 00	86 49	
11	60	60 00	70 24	
12	48	48 00	54 82	
13	36	36 00	40 10	
14	24	24 00	26 08	
15	12	12 00	12 72	

No. 55—SAN FRANCISCO.

CITIZENS' BUILDING AND LOAN ASSOCIATION.

(Incorporated June 14, 1885.)

FREMONT WOOD, Secretary.

T. M. GARDINER, President.

Fiscal year ends February 28, 1905.

No. of series, 45.

No. of shares, 7,839.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$445,793 32	Installment stock—dues.....	\$236,347 10
Arrearages.....	949 73	Earnings apportioned.....	53,068 56
On shares.....\$230 20		Advance payments.....	1,743 00
On interest.....	418 93	Overdrafts and bills payable.....	66,018 89
On premiums.....	9 25	Reserve and undivided profits.....	16,961 55
On fines, etc.....	291 35	Other liabilities.....	81,835 24
Cash on hand and in bank.....	3,276 84		
Real estate owned.....	5,788 60		
Other assets.....	165 85		
Total assets.....	\$455,974 34	Total liabilities.....	\$455,974 34
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report.....	\$1,700 18	Overdrafts and bills payable.....	\$100,700 89
Installment stock—dues.....	76,234 20	Loans on mortgages and stock.....	171,399 20
Interest received.....	28,882 42	Interest paid.....	3,410 45
Premiums received.....	1,110 90	Dues repaid — installment stock.....	55,074 10
Fines received.....	307 35	Profits repaid — installment stock.....	14,613 82
Fees received.....	177 30	Salaries.....	2,858 00
Loans repaid.....	116,980 24	Taxes.....	4,172 12
Overdrafts and bills payable.....	110,423 07	Other expenses.....	4,238 50
All other receipts.....	28,601 60	All other disbursements.....	4,673 34
Total receipts.....	\$364,417 26	Balance on hand and in bank.....	3,276 84
		Total disbursements.....	\$364,417 26

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
36.....	132	\$132 00	\$193 70	\$180 94
40.....	120	120 00	168 71	159 06
44.....	108	108 00	146 58	138 01
48.....	96	96 00	125 77	119 20
52.....	84	84 00	106 39	101 41
56.....	72	72 00	88 35	84 55
60.....	60	60 00	71 43	68 65
64.....	48	48 00	55 44	53 60
68.....	36	36 00	40 35	39 30
72.....	24	24 00	25 98	25 50
76.....	12	12 00	12 54	12 41

No. 56—SAN FRANCISCO.

COLUMBIA BUILDING AND LOAN ASSOCIATION.

(Incorporated May 2, 1890.)

E. GUNZBURGER, Secretary.

H. LEVY, President.

Fiscal year ends May 10, 1905.

No. of series, 3.

No. of shares, 70.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$19,446 82	Installment stock—dues.....	\$6,690 00
Arrearages.....	3,300 00	Paid-up and prepaid stock— capital.....	7,000 00
On shares.....	\$3,300 00	Overdrafts and bills payable	1,048 21
		Reserve and undivided profits	8,008 61
Total assets.....	\$22,746 82	Total liabilities.....	\$22,746 82
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report.....	\$48 51	Loans on mortgages and stock	\$1,000,00
Installment stock—dues.....	480 00	Dues repaid — installment stock.....	8,020 00
Interest received.....	1,242 02	Profits repaid -- installment stock.....	1,980 00
Loans repaid.....	8,000 00	Salaries.....	605 00
Overdrafts and bills payable..	1,048 21	Taxes.....	33 60
All other receipts.....	1,001 36	Other expenses.....	156 50
		All other disbursements.....	25 00
Total receipts.....	\$11,820 10	Total disbursements.....	\$11,820 10

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
3.....	156	\$156 00	\$156 00	\$156 00
4.....	150	150 00	150 00	150 00
5.....	144	144 00	144 00	144 00

No. 57—SAN FRANCISCO.

COMMERCIAL LOAN AND TRUST COMPANY.

(Incorporated December 21, 1886.)

FREDERICK H. CLARK, Secretary.

G. S. GRAHAM, President.

Fiscal year ends December 31, 1904.

No. of series, none.

No. of shares, 1,360.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$123,278 00	Installment stock—dues	\$54,508 00
Arrearages	205 79	Earnings apportioned	12,582 77
On interest	\$205 79	Paid-up and prepaid stock—capital	12,799 16
Real estate owned	10,120 16	Overdrafts and bills payable	50,424 18
Other assets	808 40	Reserve and undivided profits	2,241 87
		Other liabilities	1,856 37
Total assets	\$134,412 35	Total liabilities	\$134,412 35
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Installment stock—dues	\$14,320 75	Overdrafts and bills payable	\$43,454 91
Interest received	8,004 56	Loans on mortgages and stock	49,784 40
Fines received	14 09	Interest paid	1,719 90
Fees received	16 50	Dues repaid — installment stock	15,996 50
Loans repaid	45,796 11	Profits repaid — installment stock	5,197 51
Overdrafts and bills payable	43,826 78	Salaries	1,610 00
All other receipts	7,999 13	Taxes	1,341 49
		Other expenses	443 53
		All other disbursements	429 68
Total receipts	\$119,977 92	Total disbursements	\$119,977 92

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Dayton plan.

Book value—Dues plus 5 per cent.

Withdrawal value—Dues plus 98 per cent of profits.

No. 58—SAN FRANCISCO.

ECONOMY BUILDING AND LOAN ASSOCIATION.

(Incorporated December 31, 1889.)

M. V. KIRKETERP, Secretary.

GEO. A. NEWHALL, President.

Fiscal year ends February 28, 1905.

No. of series, 27.

No. of shares, 1,192.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$59,101 69	Installment stock—dues	\$27,463 80
Arrearages	916 47	Earnings apportioned	6,039 13
On shares	\$82 30	Advance payments	373 00
On interest	820 67	Overdrafts and bills payable	27,600 00
On premiums	13 50	Reserve and undivided profits	1,011 81
Cash on hand and in bank	116 43	Other liabilities	446 50
Real estate owned	2,639 65		
Other assets	160 00		
Total assets	\$62,934 24	Total liabilities	\$62,934 24
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$78 45	Overdrafts and bills payable	\$9,650 00
Installment stock—dues	10,433 00	Loans on mortgages and stock	36,726 14
Interest received	3,727 55	Interest paid	889 64
Premiums received	123 06	Dues repaid — installment	
Fines received	26 57	stock	14,770 00
Fees received	62 10	Profits repaid — installment	
Loans repaid	19,282 80	stock	1,639 97
Overdrafts and bills payable	30,100 00	Salaries	768 00
All other receipts	2,267 32	Taxes	832 16
		Other expenses	368 90
		All other disbursements	339 61
		Balance on hand and in bank	116 43
Total receipts	\$66,100 85	Total disbursements	\$66,100 85

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
20	108	\$108 00	\$146 26	Dues plus five per cent.
24	96	96 00	126 26	
28	84	84 00	107 20	
31	75	75 00	93 52	
36	60	60 00	71 89	
39	51	51 00	59 61	
44	36	36 00	40 33	
48	24	24 00	25 95	
53	9	9 00	9 29	

No. 59—SAN FRANCISCO.

EINTRACHT SPAR UND BAU VEREIN.

(Incorporated July 12, 1884.)

HENRY GILLE, Secretary.

WM. G. LOEWE, President.

Fiscal year ends June 30, 1905.

No. of series, 10.

No. of shares, 200.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$2,975 00	Installment stock—dues	\$10,764 00
Arrearages	456 15	Earnings apportioned	884 11
On shares	\$370 00	Advance payments	28 95
On interest	86 15	Reserve and undivided profits	610 15
Cash on hand and in bank	2,788 06	Other liabilities	480 20
Real estate owned	6,400 00		
Other assets	148 20		
Total assets	\$12,767 41	Total liabilities	\$12,767 41
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$1,468 72	Loans on mortgages and stock	\$225 00
Installment stock—dues	3,045 00	Dues repaid — installment	
Interest received	456 70	stock	7,700 00
Fines received	73 10	Profits repaid — installment	
Loans repaid	6,435 00	stock	626 95
All other receipts	297 30	Salaries	180 00
		Taxes	176 36
		Other expenses	56 40
		All other disbursements	23 05
		Balance on hand and in bank	2,788 06
Total receipts	\$11,775 82	Total disbursements	\$11,775 82

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
18	84	\$84 00	\$93 86	\$90 57
21	66	66 00	71 41	68 70
22	60	60 00	64 31	62 15
24	48	48 00	50 60	48 86
26	36	36 00	37 36	36 34
28	24	24 00	24 59	24 09

No. 60—SAN FRANCISCO.

EL DORADO LOAN ASSOCIATION.

(Incorporated March 14, 1890.)

E. GUNZBURGER, Secretary.

H. LEVY, President.

Fiscal year ends March 15, 1905.

No. of series, 3.

No. of shares, 80.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock.	\$20,272 75	Installment stock—dues.....	\$15,816 00
Arrearages.....	2,786 00	Earnings apportioned.....	864 00
On shares.....	\$2,399 00	Advance payments.....	25 00
On interest.....	252 50	Overdrafts and bills payable.	1,567 59
On premiums.....	134 50	Reserve and undivided profits	15,786 16
Real estate owned.....	11,000 00		
Total assets.....	\$34,058 75	Total liabilities.....	\$34,058 75
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report.....	\$3,788 72	Interest paid.....	\$64 52
Installment stock—dues.....	10,665 00	Dues repaid — installment	
Interest received.....	7,903 30	stock.....	27,911 00
Premiums received.....	689 00	Profits repaid — installment	
Loans repaid.....	27,450 00	stock.....	2,495 50
Overdrafts and bills payable..	1,567 59	Salaries.....	604 00
All other receipts.....	3,148 70	Taxes.....	164 71
		Other expenses.....	250 90
		All other disbursements..	23,721 68
Total receipts.....	\$55,212 31	Total disbursements.....	\$55,212 31

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
3.....	156	\$156 00	\$156 00	\$156 00
4.....	144	144 00	144 00	144 00
8.....	36	36 00	36 00	36 00

No. 61—SAN FRANCISCO.

EMPIRE BUILDING AND LOAN ASSOCIATION.

(Incorporated August 24, 1889.)

WM. E. LUTZ, Secretary.

MARION LEVENTRITT, President.

Fiscal year ends August 31, 1904.

No. of series, 11.

No. of shares, 806.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$81,900 00	Installment stock—dues	\$45,520 00
Arrearages	224 00	Earnings apportioned	16,350 23
On shares	\$224 00	Advance payments	20 00
Real estate owned	4,000 00	Overdrafts and bills payable	11,534 97
		Reserve and undivided profits	6,000 00
		Other liabilities	6,698 80
Total assets	\$86,124 00	Total liabilities	\$86,124 00

<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$232 81	Loans on mortgages and stock	\$25,300 62
Installment stock—dues	8,475 00	Interest paid	183 27
Interest received	4,824 18	Dues repaid — installment	
Premiums received	118 00	stock	6,607 00
Fees received	20 90	Profits repaid — installment	
Loans repaid	10,050 00	stock	1,647 08
Overdrafts and bills payable	11,534 97	Salaries	1,152 50
All other receipts	433 19	Taxes	518 11
		Other expenses	280 47
Total receipts	\$35,689 05	Total disbursements	\$35,689 05

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
5	132	\$132 00	\$195 20	Dues plus 4 to 6 per cent.
6	120	120 00	172 25	
7	108	108 00	150 38	
8	96	96 00	129 52	
9	84	84 00	109 69	
10	72	72 00	90 91	
11	60	60 00	73 17	
12	48	48 00	56 46	
13	36	36 00	40 79	
14	24	24 00	26 16	
15	12	2 0	12 56	

No. 62—SAN FRANCISCO.

EUREKA BUILDING AND LOAN ASSOCIATION.

(Incorporated November 3, 1890.)

Sol. J. LEVY, Secretary.

A. ANDREWS, President.

Fiscal year ends October 31, 1904.

No. of series, 19.

No. of shares, 702.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$39,393 19	Installment stock—dues.....	\$28,355 20
Arrearages.....	522 04	Earnings apportioned.....	6,922 19
On shares.....	\$232 30	Overdrafts and bills payable..	4,500 00
On interest.....	233 99	Reserve and undivided profits	2,322 40
On premiums.....	55 75	Other liabilities.....	600 00
Cash on hand and in bank.....	55 43		
Real estate owned.....	2,713 13		
Other assets.....	16 00		
Total assets.....	\$42,699 79	Total liabilities.....	\$42,699 79

<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report.....	\$4,697 94	Overdrafts and bills payable	\$5,000 00
Installment stock—dues.....	6,366 60	Loans on mortgages and stock	18,725 00
Interest received.....	2,807 15	Interest paid.....	124 57
Premiums received.....	436 61	Dues repaid — installment	
Fees received.....	29 90	stock.....	6,792 50
Loans repaid.....	9,436 55	Profits repaid — installment	
Overdrafts and bills payable..	9,500 00	stock.....	1,475 40
All other receipts.....	97 16	Salaries.....	720 00
		Taxes.....	384 49
		Other expenses.....	68 72
		All other disbursements.....	25 80
		Balance on hand and in bank	55 43
Total receipts.....	\$33,371 91	Total disbursements.....	\$33,371 91

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
6.....	132	\$132 00	\$203 82	\$203 82
10.....	108	108 00	151 73	136 40
12.....	96	96 00	129 26	112 60
14.....	84	84 00	108 82	96 30
16.....	72	72 00	90 09	81 00
18.....	60	60 00	72 63	65 40
20.....	48	48 00	56 22	51 50
22.....	36	36 00	40 64	37 80
24.....	24	24 00	26 04	24 80
26.....	12	12 00	12 52	12 20

No. 63—SAN FRANCISCO.

FAIRMOUNT LOAN ASSOCIATION.

(Incorporated March 2, 1891.)

JOHN H. GRADY, Secretary.

JOHN H. DAWSON, President.

Fiscal year ends April 29, 1905.

No. of series, 22.

No. of shares, 842.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$63,513 75	Installment stock—dues	\$40,688 50
Arrearages	3,474 80	Earnings apportioned	10,619 03
On shares	\$1,617 00	Advance payments	60 75
On interest	1,362 35	Overdrafts and bills payable	13,775 65
On premiums	495 45	Reserve and undivided profits	4,325 09
Real estate owned	2,197 90		
Other assets	282 57		
Total assets	\$69,469 02	Total liabilities	\$69,469 02
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Installment stock—dues	\$11,246 10	Overdrafts and bills payable	\$14,241 88
Interest received	4,679 72	Loans on mortgages and stock	7,071 10
Premiums received	1,558 40	Interest paid	849 43
Fines received	252 65	Dues repaid — installment	
Fees received	10 40	stock	11,425 37
Loans repaid	7,095 10	Profits repaid — installment	
Overdrafts and bills payable	13,775 65	stock	4,060 33
All other receipts	2,724 88	Salaries	655 00
		Taxes	521 07
		Other expenses	186 32
		All other disbursements	2,332 40
Total receipts	\$41,342 90	Total disbursements	\$41,342 90

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
9	119	\$119 00	\$172 10	\$166 20
11	107	107 00	149 93	145 16
13	95	95 00	128 84	125 08
15	83	83 00	108 83	105 96
17	71	71 00	89 90	85 70
19	59	59 00	72 05	68 75
21	47	47 00	55 28	52 52
23	35	35 00	39 59	37 55
25	23	23 00	24 98	24 10
27	11	11 00	11 45	11 25

No. 64—SAN FRANCISCO.

FIDELITY BUILDING AND LOAN ASSOCIATION.

(Incorporated March 19, 1887.)

WM. E. LUTZ, Secretary.

SAMUEL J. HENDY, President

Fiscal year ends March 31, 1905.

No. of series, 19.

No. of shares, 1,712.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$164,126 12	Installment stock—dues	\$79,344 35
Arrearages	6,435 88	Earnings apportioned	22,167 27
On shares	\$3,816 00	Advance payments	274 35
On interest	2,126 28	Overdrafts and bills payable	62,824 98
On premiums	493 60	Reserve and undivided profits	10,000 00
Cash on hand and in bank	140 15	Unearned premiums	2,288 38
Real estate owned	12,394 27	Other liabilities	6,739 94
Other assets	542 85		
Total assets	\$183,639 27	Total liabilities	\$183,639 27
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$190 43	Overdrafts and bills payable	\$11,505 41
Installment stock—dues	16,682 96	Loans on mortgages and stock	42,614 16
Interest received	11,354 94	Interest paid	2,559 37
Premiums received	847 50	Dues repaid — installment	18,019 39
Fees received	39 90	stock	
Loans repaid	22,597 39	Profits repaid — installment	5,360 72
Overdrafts and bills payable	32,324 98	stock	
All other receipts	414 68	Salaries	2,232 50
		Taxes	1,438 82
		Other expenses	235 54
		All other disbursements	346 72
		Balance on hand and in bank	140 15
Total receipts	\$84,452 78	Total disbursements	\$84,452 78

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
9	120	\$120 00	\$171 85	Dues plus 4 to 7 per cent interest, according to age.
10	108	108 00	150 04	
12	96	96 00	129 25	
14	84	84 00	109 50	
16	72	72 00	90 77	
18	60	60 00	73 07	
20	48	48 00	56 40	
22	36	36 00	40 75	
24	24	24 00	26 14	
26	12	12 00	12 56	

No. 65—SAN FRANCISCO.

FRANKLIN SAVINGS AND BUILDING ASSOCIATION.

(Incorporated November 18, 1875.)

WM. HATJE, Secretary.

F. LUDEMANN, President.

Fiscal year ends November 30, 1904.

No. of series, 2.

No. of shares, 1,098.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$45,000 00	Installment stock—dues	\$57,116 00
Arrearages	781 30	Earnings apportioned	3,539 00
On shares	\$676 00	Reserve and undivided profits	105 30
On interest	97 50		
On fines, etc.	7 80		
Cash on hand and in bank	14,710 00		
Other assets	269 00		
Total assets	\$60,760 30	Total liabilities	\$60,760 30
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$11,012 80	Loans on mortgages and stock	\$24,600 00
Installment stock—dues	27,338 00	Interest paid	14 00
Interest received	4,500 75	Dues repaid — installment	
Fees received	146 50	stock	99,866 00
Loans repaid	121,200 00	Profits repaid — installment	
		stock	23,762 50
		Salaries	480 00
		Taxes	494 65
		Other expenses	270 90
		Balance on hand and in bank	14,710 00
Total receipts	\$164,198 05	Total disbursements	\$164,198 05

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
7	44	\$88 00	\$94 62	\$93 00
8	10	20 00	20 20	20 00

No. 66--SAN FRANCISCO.

GERMANIA BUILDING AND LOAN ASSOCIATION.

(Incorporated June 6, 1889.)

RUDOLPH MOHR, Secretary.

GEORGE F. VOLZ, President.

Fiscal year ends June 30, 1905.

No. of series, none.

No. of shares, 2,613.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$116,889 30	Installment stock—dues	\$33,929 02
Cash on hand and in bank	1,182 73	Earnings apportioned	6,176 74
Real estate owned	3,629 15	Paid-up and prepaid stock—capital	28,491 75
Other assets	677 30	Paid-up and prepaid stock—dividends	3,314 95
		Overdrafts and bills payable	45,728 63
		Reserve and undivided profits	3,237 39
		Other liabilities	1,500 00
Total assets	\$122,378 48	Total liabilities	\$122,378 48

<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$816 00	Overdrafts and bills payable	\$22,477 84
Installment stock—dues	18,793 00	Loans on mortgages and stock	27,600 00
Paid-up and prepaid stock	5,432 75	Interest paid	2,502 29
Interest received	8,945 25	Dues repaid — installment stock	16,646 00
Loans repaid	17,580 05	Profits repaid — installment stock	2,100 06
Overdrafts and bills payable	32,728 63	Paid-up and prepaid stock—capital	12,286 00
All other receipts	4,935 05	Paid-up and prepaid stock—dividends	674 20
		Salaries	1,800 00
		Taxes	1,075 57
		Other expenses	344 74
		All other disbursements	541 30
		Balance on hand and in bank	1,182 73
Total receipts	\$89,230 73	Total disbursements	\$89,230 73

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Dayton plan.

Dividend 1904-05—5 per cent.

Book value—Dues plus dividend.

Withdrawal value—Same as book value.

No. 67—SAN FRANCISCO.

GOLDEN WEST BUILDING AND LOAN ASSOCIATION.

(Incorporated May 23, 1890.)

Sol. J. LEVY, Secretary.

G. BREMER, President.

Fiscal year ends June 30, 1905.

No. of series, 9.

No. of shares, 189.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$13,046 16	Installment stock—dues	\$10,269 90
Arrearages	164 13	Earnings apportioned	3,596 06
On shares	\$79 10	Reserve and undivided profits	70 28
On interest	85 03		
Cash on hand and in bank	700 95		
Other assets	25 00		
Total assets	\$13,936 24	Total liabilities	\$13,936 24
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Installment stock—dues	\$1,802 70	Overdrafts and bills payable	\$1,143 73
Interest received	1,176 98	Interest paid	100 60
Premiums received	150 00	Dues repaid — installment	
Fees received	1 00	stock	3,865 00
Loans repaid	4,488 66	Profits repaid — installment	
		stock	992 65
		Salaries	587 50
		Taxes	175 91
		Other expenses	53 00
		Balance on hand and in bank	700 95
Total receipts	\$7,619 34	Total disbursements	\$7,619 34

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
15	120	\$120 00	\$178 12	Dues plus 6 per cent.
18	102	102 00	145 53	
19	90	90 00	124 15	
22	60	60 00	74 44	
23	48	48 00	56 62	
25	36	36 00	40 52	
27	12	12 00	12 85	

No. 68—SAN FRANCISCO.

GLOBE MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated March 26, 1898.)

FREDERICK H. CLARK, Secretary.

FRANK OTIS, President.

Fiscal year ends March 31, 1905.

No. of series, 26.

No. of shares, 3,506.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$112,515 19	Installment stock—dues.....	\$82,338 90
Arrearages.....	76 10	Earnings apportioned.....	14,891 29
On shares.....	\$76 10	Advance payments.....	1,258 55
Cash on hand and in bank...	261 79	Overdrafts and bills payable.	10,103 75
Other assets.....	10 00	Reserve and undivided profits	1,630 40
		Other liabilities.....	2,640 19
Total assets.....	\$112,863 08	Total liabilities.....	\$112,863 08
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report.....	\$3,559 13	Overdrafts and bills payable.	\$18,714 31
Installment stock—dues.....	15,995 75	Loans on mortgages and stock	45,812 06
Interest received.....	8,906 15	Interest paid.....	739 72
Fines received.....	37 65	Dues repaid — installment	
Fees received.....	24 45	stock.....	7,851 00
Loans repaid.....	39,269 29	Profits repaid — installment	
Overdrafts and bills payable..	10,450 00	stock.....	1,129 32
All other receipts.....	517 46	Salaries.....	1,341 00
		Taxes.....	2,134 95
		Other expenses.....	388 24
		All other disbursements.....	387 49
		Balance on hand and in bank	261 79
Total receipts.....	\$78,759 88	Total disbursements.....	\$78,759 88

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
1.....	84	\$42 00	\$50 69	\$49 55
3.....	72	36 00	42 17	41 39
7.....	60	30 00	34 16	33 65
11.....	48	24 00	26 62	26 28
15.....	36	18 00	19 44	19 26
19.....	24	12 00	12 62	12 54
23.....	12	6 00	6 20	6 17

No. 69—SAN FRANCISCO.

GRANITE MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated August, 1893.)

M. L. CULVER, Secretary.

M. C. NUNAN, President.

Fiscal year ends August 31, 1904.

No. of series, 18.

No. of shares, 350.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$27,625 00	Installment stock—dues	\$23,736 00
Arrearages	191 25	Earnings apportioned	3,861 42
On shares	\$75 00	Advance payments	1,410 00
On interest	77 85	Overdrafts and bills payable	5,255 00
On premiums	38 40	Other liabilities	2,009 20
Real estate owned	8,224 15		
Other assets	231 22		
Total assets	\$36,271 62	Total liabilities	\$36,271 62
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Installment stock—dues	\$4,778 00	Overdrafts and bills payable	\$1,515 65
Interest received	1,597 60	Loans on mortgages and stock	16,281 65
Premiums received	755 15	Interest paid	104 17
Fines received	80	Dues repaid — installment	
Fees received	4 60	stock	2,808 00
Loans repaid	8,659 20	Profits repaid — installment	
Overdrafts and bills payable	6,813 80	stock	314 58
		Salaries	1,008 00
		Taxes	452 10
		Other expenses	125 00
Total receipts	\$22,609 15	Total disbursements	\$22,609 15

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
1	132	\$132 00	\$160 40	\$160 40
5	108	108 00	127 04	127 04
7	96	96 00	111 06	111 06
9	84	84 00	95 55	95 55
11	72	72 00	80 50	80 50
13	60	60 00	65 92	65 92
15	48	48 00	51 80	51 80
17	36	36 00	38 15	38 15
19	24	24 00	24 97	24 97
21	12	12 00	12 25	12 25

No. 70—SAN FRANCISCO.

HOME MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated December 2, 1885.)

FREDERICK H. CLARK, Secretary.

GEORGE M. MITCHELL, President.

Fiscal year ends December 31, 1904.

No. of series, none.

No. of shares, 2,780.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$187,049 26	Installment stock—dues.....	\$97,935 71
Arrearages.....	705 64	Earnings apportioned.....	22,333 25
On interest.....	\$705 64	Paid-up and prepaid stock—	
Cash on hand and in bank.....	818 11	capital.....	7,900 00
Real estate owned.....	410 45	Paid-up and prepaid stock—	
Other assets.....	1,220 34	dividends.....	149 22
		Overdrafts and bills payable.....	44,917 67
		Reserve and undivided profits.....	4,167 24
		Other liabilities.....	12,800 71
Total assets.....	\$190,203 80	Total liabilities.....	\$190,203 80

<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report.....	\$826 91	Overdrafts and bills payable.....	\$43,105 75
Installment stock—dues.....	25,999 76	Loans on mortgages and stock.....	60,832 96
Paid-up and prepaid stock.....	3,950 00	Interest paid.....	1,799 83
Interest received.....	12,613 79	Dues repaid — installment	
Fines received.....	12 05	stock.....	19,902 30
Fees received.....	16 50	Profits repaid — installment	
Loans repaid.....	49,963 65	stock.....	4,872 97
Overdrafts and bills payable.....	45,614 00	Paid-up and prepaid stock—	
All other receipts.....	715 67	capital.....	3,250 00
		Salaries.....	1,780 00
		Taxes.....	2,607 20
		Other expenses.....	489 86
		All other disbursements.....	253 35
		Balance on hand and in bank.....	818 11
Total receipts.....	\$139,712 33	Total disbursements.....	\$139,712 33

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Dayton plan.

Book value—Dues plus 5 per cent.

Withdrawal value—Dues plus 98 per cent of profits.

No. 71—SAN FRANCISCO.

HOUSEHOLDERS' BUILDING AND LOAN ASSOCIATION.

(Incorporated October 5, 1889.)

M. V. KIRKETERP, Secretary.

EDWARD J. SMITH, President.

Fiscal year ends October 31, 1904.

No. of series, 22.

No. of shares, 308.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$19,950 00	Installment stock—dues.....	\$11,194 50
Arrearages.....	90 64	Earnings apportioned.....	2,363 72
On shares.....	\$6 40	Overdrafts and bills payable.....	6,175 00
On interest.....	84 24	Reserve and undivided profits.....	1,059 13
Cash on hand and in bank.....	68 77	Other liabilities.....	1,100 31
Real estate owned.....	1,724 85		
Other assets.....	58 40		
Total assets.....	\$21,892 66	Total liabilities.....	\$21,892 66
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report.....	\$26 29	Overdrafts and bills payable.....	\$7,100 00
Installment stock—dues.....	3,293 20	Loans on mortgages and stock.....	10,900 00
Interest received.....	1,357 40	Interest paid.....	499 31
Premiums received.....	129 50	Dues repaid — installment	
Fees received.....	6 90	stock.....	7,535 00
Loans repaid.....	11,100 00	Profits repaid -- installment	
Overdrafts and bills payable.....	8,425 00	stock.....	1,987 46
All other receipts.....	5,693 25	Salaries.....	588 00
		Taxes.....	227 25
		Other expenses.....	261 60
		All other disbursements.....	864 15
		Balance on hand and in bank.....	68 77
Total receipts.....	\$30,031 54	Total disbursements.....	\$30,031 54

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
25.....	96	\$96 00	\$123 93	5
29.....	84	84 00	105 42	Dues plus per cent.
33.....	72	72 00	87 77	
37.....	60	60 00	70 98	
45.....	36	36 00	39 99	
49.....	24	24 00	25 80	
52.....	12	12 00	12 46	

No. 72—SAN FRANCISCO.

HUMBOLDT BUILDING AND LOAN ASSOCIATION.

(Incorporated September, 1890.)

RUDOLPH MOHR, Secretary.

HERMANN JOOST, President.

Fiscal year ends September 30, 1904.

No. of series, none.

No. of shares, 2,194.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$91,874 00	Installment stock—dues	\$30,248 89
Real estate owned	9,675 50	Earnings apportioned	9,052 52
Other assets	65 60	Paid-up and prepaid stock—capital	5,700 00
		Paid-up and prepaid stock—dividends	410 08
		Overdrafts and bills payable	42,104 65
		Reserve and undivided profits	2,344 79
		Other liabilities	11,754 17
Total assets	\$101,615 10	Total liabilities	\$101,615 10

<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Installment stock—dues	\$14,109 66	Overdrafts and bills payable	\$38,247 96
Paid-up and prepaid stock	700 00	Loans on mortgages and stock	28,173 58
Interest received	5,876 08	Interest paid	2,312 33
Loans repaid	22,176 00	Dues repaid — installment stock	12,756 50
Overdrafts and bills payable	42,104 65	Profits repaid — installment stock	3,248 49
All other receipts	2,912 72	Salaries	1,200 00
		Taxes	1,175 64
		Other expenses	332 92
		All other disbursements	431 69
Total receipts	\$87,879 11	Total disbursements	\$87,879 11

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Dayton plan.

Dividend—5 per cent.

Book value—Dues plus dividend.

Withdrawal value—Same as book value.

No. 73—SAN FRANCISCO.

INTER NOS BUILDING AND LOAN ASSOCIATION.

(Incorporated May 22, 1889.)

M. L. CULVER, Secretary.

M. C. NUNAN, President.

Fiscal year ends May 31, 1905.

No. of series, 23.

No. of shares, 860.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$47,392 40	Installment stock—dues	\$53,818 00
Arrearages	7,657 15	Earnings apportioned	8,018 08
On shares	\$3,469 00	Advance payments	7,345 77
On interest	2,926 70	Overdrafts and bills payable	24,196 91
On premiums	1,261 45	Reserve and undivided profits	2,691 80
Real estate owned	34,302 46		
Other assets	6,718 55		
Total assets	\$96,070 56	Total liabilities	\$96,070 56
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Installment stock—dues	\$11,166 00	Overdrafts and bills payable	\$27,088 70
Interest received	3,095 25	Loans on mortgages and stock	350 00
Premiums received	1,442 30	Interest paid	1,253 04
Fines received	45 40	Dues repaid — installment	
Fees received	4 60	stock	11,446 38
Loans repaid	6,150 00	Profits repaid -- installment	
Overdrafts and bills payable	24,196 91	stock	1,269 19
All other receipts	9,881 17	Salaries	2,112 00
Total receipts	\$55,981 63	Taxes	991 88
		Other expenses	856 54
		All other disbursements	10,613 90
		Total disbursements	\$55,981 63

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
13	120	\$120 00	\$144 50	\$144 50
15	108	108 00	127 78	127 78
17	96	96 00	111 96	111 96
19	84	84 00	96 00	96 00
21	72	72 00	80 83	80 83
23	60	60 00	66 15	66 15
25	48	48 00	51 95	51 95
27	36	36 00	38 23	38 23
29	24	24 00	25 00	25 00
31	12	12 00	12 26	12 26

No. 74—SAN FRANCISCO.

ITALIAN-SWISS MUTUAL LOAN ASSOCIATION.

(Incorporated April 1, 1887.)

A. SEARBOBO, Secretary.

P. C. ROSSI, President.

Fiscal year ends March 31, 1905.

No. of series, 13.

No. of shares, 964.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$84,000 00	Installment stock—dues	\$80,806 00
Arrearages	589 00	Earnings apportioned	14,538 62
On shares	\$479 50	Advance payments	118 50
On interest	109 50	Reserve and undivided profits	4,290 75
Cash on hand and in bank	8,005 63	Other liabilities	2,883 18
Real estate owned	10,001 81		
Other assets	40 51		
Total assets	\$102,636 95	Total liabilities	\$102,636 95
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$2,094 77	Loans on mortgages and stock	\$3,000 00
Installment stock—dues	12,479 00	Dues repaid — installment	
Interest received	5,256 40	stock	12,085 00
Premiums received	179 95	Profits repaid — installment	
Fines received	6 10	stock	2,395 64
Loans repaid	6,706 04	Salaries	1,800 00
All other receipts	2,036 66	Taxes	1,010 49
		Other expenses	371 16
		All other disbursements	91 00
		Balance on hand and in bank	8,005 63
Total receipts	\$28,758 92	Total disbursements	\$28,758 92

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
8	132	\$132 00	\$161 26	\$158 04
9	120	120 00	142 89	140 03
10	108	108 00	126 04	123 52
11	96	96 00	109 93	107 73
12	84	84 00	94 62	92 73
13	72	72 00	79 80	78 20
14	60	60 00	65 51	64 20
15	48	48 00	51 64	50 61
16	36	36 00	38 09	37 31
17	24	24 00	24 98	24 48
18	12	12 00	12 25	12 12

No. 75—SAN FRANCISCO.

MECHANICS' BUILDING AND LOAN ASSOCIATION.

(Incorporated January 6, 1891.)

WM. E. LUTZ, Secretary.

FREDERICK FILLMORE, President.

Fiscal year ends December 31, 1904.

No. of series, 15.

No. of shares, 953.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$95,975 00	Installment stock—dues	\$40,596 00
Arrearages	198 10	Earnings apportioned	10,129 72
On shares	\$28 00	Advance payments	16 00
On interest	166 10	Overdrafts and bills payable	37,266 04
On premiums	4 00	Reserve and undivided profits	3,611 65
Other assets	67 85	Other liabilities	4,621 54
Total assets	\$96,240 95	Total liabilities	\$96,240 95
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$219 95	Overdrafts and bills payable	\$44,376 15
Intallment stock—dues	11,406 85	Loans on mortgages and stock	15,500 00
Interest received	7,122 93	Interest paid	1,820 75
Premiums received	354 25	Dues repaid — installment	
Fines received	1 58	stock	11,996 00
Fees received	15 70	Profits repaid — installment	
Loans repaid	11,075 00	stock	4,161 08
Overdrafts and bills payable	47,766 04	Salaries	1,158 00
All other receipts	2,099 93	Taxes	730 23
		Other expenses	116 37
		All other disbursements	203 65
Total receipts	\$80,062 23	Total disbursements	\$80,062 23

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
4	132	\$132 00	\$193 99	Dues plus such per cent of profits as by-laws provide.
5	120	120 00	171 27	
6	108	108 00	149 56	
8	96	96 00	128 87	
10	84	84 00	109 21	
12	72	72 00	90 56	
14	60	60 00	72 92	
16	48	48 00	56 30	
18	36	36 00	40 70	
20	24	24 00	26 11	
22	12	12 00	12 55	

No. 76—SAN FRANCISCO.

MISSION HOME AND LOAN ASSOCIATION.

(Incorporated March 12, 1889.)

JOHN H. GRADY, Secretary.

JOHN H. DAWSON, President.

Fiscal year ends March 31, 1905.

No. of series, 21.

No. of shares, 1,001.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$73,980 80	Installment stock—dues.....	\$57,870 00
Arrearages.....	5,226 10	Earnings apportioned.....	16,699 05
On shares.....\$2,033 50		Overdrafts and bills payable.....	8,547 37
On interest.....2,207 35		Reserve and undivided profits.....	3,350 08
On premiums.....985 25			
Real estate owned.....	6,972 84		
Other assets.....	286 76		
Total assets.....	\$86,466 50	Total liabilities.....	\$86,466 50
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Installment stock—dues.....	\$12,763 75	Overdrafts and bills payable.....	\$11,144 77
Interest received.....	4,720 30	Loans on mortgages and stock.....	6,621 70
Premiums received.....	1,474 10	Interest paid.....	796 40
Fines received.....	135 45	Dues repaid — installment.....	12,753 75
Fees received.....	9 65	stock.....	
Loans repaid.....	8,499 40	Profits repaid — installment.....	4,792 84
Overdrafts and bills payable.....	8,947 37	stock.....	720 00
All other receipts.....	3,229 85	Salaries.....	718 80
		Taxes.....	287 87
		Other expenses.....	1,943 74
		All other disbursements.....	
Total receipts.....	\$39,779 87	Total disbursements.....	\$39,779 87

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
8.....	132	\$132 00	\$193 71	\$190 08
11.....	114	114 00	160 02	157 32
12.....	108	108 00	149 31	146 88
14.....	96	96 00	128 64	126 72
16.....	84	84 00	108 99	107 52
18.....	72	72 00	90 36	87 12
20.....	60	60 00	72 75	69 00
22.....	48	48 00	56 16	53 76
24.....	36	36 00	40 59	38 70
26.....	24	24 00	26 04	25 20
28.....	12	12 00	12 51	12 30

No. 77—SAN FRANCISCO.

MISSION IMPROVED BUILDING AND LOAN ASSOCIATION.

(Incorporated January 22, 1902.)

H. H. LINCOLN, Secretary.

D. COFFIN, President.

Fiscal year ends February 28, 1905.

No. of series, 6.

No. of shares, 357.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$9,837 63	Installment stock—dues	\$9,319 80
Arrearages	1,264 20	Earnings apportioned	594 88
On shares	\$1,264 20	Advance payments	102 40
Cash on hand and in bank	1,557 52	Overdrafts and bills payable	2,821 15
Other assets	180 16	Reserve and undivided profits	1 28
Total assets	\$12,839 51	Total liabilities	\$12,839 51
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$465 10	Overdrafts and bills payable	\$1,605 25
Installment stock—dues	3,269 50	Loans on mortgages and stock	4,437 50
Interest received	935 96	Interest paid	150 50
Fees received	10 45	Dues repaid — installment stock	1,532 00
Loans repaid	4,393 30	Profits repaid — installment stock	106 80
Overdrafts and bills payable	613 25	Salaries	226 50
		Taxes	70 74
		Other expenses	75
		Balance on hand and in bank	1,557 52
Total receipts	\$9,687 56	Total disbursements	\$9,687 56

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
1	36	\$36 00	\$38 48	Dues plus one half of profits.
2	30	30 00	31 72	
3	24	24 00	25 10	
4	18	18 00	18 63	

No. 78—SAN FRANCISCO.

MONARCH MUTUAL BUILDING AND LOAN ASSOCIATION..

(Incorporated May 19, 1891.)

R. MOHR, Secretary.

H. M. WREDEN, President.

Fiscal year ends April 30, 1905.

No. of series, none.

No. of shares, 1,128.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$34,750 00	Installment stock—dues	\$17,508 98
Real estate owned	7,046 06	Earnings apportioned	3,166 17
Other assets	83 50	Overdrafts and bills payable	18,829 55
		Reserve and undivided profits	724 86
		Other liabilities	1,650 00
Total assets	\$41,879 56	Total liabilities	\$41,879 56
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Installment stock—dues	\$7,087 55	Overdrafts and bills payable	\$14,932 98
Interest received	2,718 89	Loans on mortgages and stock	7,850 00
Loans repaid	8,100 00	Interest paid	1,298 43
Overdrafts and bills payable	18,829 55	Dues repaid — installment stock	10,000 00
All other receipts	584 38	Profits repaid — installment stock	1,673 11
		Salaries	720 00
		Taxes	489 12
		Other expenses	149 63
		All other disbursements	207 10
Total receipts	\$37,320 37	Total disbursements	\$37,320 37

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Dayton plan.

Dividends—4 per cent.

Book value—Dues plus dividends.

Withdrawal value—Same as book value.

No. 79—SAN FRANCISCO.

OCCIDENTAL LOAN ASSOCIATION.

(Incorporated August 25, 1885.)

E. GUNZBURGER, Secretary.

A. G. LYLE, President.

Fiscal year ends September 4, 1904.

No. of series, 11.

No. of shares, 727.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$92,924 85	Installment stock—dues	\$53,952 00
Arrearages	2,190 45	Earnings apportioned	14,961 65
On shares	\$1,092 00	Advance payments	72 00
On interest	1,009 95	Overdrafts and bills payable	18,211 03
On premiums	88 50	Reserve and undivided profits	11,508 93
Real estate owned	2,199 18	Other liabilities	86 22
Other assets	1,477 35		
Total assets	\$98,791 83	Total liabilities	\$98,791 83

<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Installment stock—dues	\$11,351 00	Overdrafts and bills payable	\$2,171 47
Interest received	8,104 80	Loans on mortgages and stock	44,615 00
Premiums received	1,580 25	Interest paid	1,268 87
Fees received	13 40	Dues repaid — installment	
Loans repaid	28,150 00	stock	14,152 00
Overdrafts and bills payable	17,211 03	Profits repaid — installment	
All other receipts	3,130 57	stock	4,177 16
		Salaries	1,290 00
		Taxes	677 93
		Other expenses	262 52
		All other disbursements	926 10
Total receipts	\$69,541 05	Total disbursements	\$69,541 05

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
8	144	\$144 00	\$199 35	\$188 28
9	132	132 00	177 12	165 84
10	120	120 00	156 53	145 57
11	108	108 00	137 15	126 95
13	84	84 00	101 26	94 36
14	72	72 00	84 59	78 92
15	60	60 00	68 71	64 35
16	48	48 00	53 58	50 79
17	36	36 00	39 18	37 59
18	24	24 00	25 46	24 73
19	12	12 00	12 39	12 20

No. 80—SAN FRANCISCO.

PACIFIC LOAN ASSOCIATION.

(Incorporated December 8, 1884.)

E. GUNZBURGER, Secretary.

H. LEVY, President.

Fiscal year ends December 6, 1904.

No. of series, 10.

No. of shares, 576.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock.	\$95,174 80	Installment stock—dues.....	\$50,024 00
Arrearages.....	3,031 80	Earnings apportioned	12,178 12
On shares.....	\$1,184 00	Advance payments.....	202 80
On interest.....	1,389 40	Overdrafts and bills payable.	29,972 08
On premiums.....	458 40	Reserve and undivided profits	8,675 40
Real estate owned.....	3,000 00	Other liabilities.....	314 55
Other assets.....	160 35		
Total assets.....	\$101,366 95	Total liabilities.....	\$101,366 95
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Installment stock—dues.....	\$8,254 00	Overdrafts and bills payable.	\$6,242 11
Interest received.....	7,452 30	Loans on mortgages and stock	33,366 00
Premiums received.....	983 35	Interest paid.....	1,968 73
Fines received.....	17 25	Dues repaid — installment	
Fees received.....	13 00	stock.....	31,420 00
Loans repaid.....	34,350 00	Profits repaid — installment	
Overdrafts and bills payable..	29,972 08	stock.....	11,146 70
All other receipts.....	6,011 97	Salaries.....	1,730 00
		Taxes.....	547 52
		Other expenses.....	288 64
		All other disbursements.....	344 25
Total receipts.....	\$87,053 95	Total disbursements.....	\$87,053 95

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
9.....	144	\$144 00	\$193 41	\$181 06
11.....	120	120 00	153 45	145 10
12.....	108	108 00	135 05	128 30
13.....	84	84 00	100 80	96 60
14.....	72	72 00	84 95	81 70
15.....	60	60 00	69 59	64 80
16.....	48	48 00	54 55	51 28
17.....	36	36 00	39 69	37 85
18.....	24	24 00	25 71	24 85
19.....	12	12 00	12 45	12 23

No. 81—SAN FRANCISCO.

PROVIDENT MUTUAL LOAN ASSOCIATION.

(Incorporated September 24, 1887.)

D. HIRSCHFELD, Secretary.

SAM WEIL, President.

Fiscal year ends September 30, 1904.

No. of series, 12.

No. of shares, 1,361.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$91,835 72	Installment stock—dues	\$70,875 60
Cash on hand and in bank	7,012 20	Earnings apportioned	24,577 04
Other assets	335 80	Reserve and undivided profits	1,424 08
		Unearned premiums	900 00
		Other liabilities	1,407 00
Total assets	\$99,183 72	Total liabilities	\$99,183 72
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$7 55	Overdrafts and bills payable	\$4,466 50
Installment stock—dues	12,368 60	Loans on mortgages and stock	21,961 68
Interest received	8,380 03	Interest paid	253 80
Premiums received	266 75	Dues repaid — installment	
Fees received	20 50	stock	22,779 50
Loans repaid	47,987 91	Profits repaid — installment	
All other receipts	733 50	stock	9,367 12
		Salaries	1,760 00
		Taxes	1,326 99
		Other expenses	495 05
		All other disbursements	292 00
		Balance on hand and in bank	7,012 20
Total receipts	\$69,714 84	Total disbursements	\$69,714 84

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
7	132	\$132 00	\$195 00	\$195 00
8	120	120 00	172 10	168 00
9	108	108 00	150 19	144 45
10	96	96 00	129 41	122 75
11	84	84 00	109 62	103 00
12	72	72 00	90 86	85 00
14	60	60 00	73 13	67 50
15	48	48 00	56 44	52 80
18	24	24 00	26 15	25 20
19	12	12 00	12 56	12 30

No. 82—SAN FRANCISCO.

PROGRESS MUTUAL LOAN ASSOCIATION.

(Incorporated January, 1895.)

D. HIESCHFELD, Secretary.

E. K. CHAPMAN, President.

Fiscal year ends December 31, 1904.

No. of series, 9.

No. of shares, 763.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock.	\$59,829 93	Installment stock—dues.....	\$39,330 00
Arrearages	48 00	Earnings apportioned	15,205 23
On shares	\$48 00	Overdrafts and bills payable.	3,842 32
Cash on hand and in bank ...	105 64	Reserve and undivided profits	1,504 02
		Unearned premiums	102 00
Total assets.	\$59,983 57	Total liabilities	\$59,983 57
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$14 38	Overdrafts and bills payable.	\$4,356 32
Installment stock—dues.....	5,876 10	Loans on mortgages and stock	27,750 00
Interest received	4,172 13	Interest paid	84 31
Premiums received	227 20	Dues repaid — installment	
Fines received	1 35	stock	1,337 80
Fees received	17 80	Profits repaid — installment	
Loans repaid	24,191 93	stock	371 30
Overdrafts and bills payable..	3,842 32	Paid-up and prepaid stock—	
All other receipts	881 65	capital	2,600 00
		Salaries	900 00
		Taxes	600 41
		Other expenses	230 94
		All other disbursements.....	888 14
		Balance on hand and in bank	105 64
Total receipts	\$39,224 86	Total disbursements	\$39,224 86

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
1.....	120	\$120 00	\$172 13	\$165 00
2.....	108	108 00	150 37	144 45
3.....	96	96 00	129 43	122 75
4.....	84	84 00	109 63	103 00
5.....	72	72 00	90 87	85 00
6.....	54	54 00	64 66	60 10
7.....	48	48 00	56 44	52 80
9.....	24	24 00	26 15	25 20
10.....	12	12 00	12 56	12 30

No. 83—SAN FRANCISCO.

PRUDENCE BUILDING AND LOAN ASSOCIATION.

(Incorporated March 18, 1891.)

J. M. ELLIS, Secretary.

A. H. LISSAK, President.

Fiscal year ends March 31, 1905.

No. of series, 16.

No. of shares, 906.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$81,936 67	Installment stock—dues	\$44,227 20
Arrearages	794 54	Earnings apportioned	10,668 95
On shares	\$466 85	Overdrafts and bills payable	23,066 64
On interest	266 14	Reserve and undivided profits	3,533 85
On premiums	61 55	Unearned premiums	1,114 42
Cash on hand and in bank	349 10	Other liabilities	551 55
Other assets	82 30		
Total assets	\$83,162 61	Total liabilities	\$83,162 61
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$494 75	Overdrafts and bills payable	\$20,883 36
Installment stock—dues	9,623 20	Loans on mortgages and stock	17,440 00
Interest received	5,536 47	Interest paid	1,374 90
Premiums received	1,349 20	Dues repaid — installment	
Fees received	8 60	stock	4,244 00
Loans repaid	6,420 84	Profits repaid — installment	
Overdrafts and bills payable	23,066 64	stock	982 72
All other receipts	1,040 98	Salaries	1,462 00
		Taxes	564 31
		Other expenses	167 94
		All other disbursements	72 35
		Balance on hand and in bank	349 10
Total receipts	\$47,540 68	Total disbursements	\$47,540 68

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
6	120	\$120 00	\$165 73	Dues plus 85 per cent of profits.
7	108	108 00	144 07	
8	96	96 00	124 45	
9	84	84 00	106 09	
10	72	72 00	88 37	
11	60	60 00	71 51	
12	48	48 00	55 77	
13	36	36 00	40 63	
14	24	24 00	26 20	
15	12	12 00	12 72	

No. 84—SAN FRANCISCO.

RICHMOND MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated August, 1897.)

W. H. DAVIS, Secretary.

FRED W. BOOLE, President.

Fiscal year ends July 31, 1904.

No. of series, 13.

No. of shares, 345.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock.	\$22,208 85	Installment stock—dues.....	\$13,029 00
		Earnings apportioned	3,523 51
		Advance payments	333 50
		Overdrafts and bills payable.	5,286 88
		Reserve and undivided profits	35 96
Total assets.....	\$22,208 85	Total liabilities	\$22,208 85
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Installment stock—dues.....	\$4,275 00	Overdrafts and bills payable.	\$9,172 52
Interest received	1,611 26	Loans on mortgages and stock	13,100 00
Premiums received	586 35	Interest paid	277 12
Fines received	13 76	Dues repaid — installment	
Fees received	6 30	stock	679 00
Loans repaid	3,457 10	Profits repaid — installment	
Overdrafts and bills payable..	13,786 88	stock	51 05
All other receipts	4 50	Salaries	300 00
		Taxes	112 92
		Other expenses	47 90
		All other disbursements	64
Total receipts.....	\$23,741 15	Total disbursements..	\$23,741 15

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
1.....	84	\$84 00	\$119 43	\$101 85
3.....	72	72 00	97 01	85 14
6.....	54	54 00	67 81	61 43
7.....	48	48 00	58 84	53 88
9.....	36	36 00	41 99	39 33
11.....	24	24 00	26 59	25 50
14.....	12	12 00	12 64	12 39

No. 85—SAN FRANCISCO.

SAFETY MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated May 12, 1894.)

M. V. KIRKETERP, Secretary.

E. W. NEWHALL, President.

Fiscal year ends April 29, 1905.

No. of series, 21.

No. of shares, 1,665.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$88,311 05	Installment stock—dues	\$54,742 20
Arrearages	809 52	Earnings apportioned	13,901 65
On shares	\$530 20	Advance payments	533 01
On interest	263 77	Overdrafts and bills payable	26,025 00
On premiums	15 55	Reserve and undivided profits	1,447 86
Cash on hand and in bank	111 65		
Real estate owned	7,417 50		
Total assets	\$96,649 72	Total liabilities	\$96,649 72
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$2,639 57	Overdrafts and bills payable	\$13,950 00
Installment stock—dues	15,950 90	Loans on mortgages and stock	27,400 00
Interest received	7,087 67	Interest paid	787 74
Premiums received	179 60	Dues repaid — installment	33,713 00
Fines received	29 66	stock	
Fees received	53 40	Profits repaid — installment	6,689 61
Loans repaid	18,876 36	stock	
Overdrafts and bills payable	39,975 00	Salaries	1,140 00
All other receipts	532 50	Taxes	1,120 05
		Other expenses	269 30
		All other disbursements	143 31
		Balance on hand and in bank	111 65
Total receipts	\$85,324 66	Total disbursements	\$85,324 66

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
1	132	\$132 00	\$194 68	\$173 42
5	108	108 00	146 07	134 73
7	96	96 00	125 09	116 61
9	84	84 00	105 65	99 32
11	72	72 00	87 64	82 96
13	60	60 00	70 67	67 18
15	48	48 00	54 92	52 34
17	36	36 00	39 96	38 24
19	24	24 00	25 84	24 94
21	12	12 00	12 51	12 19

No. 86—SAN FRANCISCO.

SAN FRANCISCO MUTUAL LOAN ASSOCIATION.

(Incorporated October 28, 1882.)

A. SEABORO, Secretary.

C. A. MALM, President.

Fiscal year ends October 31, 1904.

No. of series, 13.

No. of shares, 285.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$20,843 22	Installment stock—dues	\$21,567 50
Arrearages	1,322 00	Earnings apportioned	3,544 61
On shares	\$688 50	Advance payments	15 00
On interest	623 50	Reserve and undivided profits	3,008 21
On premiums	10 00	Other liabilities	1,856 12
Cash on hand and in bank	1,653 46		
Real estate owned	5,886 41		
Other assets	286 35		
Total assets	\$29,991 44	Total liabilities	\$29,991 44
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$80 06	Interest paid	\$35 01
Installment stock—dues	4,188 00	Dues repaid — installment stock	19,855 00
Interest received	1,463 99	Profits repaid — installment stock	3,651 55
Premiums received	30 00	Salaries	900 00
Fines received	25 60	Taxes	398 84
Loans repaid	19,482 49	Other expenses	397 25
Overdrafts and bills payable	2,931 36	All other disbursements	1,310 39
		Balance on hand and in bank	1,653 46
Total receipts	\$28,201 50	Total disbursements	\$28,201 50

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
10	156	\$156 00	\$190 48	\$186 67
11	144	144 00	171 25	167 83
12	132	132 00	154 04	150 96
13	—	—	—	—
14	108	108 00	121 17	118 75
15	96	96 00	106 82	104 69
16	84	84 00	92 61	90 76
17	72	72 00	78 33	76 67
18	60	60 00	64 53	63 24
19	48	48 00	50 98	49 96
20	36	36 00	37 76	37 01
21	24	24 00	24 82	24 41
22	12	12 00	12 25	12 12

No. 87--SAN FRANCISCO.

SAN FRANCISCO AND OAKLAND MUTUAL LOAN ASSOCIATION.

(Incorporated January 3, 1889.)

A. BARBORO, Secretary.

C. A. MALM, President.

Fiscal year ends December 31, 1904.

No. of series, 14.

No. of shares, 936.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$78,197 23	Installment stock--dues	\$72,495 00
Arrearages	495 70	Earnings apportioned	12,874 83
On shares	\$371 00	Reserve and undivided profits	5,944 70
On interest	69 50	Other liabilities	765 67
On premiums	27 50		
On fines, etc.	27 70		
Cash on hand and in bank	7,747 80		
Real estate owned	5,540 09		
Other assets	99 38		
Total assets	\$92,080 20	Total liabilities	\$92,080 20
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$16,391 33	Loans on mortgages and stock	\$22,250 00
Installment stock--dues	12,592 00	Dues repaid -- installment	
Interest received	5,367 79	stock	26,016 00
Premiums received	674 00	Profits repaid -- installment	
Fines received	23 75	stock	6,387 67
Loans repaid	29,253 67	Salaries	1,800 00
All other receipts	1,839 27	Taxes	919 90
		Other expenses	404 49
		All other disbursements	615 95
		Balance on hand and in bank	7,747 80
Total receipts	\$66,141 81	Total disbursements	\$66,141 81

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
5	144	\$144 00	\$185 95	\$182 23
6	132	132 00	165 47	162 16
7	120	120 00	146 06	143 14
8	108	108 00	128 53	125 96
9	96	96 00	112 05	109 81
10	84	84 00	96 12	94 20
11	72	72 00	80 93	79 31
12	60	60 00	66 08	64 76
13	48	48 00	51 92	50 88
14	36	36 00	38 24	37 48
5	24	24 00	25 03	24 53
6	12	12 00	12 25	12 12

No. 88—SAN FRANCISCO.

SAN FRANCISCO HOME MUTUAL LOAN ASSOCIATION.

(Incorporated November 7, 1890.)

A. SHARBORO, Secretary.

C. A. MALM, President

Fiscal year ends October 31, 1904.

No. of series, 10.

No. of shares, 269.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$28,845 20	Installment stock—dues	\$25,464 00
Arrearages	73 50	Earnings apportioned	4,657 15
On shares	\$34 00	Advance payments	10 00
On interest	34 00	Reserve and undivided profits	2,300 83
On premiums	5 50	Other liabilities	3,641 40
Cash on hand and in bank	2,082 71		
Real estate owned	4,967 49		
Other assets	104 48		
Total assets	\$36,073 38	Total liabilities	\$36,073 38
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$459 67	Loans on mortgages and stock	\$300 00
Installment stock—dues	3,440 00	Interest paid	50 90
Interest received	2,240 43	Dues repaid — installment	
Premiums received	207 15	stock	9,370 00
Fines received	17 55	Profits repaid — installment	
Loans repaid	7,108 74	stock	2,420 91
All other receipts	2,683 74	Salaries	900 00
		Taxes	481 80
		Other expenses	393 50
		All other disbursements	157 46
		Balance on hand and in bank	2,082 71
Total receipts	\$16,157 28	Total disbursements	\$16,157 28

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
3	144	\$144 00	\$183 24	\$179 58
4	132	132 00	162 84	159 59
5	120	120 00	143 97	141 09
6	108	108 00	126 45	123 92
7	96	96 00	110 37	108 16
8	84	84 00	95 11	93 21
9	72	72 00	80 17	78 57
10	60	60 00	65 57	64 26
11	48	48 00	51 51	50 48
13	24	24 00	24 90	24 45

No. 89—SAN FRANCISCO.

TRIUMPH LOAN ASSOCIATION.

(Incorporated January 13, 1891.)

JOHN BRUCKMAN, Secretary.

H. EPSTEIN, President.

Fiscal year ends January 31, 1905.

No. of series, 14.

No. of shares, 509.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$53,721 96	Installment stock—dues	\$15,899 60
Arrearages	73 56	Earnings apportioned	4,060 60
On shares	\$8 50	Overdrafts and bills payable	33,874 48
On interest	43 56	Reserve and undivided profits	3,000 00
On fines, etc.	21 50	Unearned premiums	48 00
Real estate owned	5,997 98	Other liabilities	2,910 82
Total assets	\$59,793 50	Total liabilities	\$59,793 50
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Installment stock - dues	\$2,887 90	Overdrafts and bills payable	\$1,055 56
Interest received	2,819 83	Loans on mortgages and stock	46,048 29
Premiums received	48 00	Interest paid	1,185 48
Fines received	2 50	Dues repaid — installment	14,430 00
Fees received	3 50	stock	3,727 00
Loans repaid	27,990 09	Profits repaid — installment	886 50
Overdrafts and bills payable	33,874 48	stock	334 26
All other receipts	110 00	Salaries	69 21
Total receipts	\$67,736 30	Total disbursements	\$67,736 30

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
9	120	\$120 00	\$161 60	\$156 00
13	96	96 00	122 63	119 04
15	84	84 00	104 38	96 64
17	72	72 00	86 98	84 96
19	60	60 00	70 40	69 00
21	48	48 00	54 65	52 80
22	36	36 00	39 74	38 70
23	24	24 00	25 60	25 20
24	12	12 00	12 40	12 30

No. 90—SAN FRANCISCO.

UNION LOAN ASSOCIATION.

(Incorporated May 6, 1881.

E. GUNZBURGER, Secretary.

ISAAC UPHAM, President.

Fiscal year ends May 8, 1905.

No. of series, 8.

No. of shares, 420.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$53,329 40	Installment stock—dues	\$22,092 00
Arrearages	1,178 10	Earnings apportioned	4,141 01
On shares	\$768 00	Advance payments	3 35
On interest	298 60	Overdrafts and bills payable	23,520 49
On premiums	111 50	Reserve and undivided profits	5,395 21
Other assets	901 46	Other liabilities	256 90
Total assets	\$55,408 96	Total liabilities	\$55,408 96

<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Installment stock—dues	\$6,083 00	Overdrafts and bills payable	\$24,691 77
Interest received	5,117 95	Loans on mortgages and stock	5,675 00
Premiums received	1,114 10	Interest paid	1,589 12
Fines received	101 97	Dues repaid — installment	
Fees received	1 50	stock	6,121 00
Loans repaid	16,700 00	Profits repaid — installment	
Overdrafts and bills payable	13,520 49	stock	1,277 17
All other receipts	1,467 37	Salaries	1,075 00
Total receipts	\$44,106 38	Taxes	302 62
		Other expenses	259 60
		All other disbursements	3,115 10
		Total disbursements	\$44,106 38

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
13	144	\$144 00	\$198 57	\$187 66
14	132	132 00	177 08	165 81
16	108	108 00	136 93	128 25
19	72	72 00	84 88	79 08
21	48	48 00	54 33	51 17
22	36	36 00	39 70	37 85
23	24	24 00	25 71	24 85
24	12	12 00	12 45	12 23

No. 91—SAN FRANCISCO.

WESTERN LOAN ASSOCIATION.

(Incorporated November 12, 1886.)

E. GUNZBURGER, Secretary.

D. SAMUELS, President.

Fiscal year ends November 20, 1904.

No. of series, 11.

No. of shares, 723.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$101,556 44	Installment stock—dues	\$39,808 00
Arrearages	4,721 80	Earnings apportioned	8,210 86
On shares	\$1,576 00	Advance payments	236 35
On interest	2,637 70	Overdrafts and bills payable	40,119 10
On premiums	508 10	Reserve and undivided profits	9,603 43
Other assets	100 00	Other liabilities	8,400 00
Total assets	\$106,378 24	Total liabilities	\$106,378 24
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Installment stock—dues	\$10,142 00	Overdrafts and bills payable	\$36,582 34
Interest received	7,494 20	Loans on mortgages and stock	16,375 00
Premiums received	1,298 35	Interest paid	1,864 16
Fees received	14 70	Dues repaid — installment stock	17,697 00
Loans repaid	21,400 00	Profits repaid — installment stock	6,503 63
Overdrafts and bills payable	40,119 10	Salaries	1,600 00
All other receipts	3,113 41	Taxes	970 83
Total receipts	\$83,581 76	Other expenses	224 78
		All other disbursements	1,764 02
		Total disbursements	\$83,581 76

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
8	132	\$132 00	\$191 33	\$179 46
9	120	120 00	167 88	155 91
10	108	108 00	145 76	134 43
11	96	96 00	124 91	114 79
12	84	84 00	105 34	96 80
13	72	72 00	87 04	80 27
14	60	60 00	70 06	65 03
15	48	48 00	54 57	51 28
16	36	36 00	39 94	37 97
17	24	24 00	25 72	24 86
18	12	12 00	12 45	12 23

No. 92—SAN FRANCISCO.

WEST SHORE MUTUAL LOAN ASSOCIATION.

(Incorporated August 4, 1890.)

H. K. STARKWEATHER, Secretary.

C. L. ROBINSON, President.

Fiscal year ends December 31, 1904.

No. of series, none.

No. of shares, 601.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$16,759 35	Installment stock—dues	\$12,445 97
Arrearages	33 95	Earnings apportioned	3,817 31
On interest	\$33 95	Overdrafts and bills payable	2,462 50
Cash on hand and in bank	1,475 54	Reserve and undivided profits	157 02
Other assets	673 41	Other liabilities	59 45
Total assets	\$18,942 25	Total liabilities	\$18,942 25

<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$64 25	Overdrafts and bills payable	\$252 91
Installment stock—dues	16,777 01	Loans on mortgages and stock	6,383 06
Interest received	1,652 36	Interest paid	166 97
Fees received	19 00	Dues repaid — installment	18,729 81
Loans repaid	9,661 93	Profits repaid — installment	145 91
All other receipts	507 88	Salaries	360 00
		Taxes	308 37
		Other expenses	282 01
		All other disbursements	577 85
		Balance on hand and in bank	1,475 54
Total receipts	\$28,682 43	Total disbursements	\$28,682 43

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Dayton plan.

Dues—\$1 per share per month.

Dividend 1904—4 per cent.

Book value—Dues plus dividend.

Withdrawal value—Same as book value.

No. 93—SAN FRANCISCO.

CALIFORNIA HOME BUILDING-LOAN COMPANY.

(Incorporated July 8, 1899.)

R. L. HANDY, Secretary.

P. B. ROBERTS, President.

Fiscal year ends June 30, 1905.

No. of series, none.

No. of shares, 5,441.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock.	\$275,169 78	Installment stock—dues.	\$86,841 27
Arrearages	1,505 75	Earnings apportioned	12,349 60
On interest	\$1,505 75	Paid-up and prepaid stock—capital	18,250 00
Cash on hand and in bank	2,345 61	Paid-up and prepaid stock—dividends	804 76
Real estate owned	5,126 25	Overdrafts and bills payable	157,969 52
Other assets	4,334 31	Reserve and undivided profits	1,859 35
		Other liabilities	10,407 20
Total assets	\$288,481 70	Total liabilities	\$288,481 70

<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$11,730 10	Overdrafts and bills payable	\$49,686 00
Installment stock—dues	118,359 19	Loans on mortgages and stock	132,124 59
Paid-up and prepaid stock	7,500 00	Interest paid	9,414 80
Interest received	21,263 59	Dues repaid — installment stock	93,391 53
Fines and fees received	247 40	Profits repaid — installment stock	207 88
Loans repaid	66,032 02	Paid-up and prepaid stock—capital	3,355 00
Overdrafts and bills payable	80,000 00	Paid-up and prepaid stock—dividends	777 32
All other receipts	508 39	Salaries	3,650 00
		Taxes	2,106 87
		Other expenses	4,958 58
		All other disbursements	3,622 51
		Balance on hand and in bank	2,345 61
Total receipts	\$305,640 69	Total disbursements	\$305,640 69

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

	Age, in Months.	Total Dues per Share.	Loan Fund Dues per Share.	Book Value per Share.	Withdrawal Value.
Class "A."	63	\$37 80	\$31 50	\$43 56	\$40 55
	51	30 60	25 50	32 33	30 62
	39	23 40	19 50	23 27	22 33
	27	16 20	13 50	15 20	14 78
	15	9 00	7 50	7 91	-----
	6	3 60	3 00	3 07	-----

No. 94—SAN FRANCISCO.

CONTINENTAL BUILDING AND LOAN ASSOCIATION.

(Incorporated July 17, 1889.)

WM. CORBIN, Secretary.

WASHINGTON DODGE, President.

Fiscal year ends June 30, 1905.

No. of series, none.

No. of shares, 163,264.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$2,461,549 90	Installment stock—dues	\$1,486,221 07
Arrearages	41,054 60	Earnings apportioned	337,460 94
On interest	\$35,964 40	Paid-up and prepaid stock—capital	692,780 20
On premiums	5,090 20	Paid-up and prepaid stock—dividends	17,576 40
Cash on hand and in bank	1,472 59	Advance payments	52,006 48
Real estate owned	434,931 94	Overdrafts and bills payable	153,662 51
Other assets	62,896 23	Reserve and undivided profits and life insurance reserve	45,815 56
		Other liabilities, including incomplete loans, \$166,410.81	216,382 10
Total assets	\$3,001,905 26	Total liabilities	\$3,001,905 26
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$34,522 60	Overdrafts and bills payable	\$42,000 00
Installment stock—dues	607,199 29	Loans on mortgages and stock	729,408 14
Paid-up and prepaid stock	474,423 34	Interest paid	8,561 69
Interest received	216,170 63	Dues repaid — installment stock	678,885 04
Premiums received	30,597 06	Profits repaid — installment stock	123,299 36
Fines received	785 97	Paid-up and prepaid stock—capital	578,157 45
Fees received	100 90	Paid-up and prepaid stock—dividends	41,598 24
Loans repaid	840,716 56	Salaries	18,520 00
Overdrafts and bills payable	145,662 51	Taxes	33,472 89
All other receipts, including real estate, \$217,119.92	377,001 94	Other expenses	71,126 41
		All other disbursements, including real estate, \$292,744.84	400,678 99
Total receipts	\$2,727,180 80	Balance on hand and in bank	1,472 59
		Total disbursements	\$2,727,180 80

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

	Age, in Months.	Total Dues per Share.	Loan Fund Dues per Share.	Book Value per Share.	Withdrawal Value.
Class "F." Dues, 50c or \$1 per share per month.	72 (Dues, 50c)	\$36 00	\$36 00	\$48 30	\$44 37
	60	30 00	30 00	39 01	35 67
	48	24 00	24 00	28 06	27 54
	36	18 00	18 00	20 25	19 93
	24	12 00	12 00	13 04	12 83
	12	6 00	6 00	6 21	6 18

Classes "A," "E," and "G" not now being issued.

No. 95—SAN FRANCISCO.

PACIFIC STATES SAVINGS, LOAN, AND BUILDING COMPANY.

(Incorporated July, 1889.)

WILLIAM PARDY, Secretary.

JOHN H. WISE, President.

Fiscal year ends July 31, 1904.

No. of series, 117.

No. of shares, 37,895.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$1,433,028 40	Installment stock—dues	\$827,010 86
Arrearages	16,576 79	Earnings apportioned	239,328 56
On shares	\$6,608 54	Paid-up and prepaid stock—capital	239,920 00
On interest	4,988 10	Paid-up and prepaid stock—dividends	15,757 00
On premiums	4,980 15	Advance payments	10,154 43
Cash on hand and in bank	2,187 11	Overdrafts and bills payable	111,229 45
Real estate owned	87,395 84	Reserve and undivided profits	42,153 30
Other assets	13,331 32	Other liabilities	66,960 86
Total assets	\$1,552,519 46	Total liabilities	\$1,552,519 46
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$15,595 90	Overdrafts and bills payable	\$29,802 22
Installment stock—dues	214,793 60	Loans on mortgages and stock	563,523 40
Paid-up and prepaid stock	52,620 00	Interest paid	3,190 50
Interest and premiums received	135,788 85	Dues repaid—installment stock	173,466 96
Fines received	800 95	Profits repaid—installment stock	43,849 04
Fees received	62 60	Paid-up and prepaid stock—capital	12,420 00
Loans repaid	381,613 71	Paid-up and prepaid stock—dividends	9,616 20
Overdrafts and bills payable	81,667 12	Salaries	18,365 00
All other receipts	70,676 98	Taxes	12,974 36
Total receipts	\$953,619 71	Other expenses	9,021 63
		All other disbursements	69,203 29
		Balance on hand and in bank	2,187 11
		Total disbursements	\$953,619 71

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Loan Fund Dues per Share.	Book Value per Share.	Withdrawal Value.
49	108	\$64 80	\$64 80	\$90 48	\$90 48
61	96	57 60	57 60	77 12	77 12
73	84	50 40	50 40	64 84	64 84
85	72	43 20	43 20	53 46	53 46
97	60	36 00	36 00	42 95	42 95
109	48	28 80	28 80	33 16	33 16
121	36	21 60	21 60	24 01	24 01
133	24	14 40	14 40	15 46	-----
145	12	7 20	7 20	7 47	-----

Class "C."

No. 96—SAN FRANCISCO.

PHOENIX SAVINGS, BUILDING AND LOAN ASSOCIATION

(Incorporated October 11, 1889.)

CLARENCE GRANGE, Secretary.

A. A. WATKINS, President.

Fiscal year ends June 30, 1905.

No. of series, none.

No. of shares, 60,982.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$1,178,706 70	Installment stock—dues	\$609,511 30
Cash on hand and in bank	53,652 63	Earnings apportioned	46,334 58
Real estate owned	37,606 56	Paid-up and prepaid stock—capital	280,343 08
Other assets	19,665 20	Paid-up and prepaid stock—dividends	20,519 40
		Overdrafts and bills payable	80,000 00
		Reserve and undivided profits	246,424 20
		Other liabilities	6,498 53
Total assets	\$1,289,631 09	Total liabilities	\$1,289,631 09

<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$69,543 94	Overdrafts and bills payable	\$24,552 93
Installment stock—dues	470,732 73	Loans on mortgages and stock	590,863 96
Paid-up and prepaid stock	75,844 03	Interest paid	1,558 16
Interest received	126,712 97	Dues repaid — installment stock	398,602 91
Fines received	489 50	Profits repaid — installment stock	20,564 90
Fees received	62,189 91	Paid up and prepaid stock—capital	51,853 50
Loans repaid	436,512 07	Paid up and prepaid stock—dividends	14,443 73
Overdrafts and bills payable	100,000 00	Salaries	21,366 24
All other receipts	68,469 15	Taxes	13,285 70
		Other expenses	43,620 52
		All other disbursements	176,129 12
		Balance on hand and in bank	53,652 63
Total receipts	\$1,410,494 30	Total disbursements	\$1,410,494 30

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Age, in Months.	Total Dues per Share, less Withdrawal Fee.	Loan Fund Dues per share.	Book Value per Share.	Withdrawal Value.
42	\$25 00	\$20 80	\$21 99	See Note.
36	21 40	17 80	18 73	
30	17 80	14 80	15 50	
24	14 20	11 80	12 35	
18	10 60	8 80	9 19	
12	7 00	5 80	6 02	
6	3 40	2 80	2 89	

No interest until after 2 years; thereafter, 6 per cent. Withdrawal fee of \$2.00 per share charged upon total dues.

No. 97—SAN FRANCISCO.

RENTERS' LOAN AND TRUST COMPANY.

(Incorporated November 24, 1890.)

GRANT CORDREY, Secretary.

GEORGE M. PERINE, President.

Fiscal year ends December 31, 1904.

No. of series, 110.

No. of shares, 56,216.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$1,473,741 80	Installment stock—dues	\$755,501 00
Arrearages	22,870 55	Earnings apportioned	180,873 15
On shares	\$14,834 00	Paid-up and prepaid stock—capital	411,122 59
On interest	3,756 55	Advance payments	15,496 55
On premiums	4,280 00	Overdrafts and bills payable	35,988 92
Real estate owned	17,740 00	Reserve and undivided profits	55,544 14
Other assets	6,655 21	Other liabilities	66,481 21
Total assets	\$1,521,007 56	Total liabilities	\$1,521,007 56
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Installment stock—dues	\$292,782 77	Overdrafts and bills payable	\$43,501 02
Paid-up and prepaid stock	140,170 21	Loans on mortgages and stock	665,917 80
Interest received	109,553 71	Interest paid	2,436 89
Premiums received	46,813 50	Dues repaid — installment stock	165,618 00
Fines received	78 92	Profits repaid — installment stock	41,449 39
Loans repaid	366,839 75	Paid-up and prepaid stock—capital	75,400 00
Overdrafts and bills payable	43,443 15	Paid-up and prepaid stock—dividends	26,273 40
All other receipts	128,667 11	Salaries	24,601 21
Total receipts	\$1,128,349 12	Taxes	17,293 74
		Other expenses	17,968 88
		All other disbursements	47,888 79
		Total disbursements	\$1,128,349 12

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Loan Fund Dues per Share.	Book Value per Share.	Withdrawal Value.
61	108	\$64 80	\$54 00	\$85 77	Loan Fund dues plus 75 per cent of profits.
73	96	57 60	48 00	71 11	
85	84	50 40	42 00	58 53	
97	72	43 20	36 00	47 18	
109	60	36 00	30 00	37 48	
121	48	28 80	24 00	28 92	
133	36	21 60	18 00	20 50	
145	24	14 40	12 00	13 26	
157	12	7 20	6 00	6 25	

No. 98—SAN JOSÉ.

NUCLEUS BUILDING AND LOAN ASSOCIATION.

(Incorporated April, 1889.)

C. H. JOHNSON, Secretary.

GEORGE B. MCKEE, President.

Fiscal year ends April 4, 1905.

No. of series, 9.

No. of shares, 887.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$49,676 40	Installment stock—dues	\$19,012 60
Arrearages	936 04	Earnings apportioned	2,737 56
On shares	\$86 00	Paid-up and prepaid stock—capital	24,400 00
On interest	830 04	Paid-up and prepaid stock—dividends	535 50
On premiums	20 00	Advance payments	50 00
Cash on hand and in bank	1,563 71	Overdrafts and bills payable	4,300 00
Real estate owned	800 00	Reserve and undivided profits	518 97
Other assets	322 56	Other liabilities	1,744 08
Total assets	\$53,298 71	Total liabilities	\$53,298 71

<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$3,542 12	Overdrafts and bills payable	\$500 00
Installment stock—dues	5,824 70	Loans on mortgages and stock	22,070 00
Paid-up and prepaid stock	4,300 00	Interest paid	106 54
Interest received	3,070 74	Dues repaid — installment stock	8,981 40
Premiums received	179 00	Profits repaid — installment stock	2,128 64
Loans repaid	14,465 61	Paid-up and prepaid stock—capital	700 00
Overdrafts and bills payable	4,800 00	Paid-up and prepaid stock—dividends	978 32
All other receipts	1,767 78	Salaries	787 50
Total receipts	\$37,949 95	Taxes	84 74
		Other expenses	99 10
		Balance on hand and in bank	1,563 71
		Total disbursements	\$37,949 95

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
10	128	\$128 00	\$167 14	Book value less 2 per cent.
11	117	117 00	148 14	
12	107	107 00	132 47	
13	95	95 00	114 29	
14	82	82 00	96 19	
16	64	64 00	72 76	
17	59	59 00	66 43	
18	54	54 00	60 30	
19	49	49 00	54 27	

Also, Dayton shares—Dividend, 6 per cent: book value, dues plus dividend; withdrawal value, same as book value.

No. 90—SAN JOSÉ.

MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated August 22, 1891.)

GEORGE N. JONES, Secretary.

JAMES BEAN, President.

Fiscal year ends September 30, 1904.

No. of series, none.

No. of shares, 1,628.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock.	\$106,100 25	Installment stock—dues.....	\$37,378 75
Cash on hand and in bank....	1,208 81	Earnings apportioned.....	6,705 64
Other assets.....	100 00	Paid-up and prepaid stock— capital.....	48,650 00
		Paid-up and prepaid stock— dividends.....	323 79
		Overdrafts and bills payable.	8,000 00
		Reserve and undivided profits	1,496 09
		Other liabilities.....	4,854 79
Total assets.....	\$107,409 06	Total liabilities.....	\$107,409 06
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Installment stock—dues.....	\$16,908 66	Overdrafts and bills payable.	\$18,618 77
Paid-up and prepaid stock....	17,953 83	Loans on mortgages and stock	42,100 85
Interest received.....	8,037 96	Interest paid.....	326 09
Fines received.....	8 41	Dues repaid — installment stock.....	15,336 10
Fees received.....	23 80	Profits repaid — installment stock.....	3,880 68
Loans repaid.....	28,286 56	Paid-up and prepaid stock— capital.....	7,329 54
Overdrafts and bills payable..	20,000 00	Paid-up and prepaid stock— dividends.....	27 85
All other receipts.....	1,226 96	Salaries.....	993 16
		Taxes.....	1,814 61
		Other expenses.....	455 34
		All other disbursements.....	348 40
		Balance on hand and in bank	1,208 81
Total receipts.....	\$92,446 18	Total disbursements.....	\$92,446 18

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Dayton plan.

Dividend— $5\frac{1}{4}$ per cent.

Book value—Dues plus dividend.

Withdrawal value—Dues plus 90 per cent of profits.

No. 100—SAN JOSÉ.

SAN JOSÉ BUILDING AND LOAN ASSOCIATION.

(Incorporated January 30, 1885.)

A. K. WHITTON, Secretary.

J. M. PITMAN, President.

Fiscal year ends December 31, 1904.

No. of series, 6.

No. of shares, 1,674.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$108,755 20	Installment stock—dues	\$47,663 86
Arrearages	1,357 28	Earnings apportioned	2,583 24
On shares	\$34 00	Paid-up and prepaid stock—capital	10,996 03
On interest	801 26	Overdrafts and bills payable	42,901 43
On premiums	475 12	Reserve and undivided profits	1,046 52
On fines, etc.	46 90	Other liabilities	8,246 23
Cash on hand and in bank	759 76		
Real estate owned	2,565 07		
Total assets	\$113,437 31	Total liabilities	\$113,437 31
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$2,033 27	Overdrafts and bills payable	\$12,055 00
Installment stock—dues	40,060 66	Loans on mortgages and stock	50,265 00
Paid-up and prepaid stock	300 00	Interest paid	3,216 86
Interest received	11,275 40	Dues repaid — installment stock	44,159 00
Fines received	300 75	Profits repaid — installment stock	5,311 98
Loans repaid	40,008 48	Paid-up and prepaid stock—capital	1,800 00
Overdrafts and bills payable	25,751 43	Paid-up and prepaid stock—dividends	427 55
All other receipts	4,643 47	Salaries	1,600 00
Total receipts	\$124,373 46	Taxes	1,619 95
		Other expenses	353 74
		All other disbursements	2,804 62
		Balance on hand and in bank	759 76
		Total disbursements	\$124,373 46

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
10	131	\$131 00	\$184 97	\$183 70
11	119	119 00	161 06	160 15
12	107	107 00	139 61	138 25
16	95	95 00	119 78	118 50
17	92	92 00	115 89	115 00
22	77	77 00	92 83	92 83

Also, 1,552 shares on Dayton plan—dividend, 6 per cent; book value, dues plus dividend.

No. 101—SAN LUIS OBISPO.

SAN LUIS BUILDING AND LOAN ASSOCIATION.

(Incorporated March 1, 1888.)

M. LEWIN, Secretary.

BENJAMIN BROOKS, President.

Fiscal year ends March 1, 1905.

No. of series, 10.

No. of shares, 1,935.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$125,470 00	Installment stock—dues	\$90,936 00
Arrearages	55 58	Earnings apportioned	22,299 65
On shares	\$19 00	Advance payments	870 98
On interest	27 78	Overdrafts and bills payable	8,256 65
On premiums	1 80	Reserve and undivided profits	10
On fines, etc.	7 00	Other liabilities	3,162 20
Total assets	\$125,525 58	Total liabilities	\$125,525 58
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$5,365 03	Overdrafts and bills payable	\$1,143 56
Installment stock—dues	25,917 00	Loans on mortgages and stock	37,900 00
Interest received	10,504 33	Interest paid	134 70
Premiums received	1,803 46	Dues repaid — installment	28,123 00
Fines received	176 89	stock	10,451 51
Fees received	62 62	Profits repaid — installment	1,447 88
Loans repaid	30,020 00	stock	185 10
Overdrafts and bills payable	8,256 65	Salaries	2,647 42
All other receipts	84 10	Taxes	185 10
Total receipts	\$82,190 08	All other disbursements	156 91
		Total disbursements	\$82,190 08

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
6	120	\$120 00	\$188 51	\$185 08
7	108	108 00	153 72	148 01
8	96	96 00	129 18	122 54
9	84	84 00	108 71	101 91
10	72	72 00	89 96	83 67
11	60	60 00	71 99	66 89
12	48	48 00	55 65	51 83
13	36	36 00	40 26	38 13
14	24	24 00	25 90	24 95
15	12	12 00	12 47	12 24

No. 102—SAN MATEO.

SAN MATEO MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated May 22, 1896.)

C. H. KIRKBRIDE, Secretary.

E. A. HUSING, President.

Fiscal year ends December 31, 1904.

No. of series, 31.

No. of shares, 1,101.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$75,120 00	Installment stock—dues.....	\$42,747 00
Arrearages.....	418 65	Earnings apportioned.....	11,752 62
On shares.....	\$173 00	Advance payments.....	111 00
On interest.....	223 15	Overdrafts and bills payable..	19,407 25
On premiums.....	5 00	Reserve and undivided profits	1,326 08
On fines, etc.....	17 50	Other liabilities.....	849 06
Cash on hand and in bank.....	519 91		
Other assets.....	134 45		
Total assets.....	\$76,193 01	Total liabilities.....	\$76,193 01

<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report.....	\$928 48	Overdrafts and bills payable..	\$9,640 00
Installment stock—dues.....	12,686 00	Loans on mortgages and stock	31,225 88
Interest received.....	4,901 15	Interest paid.....	769 74
Premiums received.....	633 70	Dues repaid — installment	
Fines received.....	39 20	stock.....	2,472 00
Fees received.....	44 80	Profits repaid — installment	
Loans repaid.....	7,950 00	stock.....	272 88
Overdrafts and bills payable..	19,297 25	Salaries.....	530 00
All other receipts.....	42 16	Taxes.....	851 77
		Other expenses.....	106 77
		All other disbursements.....	133 84
		Balance on hand and in bank	519 91
Total receipts.....	\$46,522 74	Total disbursements.....	\$46,522 74

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
3.....	96	\$96 00	\$134 18	\$126 54
7.....	84	84 00	112 01	103 61
11.....	72	72 00	91 67	85 77
15.....	60	60 00	73 01	67 81
19.....	48	48 00	55 90	52 74
23.....	36	36 00	40 19	38 10
27.....	24	24 00	25 78	24 89
31.....	12	12 00	12 45	12 23

No. 103--SAN RAFAEL.

MARIN COUNTY MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated July 19, 1886.)

L. A. LANCEL, Secretary.

GEORGE M. DODGE, President.

Fiscal year ends July 31, 1904.

No. of series, 12.

No. of shares, 3,517.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$146,460 45	Installment stock--dues	\$131,058 00
Cash on hand and in bank	20,173 72	Earnings apportioned	33,063 96
Other assets	19 60	Advance payments	531 00
		Reserve and undivided profits	280 81
		Other liabilities	1,720 00
Total assets	\$166,653 77	Total liabilities	\$166,653 77
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$5,967 52	Loans on mortgages and stock	\$22,630 00
Installment stock--dues	43,546 00	Interest paid	17 13
Interest received	11,455 75	Dues repaid -- installment	
Premiums received	2,083 60	stock	32,186 00
Fines received	18 80	Profits repaid -- installment	
Fees received	77 30	stock	9,789 87
Loans repaid	25,092 80	Salaries	1,200 00
All other receipts	46 25	Taxes	2,149 94
		Other expenses	121 76
		All other disbursements	19 60
		Balance on hand and in bank	20,173 72
Total receipts	\$88,288 02	Total disbursements	\$88,288 02

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
10	108	\$108 00	\$177 26	\$173 80
11	96	96 00	147 20	142 08
12	84	84 00	121 20	113 76
13	72	72 00	97 80	90 06
14	60	60 00	76 90	70 14
15	48	48 00	58 20	53 10
16	36	36 00	41 50	38 75
18	24	24 00	26 22	25 11
20	12	12 00	12 60	12 30

No. 104—SANTA ANA.

HOME MUTUAL BUILDING AND LOAN ASSOCIATION

(Incorporated April 1, 1893.)

F. W. MANSUR, Secretary.

JOHN McFADDEN, President.

Fiscal year ends December 31, 1904.

No. of series, 15.

No. of shares, 2,888.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock.	\$204,960 00	Installment stock—dues.	\$127,518 00
Arrearages	336 05	Earnings apportioned	41,863 22
On shares	\$135 50	Paid-up and prepaid stock—	
On interest	200 55	capital	14,800 00
Cash on hand and in bank	34 24	Overdrafts and bills payable	15,783 75
Other assets	50 00	Reserve and undivided profits	2,859 12
		Other liabilities	2,556 20
Total assets	\$205,380 29	Total liabilities	\$205,380 29
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$4,647 50	Overdrafts and bills payable	\$8,750 00
Installment stock—dues	33,372 00	Loans on mortgages and stock	72,584 60
Paid-up and prepaid stock	11,000 00	Interest paid	552 48
Interest received	14,291 20	Dues repaid — installment	
Premiums received	1,643 85	stock	22,004 50
Fines received	6 75	Profits repaid — installment	
Fees received	84 80	stock	9,911 50
Loans repaid	34,340 10	Paid-up and prepaid stock—	
Overdrafts and bills payable	20,533 75	capital	2,800 00
All other receipts	1,668 70	Paid-up and prepaid stock—	
		dividends	318 67
Total receipts	\$121,588 65	Salaries	900 00
		Taxes	2,844 13
		Other expenses	480 53
		All other disbursements	408 00
		Balance on hand and in bank	34 24
		Total disbursements	\$121,588 65

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
2	120	\$126 00	\$182 80	\$168 60
3	108	113 40	158 27	147 06
4	96	100 80	135 39	126 75
5	84	88 20	114 06	107 60
6	72	75 60	94 17	86 74
7	60	63 00	75 61	70 56
8	48	50 40	58 31	54 35
10	36	37 80	42 16	39 98
12	24	25 20	27 12	26 16
14	12	12 60	13 08	12 84

No. 105—SANTA ANA.

ORANGE COUNTY MUTUAL BUILDING AND LOAN
ASSOCIATION.

(Incorporated March 7, 1901.)

N. A. ULM, Secretary.

C. D. BALL, President.

Fiscal year ends March 1, 1905.

No. of series, none.

No. of shares, 1,026.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$36,775 00	Installment stock—dues	\$9,311 29
Cash on hand and in bank	7,159 28	Earnings apportioned	405 46
Other assets	563 23	Paid-up and prepaid stock— capital	22,000 00
		Advance payments	374 00
		Overdrafts and bills payable	10,000 00
		Reserve and undivided profits	899 66
		Other liabilities	1,507 10
Total assets	\$44,497 51	Total liabilities	\$44,497 51

<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$6,220 67	Overdrafts and bills payable	\$1,000 00
Installment stock—dues	7,381 79	Loans on mortgages and stock	19,042 90
Paid-up and prepaid stock	9,600 00	Interest paid	655 00
Interest received	2,794 88	Dues repaid—installment stock	6,318 88
Fines received	50	Profits repaid—installment stock	197 92
Fees received	232 20	Paid-up and prepaid stock— capital	500 00
Loans repaid	10,250 00	Paid-up and prepaid stock— dividends	744 20
		Salaries	300 00
		Taxes	538 20
		Other expenses	23 66
		Balance on hand and in bank	7,159 28
Total receipts	\$36,480 04	Total disbursements	\$36,480 04

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Dayton plan.

Dividend 1904—6½ per cent.

Book value—Dues plus dividend.

Withdrawal value—Same as book value.

No. 106—SANTA BARBARA.

LOAN AND BUILDING ASSOCIATION.

(Incorporated May 23, 1887.)

J. T. JOHNSON, Secretary.

H. L. STAMBACH, President.

Fiscal year ends July 6, 1904.

No. of series, 14.

No. of shares, 4,488.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$258,075 00	Installment stock—dues	\$207,858 00
Arrearages	2,710 60	Earnings apportioned	44,819 50
On shares	\$1,109 00	Paid-up and prepaid stock—capital	3,000 00
On interest	1,464 75	Advance payments	410 75
On fines, etc.	136 85	Reserve and undivided profits	106 05
Cash on hand and in bank	887 30	Other liabilities	5,844 50
Other assets	365 90		
Total assets	\$262,038 80	Total liabilities	\$262,038 80

<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$2,513 24	Loans on mortgages and stock	\$70,925 00
Installment stock—dues	53,291 00	Dues repaid — installment stock	24,469 00
Paid-up and prepaid stock	5,000 00	Profits repaid — installment stock	7,382 05
Interest received	19,506 20	Paid-up and prepaid stock—capital	6,100 00
Fines received	12 50	Paid-up and prepaid stock—dividends	398 65
Fees received	121 75	Salaries	1,080 00
Loans repaid	34,137 00	Taxes	5,697 53
All other receipts	3,343 90	Other expenses	986 06
		Balance on hand and in bank	887 30
Total receipts	\$117,925 59	Total disbursements	\$117,925 59

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
6	126	\$126 00	\$181 40	\$181 40
7	114	114 00	156 65	156 65
8	102	102 00	135 15	135 15
9	90	90 00	114 90	114 90
10	78	78 00	96 10	96 10
11	66	66 00	78 55	77 30
12	54	54 00	62 00	61 40
13	42	42 00	46 55	45 65
14	36	36 00	39 20	38 65
16	24	24 00	25 35	25 00
18	12	12 00	12 30	12 20

No. 107—SANTA BARBARA.

SANTA BARBARA MUTUAL BUILDING AND LOAN
ASSOCIATION.

(Incorporated May 20, 1901.)

J. M. WARREN, Secretary.

E. C. ROEDER, President.

Fiscal year ends March 1, 1905.

No. of series, none.

No. of shares, 3,708.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$110,937 00	Installment stock—dues	\$105,919 08
Arrearages	720 36	Earnings apportioned	4,743 99
On interest	\$720 36	Reserve and undivided profits	677 04
Cash on hand and in bank	2,802 25	Other liabilities	3,150 00
Other assets	30 50		
Total assets	\$114,490 11	Total liabilities	\$114,490 11
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$3,720 66	Overdrafts and bills payable	\$10,400 00
Installment stock—dues	68,394 04	Loans on mortgages and stock	56,550 50
Interest received	7,207 15	Interest paid	42 13
Loans repaid	10,350 00	Dues repaid — installment	27,442 71
Overdrafts and bills payable	10,400 00	stock	481 63
		Profits repaid — installment	745 42
		stock	1,434 14
		Salaries	173 07
		Taxes	2,802 25
		Other expenses	
		Balance on hand and in bank	
Total receipts	\$100,071 85	Total disbursements	\$100,071 85

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Dayton plan.

Dividend—6 per cent.

Book value—Dues plus dividend.

Withdrawal value—Same as book value.

No. 108—SANTA CLARA.

SANTA CLARA BUILDING AND LOAN ASSOCIATION.

(Incorporated March 19, 1889.)

F. O. ROLL, Secretary.

J. B. O'BRIEN, President.

Fiscal year ends March 31, 1905.

No. of series, 10.

No. of shares, 1,669.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$106,900 00	Installment stock—dues	\$69,198 00
Arrearages	621 80	Earnings apportioned	18,407 70
On shares	\$427 50	Advance payments	157 50
On interest	128 60	Overdrafts and bills payable	10,458 82
On premiums	3 25	Reserve and undivided profits	4,256 52
On fines, etc.	62 45	Unearned premiums	1,387 51
		Other liabilities	3,655 75
Total assets	\$107,521 80	Total liabilities	\$107,521 80

<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Installment stock—dues	\$20,952 00	Overdrafts and bills payable	\$4,263 72
Interest received	6,591 90	Loans on mortgages and stock	33,016 95
Premiums received	1,673 20	Interest paid	322 79
Fines received	39 45	Dues repaid — installment stock	7,048 50
Fees received	39 60	Profits repaid — installment stock	2,221 75
Loans repaid	9,500 00	Salaries	630 00
Overdrafts and bills payable	10,458 82	Taxes	1,259 37
All other receipts	9 00	Other expenses	341 39
		All other disbursements	59 50
Total receipts	\$49,263 97	Total disbursements	\$49,263 97

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
7	120	\$120 00	\$180 00	\$180 00
8	108	108 00	156 60	155 00
9	96	96 00	134 40	129 00
10	84	84 00	113 40	108 00
11	72	72 00	93 60	88 00
12	60	60 00	75 00	70 00
13	48	48 00	57 60	52 50
14	36	36 00	41 40	38 00
15	24	24 00	26 40	25 00
16	12	12 00	12 60	12 25

No. 109—SANTA PAULA.

SANTA PAULA BUILDING AND LOAN ASSOCIATION.

(Incorporated April, 1890.)

H. H. YOUNGKEN, Secretary.

J. R. HOUGH, President.

Fiscal year ends May 11, 1905.

No. of series, 30.

No. of shares, 2,120.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$82,600 00	Installment stock—dues	\$59,553 00
Arrearages	479 46	Earnings apportioned	10,857 50
On shares	\$227 60	Overdrafts and bills payable	12,900 00
On interest	164 00	Unearned premiums	73 00
On premiums	49 88	Other liabilities	237 24
On fines, etc.	37 98		
Cash on hand and in bank	406 75		
Other assets	134 53		
Total assets	\$83,620 74	Total liabilities	\$83,620 74
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$187 44	Overdrafts and bills payable	\$8,000 00
Installment stock—dues	24,873 90	Loans on mortgages and stock	29,962 76
Interest received	6,214 84	Interest paid	688 46
Premiums received	1,550 49	Dues repaid — installment stock	21,274 70
Fines received	63 28	Profits repaid — installment stock	6,588 83
Fees received	92 10	Salaries	600 00
Loans repaid	22,300 00	Taxes	834 96
Overdrafts and bills payable	12,900 00	Other expenses	244 72
All other receipts	741 67	All other disbursements	322 54
		Balance on hand and in bank	406 75
Total receipts	\$68,923 72	Total disbursements	\$68,923 72

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
10	72	\$72 00	\$95 04	\$95 04
11	60	60 00	75 43	75 43
12	48	48 00	57 74	54 24
13	36	36 00	41 30	39 36
14	24	24 00	26 34	25 50
15	12	12 00	12 60	12 39

No. 110--SANTA ROSA.

SANTA ROSA BUILDING AND LOAN ASSOCIATION.

(Incorporated October 3, 1888.)

C. D. BARNETT, Secretary.

ALLEN B. LEMMON, President.

Fiscal year ends October 30, 1904.

No. of series, 11.

No. of shares, 1,776.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$128,738 69	Installment stock—dues	\$82,268 40
Arrearages	555 28	Earnings apportioned	15,940 06
On shares	\$109 10	Advance payments	431 39
On interest	395 73	Overdrafts and bills payable	23,621 31
On fines, etc.	50 45	Reserve and undivided profits	4 52
Other assets	10 75	Other liabilities	7,039 04
Total assets	\$129,304 72	Total liabilities	\$129,304 72

<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$583 24	Loans on mortgages and stock	\$51,545 20
Installment stock—dues	17,206 95	Interest paid	516 64
Interest received	9,123 93	Dues repaid — installment stock	20,524 00
Premiums received	26 40	Profits repaid — installment stock	5,160 95
Fines received	35 05	Salaries	480 00
Fees received	60 30	Taxes	620 38
Loans repaid	28,311 56	Other expenses	226 60
Overdrafts and bills payable	23,621 31	All other disbursements	32 00
All other receipts	137 03		
Total receipts	\$79,105 77	Total disbursements	\$79,105 77

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
6	132	\$132 00	\$181 82	\$181 10
7	120	120 00	158 84	158 00
8	108	108 00	137 63	137 16
9	96	96 00	118 54	118 08
10	84	84 00	100 85	100 17
11	72	72 00	84 12	83 34
12	60	60 00	68 25	67 50
13	48	48 00	53 26	52 56
14	36	36 00	39 01	38 43
16	12	12 00	12 37	12 25

No. 111—SAUSALITO.

SAUSALITO MUTUAL LOAN ASSOCIATION.

(Incorporated December 1, 1887.)

THOS. PENLINGTON, Secretary.

C. H. BECKER, President.

Fiscal year ends October 31, 1904.

No. of series, 8.

No. of shares, 1,042.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$42,650 00	Installment stock—dues	\$36,126 00
Arrearages	320 98	Earnings apportioned	6,834 69
On shares	\$207 50	Overdrafts and bills payable	1,700 00
On interest	59 33	Reserve and undivided profits	1,125 57
On premiums	25 00		
On fines, etc.	29 15		
Cash on hand and in bank	297 39		
Real estate owned	2,497 89		
Other assets	20 00		
Total assets	\$45,786 26	Total liabilities	\$45,786 26
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$62 64	Overdrafts and bills payable	\$2,700 00
Installment stock—dues	12,463 50	Loans on mortgages and stock	11,900 00
Interest received	2,942 01	Interest paid	404 98
Premiums received	1,230 18	Dues repaid — installment stock	8,711 00
Fines received	99 55	Profits repaid — installment stock	1,774 60
Fees received	33 80	Salaries	480 00
Loans repaid	8,230 00	Taxes	473 91
Overdrafts and bills payable	1,400 00	Other expenses	79 80
All other receipts	360 00	Balance on hand and in bank	297 39
Total receipts	\$26,821 68	Total disbursements	\$26,821 68

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
11	77	\$77 00	\$100 00	\$100 00
12	72	72 00	92 47	90 00
13	60	60 00	73 73	71 00
14	48	48 00	56 47	53 92
15	36	36 00	40 64	38 80
16	24	24 00	26 04	25 02
17	12	12 00	12 52	12 26

No. 112—SAUSALITO.

TAMALPAIS MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated March 16, 1897.)

J. A. McPHERSON, Secretary.

T. W. JACKSON, President.

Fiscal year ends April 30, 1905.

No. of series, 16.

No. of shares, 609.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$22,950 00	Installment stock—dues	\$9,470 00
Arrearages	819 07	Earnings apportioned	1,099 62
On shares	\$480 55	Paid-up and prepaid stock—capital	7,060 00
On interest	194 42	Paid-up and prepaid stock—dividends	184 70
On premiums	82 88	Advance payments	15 00
On fines, etc.	61 22	Overdrafts and bills payable	6,000 00
Cash on hand and in bank	348 39	Reserve and undivided profits	36 54
		Other liabilities	251 60
Total assets	\$24,117 46	Total liabilities	\$24,117 46
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$708 92	Overdrafts and bills payable	\$1,300 00
Installment stock—dues	5,226 45	Loans on mortgages and stock	13,912 85
Paid-up and prepaid stock	3,860 00	Interest paid	319 05
Interest received	1,099 76	Dues repaid — installment stock	1,714 00
Premiums received	471 54	Profits repaid — installment stock	257 22
Fines received	6 30	Paid-up and prepaid stock—capital	1,410 00
Fees received	34 20	Paid-up and prepaid stock—dividends	267 30
Loans repaid	2,210 00	Salaries	200 00
Overdrafts and bills payable	6,300 00	Taxes	189 06
All other receipts	129 11	Other expenses	128 41
Total receipts	\$20,046 28	Balance on hand and in bank	348 39
		Total disbursements	\$20,046 28

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
4	66	\$66 00	\$83 38	\$83 38
7	48	48 00	57 39	55 98
9	36	36 00	41 39	40 31
13	24	24 00	26 44	25 70
17	12	12 00	12 62	12 37

No. 113—STOCKTON.

SAN JOAQUIN VALLEY BUILDING AND LOAN ASSOCIATION.

(Incorporated June 17, 1889.)

A. M. NOBLE, Secretary.

S. N. CROSS, President.

Fiscal year ends December 31, 1904.

No. of series, none.

No. of shares, 5,372.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$253,450 06	Installment stock—dues	\$107,341 20
Arrearages	2,339 60	Earnings apportioned	16,012 29
On interest	\$2,339 60	Paid-up and prepaid stock—capital	112,362 55
Other assets	162 80	Paid-up and prepaid stock—dividends	7,533 65
		Overdrafts and bills payable	5,130 53
		Reserve and undivided profits	5,725 14
		Other liabilities	1,847 10
Total assets	\$255,952 46	Total liabilities	\$255,952 46
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$9,636 77	Loans on mortgages and stock	\$105,267 15
Installment stock—dues	49,207 41	Interest paid	148 14
Paid-up and prepaid stock	38,400 50	Dues repaid—installment stock	31,893 92
Interest received	20,608 36	Profits repaid—installment stock	3,027 98
Fees received	36 00	Paid-up and prepaid stock—capital	25,043 60
Loans repaid	51,346 25	Paid-up and prepaid stock—dividends	3,802 80
Overdrafts and bills payable	5,130 53	Salaries	1,458 00
All other receipts	8,095 65	Taxes	4,053 15
		Other expenses	553 58
		All other disbursements	7,213 15
Total receipts	\$182,461 47	Total disbursements	\$182,461 47

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Dayton plan.

Dues—\$1 per share.

Dividend—6 per cent.

Book value—Dues plus dividend.

Withdrawal value—Full book value.

No. 114—STOCKTON.

STOCKTON LAND, LOAN AND BUILDING ASSOCIATION.

(Incorporated February, 1887.)

CHAS. E. LITTLEHALE, Secretary.

J. D. YOUNG, President.

Fiscal year ends January 31, 1905.

No. of series, none.

No. of shares, 7,231.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$414,089 83	Installment stock—dues	\$276,970 39
Arrearages	10,473 12	Earnings apportioned	52,003 91
On interest	\$10,473 12	Paid-up and prepaid stock—capital	74,107 83
Cash on hand and in bank	1,983 53	Paid-up and prepaid stock—dividends	2,603 22
Real estate owned	2,860 17	Reserve and undivided profits	10,006 35
Other assets	980 38	Other liabilities	14,695 33
Total assets	\$430,387 03	Total liabilities	\$430,387 03
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$8,868 01	Loans on mortgages and stock	\$177,687 42
Installment stock—dues	69,518 78	Interest paid	65 70
Paid-up and prepaid stock	23,111 51	Dues repaid — installment stock	30,126 24
Interest received	35,202 38	Profits repaid — installment stock	11,586 94
Fees received	108 45	Paid-up and prepaid stock—capital	22,311 04
Loans repaid	117,715 05	Paid-up and prepaid stock—dividends	3,766 46
All other receipts	3,238 65	Salaries	2,425 00
Total receipts	\$257,762 83	Taxes	7,128 25
		Other expenses	435 35
		All other disbursements	246 90
		Balance on hand and in bank	1,983 53
		Total disbursements	\$257,762 83

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Dayton plan.

Dues—\$1 per share per month.

Dividend 1904—7.08 per cent.

Book value—Dues and dividend.

Withdrawal value—Same as book value.

No. 115—TULARE.

TULARE BUILDING AND LOAN ASSOCIATION.

(Incorporated January, 1889.)

H. M. SHREVE, Secretary.

A. W. WHEELER, President.

Fiscal year ends December 31, 1904.

No. of series, 9.

No. of shares, 228.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$6,150 00	Installment stock—dues	\$13,095 00
Arrearages	353 13	Earnings apportioned	3,176 47
On shares	\$317 75	Advance payments	2,572 85
On interest	32 66	Overdrafts and bills payable	4,000 00
On fines, etc.	2 72	Reserve and undivided profits	363 10
Cash on hand and in bank	1,127 85	Unearned premiums	246 77
Real estate owned	15,650 11	Other liabilities	133 90
Other assets	307 00		
Total assets	\$23,588 09	Total liabilities	\$23,588 09

<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$217 78	Overdrafts and bills payable	\$2,000 00
Installment stock—dues	2,344 25	Interest paid	315 00
Interest received	1,102 81	Dues repaid — installment stock	2,225 00
Fees received	7 40	Profits repaid — installment stock	820 25
All other receipts	6,138 07	Salaries	600 00
		Taxes	315 57
		Other expenses	263 44
		All other disbursements	2,143 20
		Balance on hand and in bank	1,127 85
Total receipts	\$9,810 31	Total disbursements	\$9,810 31

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
4	138	\$138 00	\$199 00	\$183 75
5	126	126 00	173 53	161 64
6	114	114 00	150 86	141 63
7	90	90 00	111 13	105 84
8	78	78 00	93 44	90 44
9	42	42 00	46 32	44 16
10	36	36 00	39 11	37 55
11	12	12 00	12 41	12 20

No. 116—UPLAND.

MAGNOLIA MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated September 24, 1901.)

M. F. PALMER, Secretary.

P. E. WALLINE, President.

Fiscal year ends September 30, 1904.

No. of series, none.

No. of shares, 1,432.

FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$60,800 00	Installment stock—dues	\$24,025 83
Cash on hand and in bank	839 67	Earnings apportioned	1,544 86
		Paid-up and prepaid stock— capital	28,200 00
		Paid-up and prepaid stock— dividends	1,531 58
		Overdrafts and bills payable	6,150 00
		Reserve and undivided profits	21 54
		Other liabilities	165 86
Total assets	\$61,639 67	Total liabilities	\$61,639 67
<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Balance last report	\$1,912 11	Overdrafts and bills payable	\$4,500 00
Installment stock—dues	15,702 97	Loans on mortgages and stock	21,700 00
Paid-up and prepaid stock	11,900 00	Interest paid	277 83
Interest received	3,902 20	Dues repaid — installment stock	7,136 31
Fines received	18 30	Profits repaid — installment stock	154 36
Fees received	44 00	Paid-up and prepaid stock— capital	9,000 00
Loans repaid	5,200 00	Paid-up and prepaid stock— dividends	1,501 59
Overdrafts and bills payable	6,800 00	Salaries	240 00
		Other expenses	129 82
		Balance on hand and in bank	839 67
Total receipts	\$45,479 58	Total disbursements	\$45,479 58

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Dayton plan.

Dividend— $8\frac{1}{4}$ per cent.

Book value—Dues plus dividend.

Withdrawal value—Same as book value.

No. 117—VISALIA.

VISALIA BUILDING AND LOAN ASSOCIATION.

(Incorporated January 5, 1887.)

C. L. JOHNSON, Secretary.

C. J. GIDDINGS, President.

Fiscal year ends January 31, 1905.

No. of series, none.

No. of shares, 4,544.

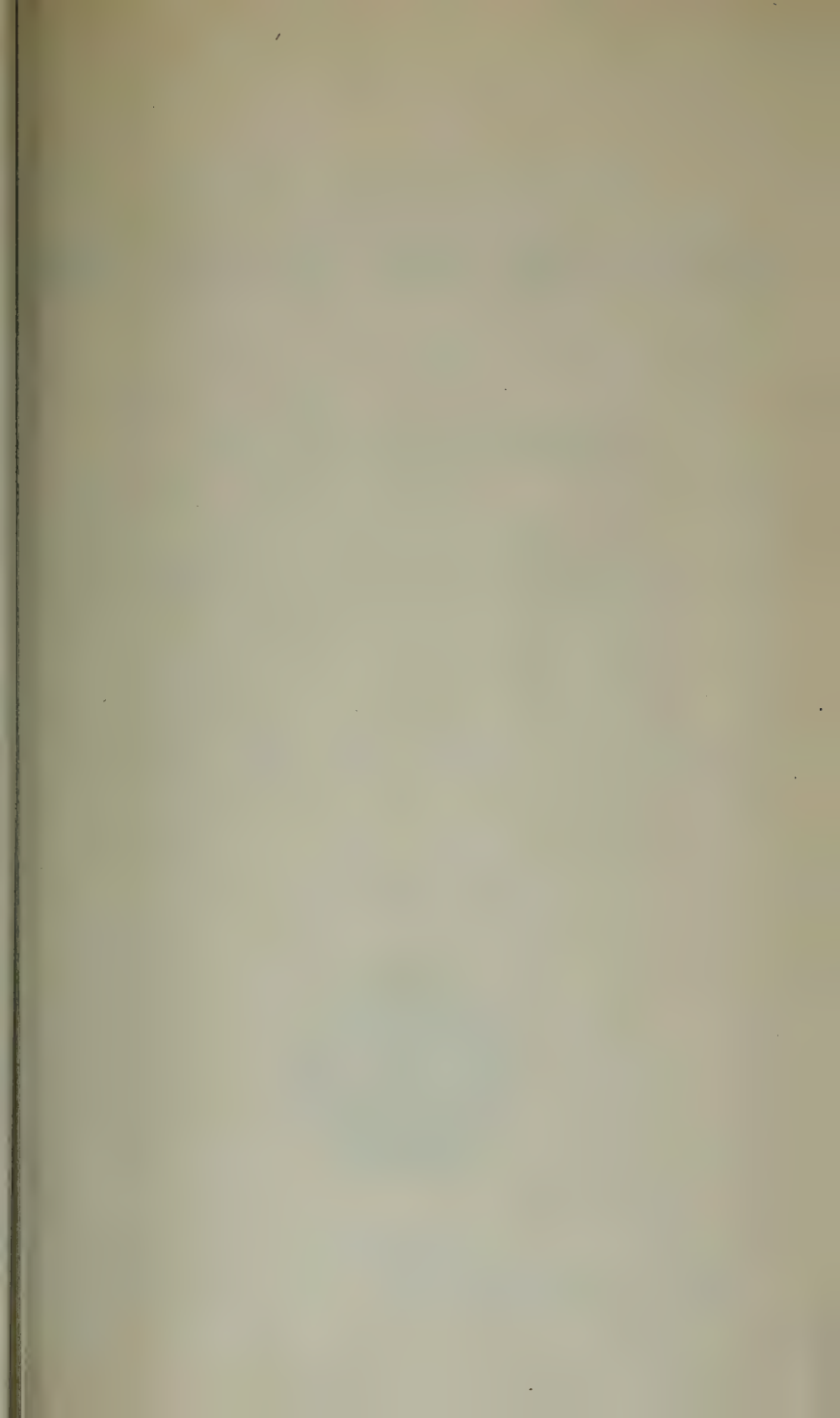
FINANCIAL STATEMENT.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages and stock	\$138,550 00	Installment stock—dues.....	\$73,203 20
Arrearages.....	140 23	Earnings apportioned	16,410 86
On interest	\$140 23	Paid-up and prepaid stock—	
Other assets	8 24	capital.....	20,300 00
		Paid-up and prepaid stock—	
		dividends.....	609 00
		Overdrafts and bills payable.....	22,350 79
		Reserve and undivided profits.....	1,400 07
		Unearned premiums	405 21
		Other liabilities.....	4,019 34
Total assets.....	\$138,698 47	Total liabilities	\$138,698 47

<i>Receipts for Fiscal Year.</i>		<i>Disbursements for Fiscal Year.</i>	
Installment stock—dues	\$22,958 41	Overdrafts and bills payable.....	\$4,670 20
Interest received.....	12,637 83	Loans on mortgages and stock.....	41,450 00
Fines received.....	4 20	Interest paid.....	2,823 86
Fees received	197 25	Dues repaid — installment	
Loans repaid.....	22,200 00	stock.....	5,056 77
Overdrafts and bills payable.....	853 66	Profits repaid — installment	
		stock.....	606 50
		Paid-up and prepaid stock—	
		capital.....	600 00
		Salaries.....	720 00
		Taxes	2,776 36
		Other expenses	89 42
		All other disbursements.....	58 24
Total receipts.....	\$58,851 35	Total disbursements.....	\$58,851 35

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
-----	90	\$45 00	\$64 44	\$64 44
-----	72	36 00	47 47	47 47
-----	60	30 00	37 67	37 67
-----	48	24 00	28 72	28 72
-----	36	18 00	20 52	20 52
-----	24	12 00	13 06	13 06
-----	12	6 00	6 25	6 25



REPORT
ON THE
BUILDING AND LOAN ASSOCIATIONS
OF THE
STATE OF CALIFORNIA

BY THE
BUILDING AND LOAN COMMISSIONERS, IN ACCORDANCE WITH AN ACT
OF THE LEGISLATURE, APPROVED MARCH 21, 1905,

TO

His Excellency GEORGE C. PARDEE, Governor of the State of California

OCTOBER 1, 1906



SACRAMENTO:

W. W. SHANNON, : : : : : SUPERINTENDENT STATE PRINTING.
1906.

REPORT

OF THE

BUREAU OF BUILDING AND LOAN SUPERVISION.

OFFICE OF THE BUILDING AND LOAN COMMISSIONERS,
SAN FRANCISCO, October 1, 1906.

To HIS EXCELLENCY GEORGE C. PARDEE,

Governor of the State of California.

SIR: Pursuant to the requirements of Section 5 of Chapter DIV, Laws of 1905, approved March 21, 1905, we submit the Thirteenth Annual Report upon the Building and Loan Associations of this State, covering tabulations from the annual reports of 106 Building and Loan Associations and 3 Coöperative Home Associations, the fiscal terms of which ended between July 1, 1905, and June 30, 1906, both inclusive.

In addition to the 106 associations embraced in these tabulations, five new associations were formed and licensed during the fiscal year; one association closed its affairs in San Francisco, was removed to another county, and there resumed business under a new name and practically as a new association; one association amended its by-laws and thus changed the date for the close of its fiscal term, and six associations in San Francisco have been unable to get their destroyed records sufficiently restored to permit of the preparation of a proper report at this date. All these are included in the active roll of associations, and reports in due form will be received and appear in the next report of this office. Twelve associations are still in process of liquidation, and from which final reports have not been received.

Of the 106 associations reported upon, 97 are locals, having assets amounting to \$11,254,225.50, which sum is \$127,669.35 less than the reported assets of the locals for 1905; but there are 6 locals whose assets are not included in the above total, and which amounted to \$474,191.35 in 1905. If these be considered at this time there has, in reality, been an increase of \$345,222.00 in the assets of the 97 associations, during the past year. Nine are classed as State associations, as they employ agents and transact business in all parts of the State. This is a decrease of two from the number at the time of our last report. Their assets total \$7,974,713.38, which is \$3,230,263.64 less than the total for

1905; but \$2,801,638.65 of this is due to the withdrawal of the above noted two associations from the building and loan business, which leaves \$419,624.99 as the real decrease in the assets of the present nine State associations.

The volume of real estate held by all associations has been materially decreased; while the reserve fund, as applicable to the associations reporting, shows a very considerable increase, both of which are features indicative of increased stability and solvency, and reflect credit upon the general management.

Since 1900 the reports for the several fiscal years show the following variations in the total number of associations, the number reporting, and the aggregate assets:

Annual Report for—	Total Roll.	No. Reporting.	Assets.
1901 -----	153	138	\$17,881,576.70
1902 -----	151	138	18,190,867.58
1903 -----	146	133	19,865,852.02
1904 -----	141	126	21,306,042.32
1905 -----	142	117	22,586,871.87
1906 -----	131	106	19,228,938.88

The disaster of April 18, with its widespread havoc and destruction in the disturbed territory, and particularly in San Francisco, respected neither class, sect nor business, and the operations of building and loan associations were interfered with to a like extent and in like manner as all other business callings. It was a visitation not contemplated and totally unprovided for under the operation of any law. What was to be the effect and what the outcome no one could foretell. Radical action was necessary for the protection of the interests of investors and borrowers. To protect these interests the associations must be protected as well. More than one half of the associations in San Francisco had lost every vestige of their books, records, and accounts. Of the others, very few had been successful in preserving a complete record of their business and condition. Few were able to immediately determine what of their securities were damaged and what were entirely gone. Legal holidays prevailed; spot cash was demanded for all purchases made, and recourse could not be had to balances in bank, for the banks were in a similarly demoralized condition, and not attempting the transaction of regular business. Would there be a general demand for withdrawals to enable investors in the building and loan associations to meet the requirements for securing the necessities of life and procuring immediate shelter? Who could foretell? The work of restoring lost records must be immediately proceeded with. New books of account must be prepared at the earliest possible moment. Securities and insurance must be looked after without unnecessary delay, and until these were investigated very few could approximately estimate their financial condition. To attempt and prosecute this work, in the

then discouraged condition of business relations, would demand the undivided attention of the several secretaries and others familiar with the internal affairs of the associations for a considerable period. During such period each must contribute his proportionate share of work, time, and patience and refrain from the placing of obstacles in the path of completion of the task so unexpectedly presented.

To aid in the accomplishment of these imperative duties, and to protect the several associations and the interests of the members and investors, this office, on April 26, issued the following circular order to all interested associations:

State of California,
Temporary Office of the Building and Loan Commissioners,
221 Syndicate Building.

OAKLAND, April 26, 1906.

As a matter of emergency and for the better protection of all persons interested, the following rules are hereby promulgated for the government of building and loan associations in the counties of San Francisco, Alameda, Marin, Solano, Napa, Mendocino, San Mateo, and Santa Clara, pending a readjustment of business and the restoration of normal conditions:

First—Require all notices of intention to withdraw to be filed in writing and registered in the order of filing, as is contemplated by Section 638a of the Civil Code.

Second—Payments must be made thereon in the order of filing and registration as fast as funds in hand will permit, but subject to the following variations from the provisions of Section 638a of the Civil Code:

On demands for withdrawal calling for \$500 or less, not more than \$50 may be paid to any one person until all who may have filed such notices of intention have been paid a similar amount or funds have been set aside therefor.

On demands calling for more than \$500 not more than ten per cent may, in like manner, be paid to any one person as a first payment.

The same rule shall be observed as to the second and all subsequent payments, until full payment has been made on each demand filed, or the notice be canceled; this in lieu of payment in full of each notice of withdrawal in the order of filing and registration.

Third—The foregoing rules shall apply to all classes of stock, and, as far as possible, to all other claims and demands.

Fourth—All associations outside the territory directly affected by the recent conflagration are advised that, if their by-laws do not already contain a similar provision, the provisions of Section 638a of the Civil Code should be adopted as their rule of procedure.

Shareholders and others must recognize that the funds of building and loan associations are loaned upon long-time mortgages upon real estate, and that the ability of any association to meet its demands for withdrawal, even under normal conditions, depends largely upon the current income on investment shares and the ability of borrowers to meet and live up to the conditions under which their loans were made. Because withdrawals are restricted, as the result of abnormal conditions that may for a time suspend these two sources of income, is no indication that all demands may not be finally met in full.

By order of the Bureau of Building and Loan Supervision.

D. W. FIELD,
CHAS. M. SHORTRIDGE,
Building and Loan Commissioners.

J. L. FIELDS, Secretary.

This order met with universal approval by the officers of the associations directly affected and interested, and the work of restoration proceeded as speedily as conditions would permit.

As fast as the several associations succeeded in getting their affairs into such shape that they felt entirely safe in resuming normal business relations, they were permitted and advised so to do, even though their work of restoration might be in nowise fully completed. On September 1 it appeared that the objects aimed to be attained by the foregoing order had been practically accomplished and that the work had progressed sufficiently near to completion to warrant its revocation, which was accordingly done and due notice given to the several associations.

Many details of the work of restoration yet remain to be perfected, to enable the preparation of a complete and perfect statement by several associations, but it has reached such a degree of completion that such details are of minor importance and not of a nature calculated to affect their financial standing.

Scarcely any association suffered a direct financial loss, beyond the destruction of its books, records, and office furniture and fixtures, and nearly all were the fortunate possessors of a material reserve fund, sufficient in volume to afford ample protection to the shareholders against the loss of these as well as the few other losses that were incurred. Very few associations had loans of any considerable amount within the area of the burned district, and nearly all such as were held were amply protected by good and collectible insurance.

The inconvenience and confusion arising from the loss of books, records, and statistical data have not alone been confined to the several associations located within the area of the conflagration. The records and data of this office, collected during the past thirteen years, including reports from associations, reports from other states, text and law books on building and loan associations and corporations, opinions of the Attorney-General, rulings of this office, letters and documents of all kinds, and all office furniture and fixtures were completely destroyed.

In order to proceed with the preparation of this report, it became necessary to secure copies of the last annual reports of all associations in the State, where the annual fiscal terms had ended since June 30, 1905, and prior to April 18 last. Where such reports had been made by associations located in San Francisco it has been difficult and almost impossible to secure such copies, as their retained duplicates, together with the printed copies made therefrom for circulation among their shareholders and others, had been destroyed, and, as the work of restoration is not yet fully completed, the preparation of new reports was thus very much delayed, even where possible to secure the preparation of such as could be safely considered satisfactory.

Under such conditions, the present report of this office must of necessity be lacking in many of the features that have made its previous reports of material interest. Features that could not be obtained from all associations we have been compelled to eliminate; otherwise

unjust and unwise comparisons might be made to the disadvantage of individual associations, where justice and impartiality should be the imperative rule.

During the fifty-seventh fiscal year new associations were formed and authorized at Porterville, Paso Robles, Corona, Sebastopol, and South San Francisco. Eight associations that were on the active roll at the time of the last annual report have permanently retired, as follows: The "Phoenix" and "Renters" each secured a banking license by permission of the Attorney-General and are now transacting business as banks; the "Bankers' Loan and Trust Company" was absorbed by the State Savings and Commercial Bank; the "Commercial" consolidated with the "Home Mutual" under the name of the "Home Mutual Deposit and Loan Company"; the "Alta," "American," "Golden West," and "Federal Safe Deposit" filed notices of final liquidation, and eight associations that were designated as "in liquidation" on June 30, 1905, have furnished evidence of final liquidation. "The Eintracht Spar und Bau Verein" liquidated all its liabilities to its former shareholders, was removed to Berkeley and there resumed business as the "Berkeley Loan and Security Company."

With these changes we then have the following as the

STATUS OF ASSOCIATIONS.

Total roll July 1, 1905—Active	122
Liquidating.....	20
	<hr/> 142
New associations	5
Porterville Mutual—Porterville.	
Paso Robles Mutual—Paso Robles.	
Corona Mutual—Corona.	
Sebastopol Mutual—Sebastopol.	
South City Mutual—South San Francisco.	
	<hr/> 147
Retired from active roll.....	8
Phoenix—San Francisco.	
Renters—San Francisco.	
Alta—San Francisco.	
Commercial—San Francisco.	
Bankers—San Francisco.	
Golden West—San Francisco.	
Federal—San Francisco.	
American—San Francisco.	
Finally liquidated	8
Capital—San Francisco.	
California—San Francisco.	
Mutual Savings Fund—San Francisco.	
Homeseekers—San Francisco.	
Mutual—Fort Bragg.	
People's—Oakland.	
Western—Los Angeles.	
Ukiah Mutual—Ukiah.	
	<hr/> 16
Leaving a total roll of.....	<hr/> 131

Active and reporting.....	106
Active, but not reporting.....	8
New associations during year.....	5
Total active.....	119
Liquidating.....	12
Imperial—Los Angeles.	National Home—San Francisco.
San Diego Savings—San Diego.	Ætna—San Francisco.
Union—Sacramento.	Atlas—San Francisco.
Occidental—Sacramento.	Pacific Coast Savings—San Francisco.
Yerba Buena—San Francisco.	Guardian—Vallejo.
Excelsior—San Francisco.	Oakland—Oakland.
Total roll.....	131

DISTRIBUTION BY COUNTIES—ACTIVE ROLL.

Counties.	Ass'ns.	Counties.	Assn's
Alameda.....	11	San Bernardino.....	3
Fresno.....	1	San Diego.....	4
Humboldt.....	1	San Francisco.....	44
Kern.....	2	San Luis Obispo.....	2
Los Angeles.....	14	San Joaquin.....	2
Marin.....	3	San Mateo.....	3
Merced.....	1	Santa Barbara.....	2
Mendocino.....	1	Santa Clara.....	6
Napa.....	1	Solano.....	1
Orange.....	4	Sonoma.....	4
Placer.....	1	Tulare.....	3
Riverside.....	2	Ventura.....	1
Sacramento.....	2		

Counties, 25. Associations, 119.

ASSETS AND LIABILITIES.

ASSETS.

	Locals.	Other Ass'ns.	Total.
Loans.....	\$10,699,357 69	\$6,974,726 39	\$17,674,084 08
Arrearages.....	118,443 51	81,023 49	199,467 00
Cash on hand and in bank.....	224,525 58	240,561 05	465,086 63
Real estate.....	178,038 48	564,659 48	742,697 96
Advances, secured.....	16,296 14	71,987 06	88,283 20
Other assets.....	17,564 10	41,755 91	59,320 01
Totals.....	\$11,254,225 50	\$7,974,713 38	\$19,228,938 88

LIABILITIES.

	Locals.	Other Ass'ns.	Total.
Installment stock.....	\$6,386,738 61	\$3,403,076 73	\$9,789,815 34
Earnings apportioned.....	1,448,282 83	954,384 84	2,402,667 67
Paid-up and prepaid stock.....	1,178,929 08	2,185,275 73	3,364,204 81
Dividends unpaid.....	42,146 72	121,864 76	164,011 48
Advance payments.....	62,367 67	30,855 95	93,223 62
Overdrafts and bills payable.....	1,448,576 86	641,895 59	2,090,472 45
Reserve and undivided profits.....	317,541 88	344,014 65	661,556 53
Due on incomplete loans.....	232,023 17	158,873 84	390,897 01
Sundry ledger accounts.....	22,287 01	97,102 15	119,389 16
All other liabilities.....	115,331 67	37,369 14	152,700 81
Totals.....	\$11,254,225 50	\$7,974,713 38	\$19,228,938 88

STATISTICAL INFORMATION.

	Locals.	Other Ass'ns.	Total.
Shares in force	184,160	223,891	408,051
New homes reported built last year	986	498	1,484
Total number of homes reported built			24,943
Number of associations owning real estate	36	7	43
Number of associations not owning real estate	61	2	63

COÖPERATIVE HOME ASSOCIATIONS.

At the time of our last annual report seven Coöperative Home Associations were transacting business under licenses issued by this office. Since that date one has been formed, which did but little business, retiring with four others early in the present year, leaving but three now attempting the transaction of business, and of these but one is attempting to secure new business.

Their combined assets and liabilities appear as follows:

ASSETS.		LIABILITIES.	
Loans	\$279,091 95	Capital stock	\$19,619 00
Cash	24,198 94	Contract payments	293,712 70
Advances	25,800 23	Interest credits	7,360 74
Other assets	30,886 10	Equalization fund	7,269 99
		Reserve fund	31,603 31
		Sundry ledger accounts	344 23
		Other liabilities	67 25
Total	\$359,977 22	Total	\$359,977 22

Contracts in force, 2,027—a loss of 800 from last year.

The cost of conducting the business appears to have been:

For salaries	\$5,479 04
For office expenses	7,720 16
For commissions, etc.	2,221 57
Making a total of	\$15,420 77

An amount equal to 5.52 per cent on the loans in force.

Since February, 1902, thirty-eight of this class of associations have been organized in this State, of which only three still remain in business, and of these there is a reasonable probability that one or more may retire during the current fiscal year.

It would seem reasonable that enough experiments have been made along this line to fully demonstrate the impracticability of this system of financial institutions, and this office will henceforth decline to issue a license to any corporation of this nature, not now transacting business under its supervision, where the element of time is intended as an equivalent of interest paid by a borrower, or of dividends accruing to an investor.

Under existing conditions it is impossible to present a history of the status of each and every association as of a specific date. The law

requires reports of their condition to be made to this office only at the close of their respective fiscal years, or within thirty days thereafter, as of that particular date. Their annual fiscal terms close during each and every month throughout the entire year, and with no uniformity as to the day of the month; hence the reports of this office must be tabulated from the association reports varying in age from one to twelve months. Under such circumstances it is impossible to present data having a statistical value that it should have, either as to condition or for reference. The only remedy for this condition that appears feasible is either to require these reports to be made as of a specific date, irrespective of the close of the annual fiscal period of the several associations, or to empower this office to call for a report or reports from each, as of a date then past, in manner similar to the powers conferred upon the Bank Commissioners in their supervision of the savings and commercial banks. With such a change in the law it would then be possible to present a report of the entire State, as of a uniform date, in a form that would be of material value, both for reference and for comparison. This idea has been referred to in previous reports, and we again present it for serious consideration, it being in line with the law and practice in many of the Eastern States.

Under the laws of several of the Eastern States, and especially of New York, building and loan and kindred associations are prohibited from making any deduction from the stock payments to provide for running expenses. Under the laws of this State there is no such prohibition, and the practice of making such deduction has been sustained by the courts; but because of the inability of the average shareholder to comprehend the necessity for and the peculiar operation of this deduction, where it has been made, it has been the cause of much friction, with the result that all but two associations have voluntarily discontinued the issuance of shares upon this plan. Every question is open to argument pro and con, and this feature of providing for the payment of expenses is no exception to that idea; still it requires little if any argument to demonstrate that a share of stock will mature at an earlier date if the entire periodical payments be applied to that purpose, than will be the case if a portion be set apart for the payment of expenses. Public sentiment is unquestionably opposed to the continuance of such practice; hence, because of the friction that has arisen in connection with the practice and of the opportunity thus presented for an abuse of the privilege by officers and directors who might be disposed to take undue advantage of an opportunity to provide in this manner for expense moneys not directly earned, may it not be wise to follow in the footsteps of a sister state or states and prohibit by law the making of any such deductions?

The policy of this office is, and for some time past has been, to discourage the formation of any new associations upon this plan and to endeavor to prevent any association, not *now* issuing shares of stock based upon this feature, from amending its by-laws in such manner as to permit of such issue being made, and we recommend that laws sufficient to that end be passed at the coming session of the Legislature.

Amendments to the existing laws should also be made, providing for the creation and maintenance of an adequate reserve fund by all associations, to the end that such losses as may be incurred can be met without materially affecting the current net profits and the resulting periodical distribution thereof as dividends; providing for the issuance of "fully paid-up stock," and also for the issuance of installment stock, not alone in "serial" form as at present, but also in such other form as may be prescribed by the by-laws of any association. The making of loans upon the "equal payment" or "definite contract" plan should be definitely provided for by proper amendments;—not that the present practice of making such loans is in violation of existing laws, but that there may be specific and positive statutory provisions governing such practice.

As an appendix to this report there will be found, in condensed form, the "Assets and Liabilities" of each association reporting, the statement of which has entered into the tabulations of this report, together with the share values and surrender values of the shares of serial associations, at ages of from 12 to 120 months, in annual periods; and as to "Dayton" associations, showing dues per share, last dividend, book and withdrawal values. These are arranged alphabetically by cities and towns, thereby avoiding the necessity of a separate index.

All of which is respectfully submitted.

D. W. FIELD,
CHAS. M. SHORTRIDGE,
Commissioners.

J. L. FIELDS, Secretary.

STATEMENT OF RECEIPTS ON ACCOUNT OF LICENSE FEES AND ASSESSMENT FOR EXPENSES,

FOR TWELVE MONTHS ENDING JUNE 30, 1906.

Association.	Location.	Amount.
Alameda Building and Loan Association	Alameda	\$106 53
California Building-Loan Association	Alameda	77 20
Columbian Mutual Building and Loan Association	Alameda	38 40
Encinal Building-Loan Association	Alameda	23 33
Savings, Loan, and Building Association	Anaheim	20 81
People's Mutual Building and Loan Association	Bakersfield	42 92
Benicia Building and Loan Association	Benicia	32 92
Homestead Loan Association	Berkeley	149 40
Berkeley Loan and Security Company	Berkeley	10 00
Covina Mutual Building and Loan Association	Covina	10 00
Corona Mutual Building and Loan Association	Corona	10 00
Escondido Mutual Building and Loan Association	Escondido	10 00
Mutual Loan and Investment Society	Fort Bragg	10 00
Fortuna Building and Loan Association	Fortuna	10 00
Mutual Building and Loan Association	Fresno	41 92
Healdsburg Mutual Building and Loan Association	Healdsburg	20 91
Kern County Mutual Building and Loan Association	Kern	14 73
Fraternal Mutual Building and Loan Association	Los Angeles	17 20
Home Investment Building and Loan Association	Los Angeles	33 21
Metropolitan Loan Association	Los Angeles	106 64
Southern California Loan Association	Los Angeles	174 02
Fidelity Savings and Loan Association	Los Angeles	107 15
State Mutual Building and Loan Association	Los Angeles	604 16
Union Mutual Building and Loan Association	Los Angeles	57 35
Provident Mutual Building and Loan Association	Los Angeles	549 87
Protective Savings Mutual Building and Loan Ass'n	Los Angeles	199 90
Mutual Building and Loan Association	Long Beach	10 00
Los Gatos Building and Loan Association	Los Gatos	10 00
Merced Mutual Building and Loan Association	Merced	23 13
Napa Building and Loan Association	Napa	36 74
Newcastle Building and Loan Association	Newcastle	11 60
Home Security Loan Society	Oakland	93 30
Brooklyn Investment and Loan Association	East Oakland	21 50
Cosmopolitan Mutual Building and Loan Association	East Oakland	76 65
West Oakland Mutual Loan Association	West Oakland	14 21
People's Mutual Building and Loan Association	Ontario	63 60
Magnolia Mutual Building and Loan Association	North Ontario	29 37
Orange Building and Loan Association	Orange	62 15
Palo Alto Mutual Building and Loan Association	Palo Alto	116 82
Paso Robles Mutual Building and Loan Association	Paso Robles	10 00
Mutual Building and Loan Association	Pasadena	67 44
Los Angeles County Mutual Building and Loan Ass'n	Pasadena	54 84
Petaluma Mutual Loan Association	Petaluma	13 53
Pleasanton Mutual Building and Loan Association	Pleasanton	10 00
Mutual Building and Loan Association	Pomona	72 90

STATEMENT OF RECEIPTS--CONTINUED.

Association.	Location.	Amount.
Porterville Mutual Building and Loan Association	Porterville	\$10 00
San Mateo County Building and Loan Association	Redwood City	94 40
Riverside County Mutual Building and Loan Ass'n	Riverside	27 02
Sacramento Building and Loan Association	Sacramento	92 81
Germania Building and Loan Association	Sacramento	100 42
Santa Fé Building and Loan Association	San Bernardino	93 15
San Diego Building and Loan Association	San Diego	134 00
Silver Gate Building and Loan Association	San Diego	30 30
Acme Building and Loan Association	San Francisco	26 22
Alliance Building and Loan Association	San Francisco	10 65
Argonaut Mutual Building and Loan Association	San Francisco	31 50
Bay City Building and Loan Association	San Francisco	27 22
Cal. Mutual Savings Fund Loan and Building Ass'n	San Francisco	28 67
City Building and Loan Association	San Francisco	24 96
Citizens' Building and Loan Association	San Francisco	177 13
Columbia Building and Loan Association	San Francisco	10 00
Economy Building and Loan Association	San Francisco	27 03
El Dorado Loan Association	San Francisco	13 61
Empire Building and Loan Association	San Francisco	22 25
Eureka Building and Loan Association	San Francisco	16 49
Fairmount Loan Association	San Francisco	29 17
Fidelity Building and Loan Association	San Francisco	75 20
Franklin Savings, Building, and Loan Association	San Francisco	25 80
Germania Building and Loan Association	San Francisco	52 18
Golden West Building and Loan Association	San Francisco	10 00
Globe Mutual Building and Loan Association	San Francisco	48 28
Granite Mutual Building and Loan Association	San Francisco	13 60
Home Mutual Deposit Loan Company	San Francisco	133 90
Householders' Building and Loan Association	San Francisco	10 00
Humboldt Building and Loan Association	San Francisco	39 28
Inter-Nos Building and Loan Association	San Francisco	40 25
Italian-Swiss Mutual Loan Association	San Francisco	43 93
Mechanics' Building and Loan Association	San Francisco	39 59
Mission Home and Loan Association	San Francisco	36 31
Monarch Mutual Building and Loan Association	San Francisco	17 30
Occidental Loan Association	San Francisco	32 00
Pacific Loan Association	San Francisco	36 60
Provident Mutual Loan Association	San Francisco	42 32
Progress Mutual Loan Association	San Francisco	25 77
Prudence Building and Loan Association	San Francisco	35 33
Richmond Mutual Building and Loan Association	San Francisco	10 00
Safety Mutual Building and Loan Association	San Francisco	41 33
San Francisco Mutual Loan Association	San Francisco	10 00
San Francisco and Oakland Mutual Loan Association	San Francisco	39 45
San Francisco Home Mutual Loan Association	San Francisco	13 60
Triumph Loan Association	San Francisco	24 45
Union Loan Association	San Francisco	23 70
Western Loan Association	San Francisco	34 73
West Shore Mutual Loan Association	San Francisco	10 00
Mission Improved Building and Loan Association	San Francisco	10 00
California Home Building-Loan Company	San Francisco	119 64
Continental Building and Loan Association	San Francisco	1,219 27
Pacific States Savings and Loan Company	San Francisco	591 57
Bankers' Loan and Trust Company	San Francisco	20 76
Federal Safe Deposit Company	San Francisco	10 00
American Loan and Security Company	San Francisco	10 00

STATEMENT OF RECEIPTS—CONTINUED.

Association.	Location.	Amount.
Nucleus Building and Loan Association	San José	\$22 88
Mutual Building and Loan Association	San José	45 13
San José Building and Loan Association	San José	48 96
San Luis Building and Loan Association	San Luis Obispo.....	52 93
San Mateo Mutual Building and Loan Association	San Mateo	32 40
Marin County Mutual Building and Loan Association	San Rafael	75 00
Home Mutual Building and Loan Association	Santa Ana	87 12
Orange County Mutual Building and Loan Association	Santa Ana	18 50
Loan and Building Association	Santa Barbara.....	117 50
Santa Barbara Mutual Building and Loan Association	Santa Barbara.....	47 88
Santa Clara Building and Loan Association	Santa Clara	44 77
Santa Paula Building and Loan Association	Santa Paula	35 75
Santa Rosa Building and Loan Association	Santa Rosa	55 50
Sausalito Mutual Loan Association	Sausalito	19 48
Tamalpais Mutual Building and Loan Association	Sausalito	10 07
South City Mutual Building and Loan Association	South San Francisco	10 00
San Joaquin Valley Building and Loan Association	Stockton	109 31
Stockton Land, Loan, and Building Association	Stockton	178 75
Tulare Building and Loan Association	Tulare	10 00
Visalia Building and Loan Association	Visalia	58 05
Escondido Mutual Building and Loan Association	Escondido	10 00
Western Home Company (new)	Oakland	4 00
• Paso Robles Mutual Building and Loan Ass'n (new)	Paso Robles	3 00
Corona Mutual Building and Loan Association (new)	Corona	3 00
Porterville Mutual Building and Loan Ass'n (new)	Porterville	3 00
Sebastopol Mutual Building and Loan Ass'n (new)	Sebastopol	10 00
Chicago Home Building Company	Los Angeles	10 00
Coöperative Home Builders	Los Angeles	101 31
Oakland Home Company	Oakland	40 25
Western Home Company	Oakland	10 00
Total		\$8,513 63
Deposited with State Treasurer—January 29	\$7,083 40	
March 1	1,392 43	
June 30	37 80	
		\$8,513 63

STATE OF CALIFORNIA, }
 CITY AND COUNTY OF SAN FRANCISCO. } ss.

J. L. Fields, Secretary for the Building and Loan Commissioners, being first duly sworn, deposes and says that the foregoing is a correct statement of the receipts for the fiscal year ended June 30, 1906, and of the disposition thereof.

J. L. FIELDS.

Subscribed and sworn to before me, this first day of October, 1906.

{ NOTARIAL }
 { SEAL. }

JOHN J. QUINN,
 Notary Public in and for the City and County of
 San Francisco, State of California.

APPENDIX.

REPORTS OF BUILDING AND LOAN ASSOCIATIONS.

ALPHABETICALLY ARRANGED BY CITIES AND TOWNS.

REPORTS OF BUILDING AND LOAN ASSOCIATIONS

No. 1—ALAMEDA.

ALAMEDA BUILDING AND LOAN ASSOCIATION.

(Incorporated March 9, 1876.)

CHAS. P. HOAG, Secretary.

C. C. VOLBERG, President.

Fiscal year ended March 31, 1906.

No. of series, none.

No. of shares, 3,371.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$259,440 59	Installment stock—dues	\$150,561 88
Cash in office and bank	1,233 81	Installment stock—profits	36,477 64
Advances—secured	548 19	Overdrafts and bills payable ..	58,060 10
All other assets	150 00	Reserve and undivided profits ..	5,000 00
		Loans due and incomplete	6,420 15
		All other liabilities	4,852 82
Total assets	\$261,372 59	Total liabilities	\$261,372 59

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Dayton Plan. Dues—\$1.00 per share per month.

Dividend, last fiscal year—6 per cent.

Book value—Dues plus dividend.

Withdrawal value—Book value less 2 per cent of profits.

No. 2—ALAMEDA.

CALIFORNIA BUILDING--LOAN ASSOCIATION.

(Incorporated February 9, 1888.)

CHAS. E. NAYLOR, Secretary.

GEO. E. PLUMMER, President.

Fiscal year ended February 28, 1906.

No. of series, 15.

No. of shares, 1,928.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$170,066 59	Installment stock—dues	\$73,178 90
Arrearages	85 79	Installment stock—profits	22,646 44
On interest	\$85 79	Overdrafts and bills payable ..	48,965 96
Real estate	1,931 82	Reserve and undivided profits ..	2,261 10
Advances—secured	76 00	Loans due and incomplete	23,714 20
		All other liabilities	1,393 60
Total assets	\$172,160 20	Total liabilities	\$172,160 20

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
10.....	120	\$120 00	\$173 20	\$173 20
12.....	108	108 00	150 75	150 75
14.....	96	96 00	129 50	126 15
16.....	84	84 00	109 28	104 23
18.....	72	72 00	90 27	84 78
20.....	60	60 00	72 39	67 43
22.....	48	48 00	55 67	53 76
24.....	36	36 00	40 08	39 24
27.....	12	12 00	12 36	12 36

No. 3—ALAMEDA.

COLUMBIAN MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated July 17, 1893.)

H. K. STARKWEATHER, Secretary.

JAMES K. LYNCH, President.

Fiscal year ended July 31, 1905.

No. of series, 24.

No. of shares, 1,342.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$79,057 96	Installment stock—dues.....	\$48,133 80
Arrearages.....	997 10	Installment stock—profits...	13,901 87
On shares.....	\$422 00	Advance payments.....	2,383 80
On interest.....	555 60	Overdrafts and bills payable..	24,000 00
On premium.....	7 50	Reserve and undivided profits	489 32
On fines.....	12 00	Sundry ledger accounts.....	412 35
Cash in office and bank.....	8,615 67		
All other assets.....	650 41		
Total assets.....	\$89,321 14	Total liabilities.....	\$89,321 14

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
7.....	120	\$120 00	\$163 04	\$163 04
10.....	108	108 00	142 07	142 07
18.....	84	84 00	104 02	101 64
25.....	60	60 00	70 01	69 00
27.....	48	48 00	54 40	53 76
29.....	36	36 00	39 47	39 24
31.....	24	24 00	25 52	25 44
33.....	12	12 00	12 38	12 36

No. 4—ALAMEDA.

ENCINAL BUILDING-LOAN ASSOCIATION.

(Incorporated December 28, 1888.)

E. MINOR SMITH, Secretary.

FRANK OTIS, President.

Fiscal year ended December 31, 1905.

No. of series, 21.

No. of shares, 732.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$54,533 25	Installment stock—dues	\$34,149 60
Arrearages.....	663 85	Installment stock—profits...	8,997 86
On shares.....	\$233 20	Advance payments	20 00
On interest.....	414 30	Overdrafts and bills payable..	13,279 00
On premium.....	16 35	Reserve and undivided profits	2,347 70
Cash in office and bank.....	719 36	All other liabilities	10 00
Real estate.....	2,800 00		
Advances—secured.....	47 70		
All other assets.....	40 00		
Total assets.....	\$58,804 16	Total liabilities	\$58,804 16

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
14.....	120	\$120 00	\$157 97	Dues plus 5 per cent for average time.
16.....	108	108 00	136 48	
20.....	84	84 00	99 72	
22.....	72	72 00	83 02	
24.....	60	60 00	67 41	
26.....	48	48 00	52 56	
28.....	36	36 00	38 48	
30.....	24	24 00	25 10	
32.....	12	12 00	12 30	

No. 5—ANAHEIM.

SAVINGS, LOAN AND BUILDING ASSOCIATION.

(Incorporated January 8, 1889.)

FRED. A. BACKS, JR., Secretary.

A. F. STEADMAN, President.

Fiscal year ended April 30, 1906.

No. of series, 11.

No. of shares, 1,420.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$50,684 84	Installment stock—dues	\$40,326 00
Arrearages.....	1,351 09	Installment stock—profits...	12,496 39
On shares.....	\$615 00	Advance payments	62 35
On interest.....	684 99	Reserve and undivided profits	60 88
On premium.....	27 00		
On fines.....	24 10		
Cash in office and bank.....	909 69		
Total assets.....	\$52,945 62	Total liabilities	\$52,945 62

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
8.....	120	\$60 00	\$88 25	\$84 01
9.....	108	54 00	76 27	71 82
10.....	96	48 00	65 11	60 83
11.....	84	42 00	54 76	50 93
12.....	72	36 00	45 19	41 97
13.....	60	30 00	36 34	33 80
14.....	48	24 00	28 06	26 03
15.....	36	18 00	20 26	18 90
16.....	24	12 00	13 00	12 20
17.....	12	6 00	6 25	6 02

No. 6—BAKERSFIELD.

PEOPLE'S MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated January 27, 1892.)

F. W. ROBINSON, Secretary.

W. S. TEVIS, President.

Fiscal year ended January 24, 1906.

No. of series, 8.

No. of shares, 2,469.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock...	\$116,750 00	Installment stock—dues.....	\$75,283 20
Arrearages.....	70 55	Installment stock—profits....	22,411 60
On shares.....	\$26 10	Advance payments.....	195 58
On interest.....	21 75	Overdrafts and bills payable..	18,500 00
On premium.....	15 23	Reserve and undivided profits	1,200 96
On fines.....	7 47	Loans due and incomplete...	115 35
Cash in office and bank.....	514 29		
Advances—secured.....	371 85		
Total assets.....	\$117,706 69	Total liabilities.....	\$117,706 69

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
7.....	96	\$57 60	\$88 23	\$85 00
8.....	84	50 40	72 38	66 50
9.....	72	43 20	58 39	52 00
10.....	60	36 00	46 04	40 00
11.....	48	28 80	34 96	31 00
12.....	36	21 60	25 00	22 50
13.....	24	14 40	15 89	14 50
14.....	12	7 20	7 58	7 20

No. 7—BENICIA.

BENICIA BUILDING AND LOAN ASSOCIATION.

(Incorporated January 11, 1883.)

A. ROBINSON, Secretary.

C. STEWART, President.

Fiscal year ended January 31, 1906.

No. of series, 20.

No. of shares, 828.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock	\$62,287 50	Installment stock—dues	\$45,738 00
Arrearages	5,832 55	Installment stock—profits	12,728 79
On shares	\$3,511 00	Advance payments	80 00
On interest	2,321 55	Overdrafts and bills payable	6,966 95
Cash in office and bank	4,582 17	Reserve and undivided profits	275 38
Advances—secured	916 88	Sundry ledger accounts	189 02
All other assets	154 44	Unearned premiums	7,795 40
Total assets	\$73,773 54	Total liabilities	\$73,773 54

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
12	120	\$120 00	\$180 36	\$177 35
14	108	108 00	155 35	152 99
16	96	96 00	132 20	128 58
18	84	84 00	110 80	105 44
20	72	72 00	91 03	85 33
22	60	60 00	72 75	67 02
24	48	48 00	55 83	51 13
26	36	36 00	40 20	37 26
28	24	24 00	25 75	24 35
30	12	12 00	12 39	12 00

No. 8—BERKELEY.

HOMESTEAD LOAN ASSOCIATION.

(Incorporated March 3, 1886.)

FREDERICK H. CLARK, Secretary.

GEO. LEONARD, President.

Fiscal year ended March 31, 1906.

No. of series, 90.

No. of shares, 5,811.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock	\$398,704 74	Installment stock—dues	\$218,546 50
Arrearages	1,157 75	Installment stock—profits	59,036 67
On shares	\$1,157 75	Paid-up and prepaid stock—capital	56,675 00
Cash in office and bank	2,096 06	Paid-up and prepaid stock—dividends	1,107 59
Office building of Association	17,710 38	Advance payments	5,118 50
Advances—secured	158 65	Overdrafts and bills payable	30,180 00
All other assets	800 00	Reserve and undivided profits	5,129 50
		Loans due and incomplete	38,001 47
		Sundry ledger accounts	1,332 35
		Tax reserve	5,500 00
Total assets	\$420,627 58	Total liabilities	\$420,627 58

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
19.....	132	\$132 00	\$194 93	\$191 78
21.....	120	120 00	168 96	166 52
23.....	108	108 00	145 30	142 69
25.....	96	96 00	124 06	121 54
27.....	84	84 00	104 59	102 33
38.....	72	72 00	86 66	83 72
50.....	60	60 00	69 91	67 92
62.....	48	48 00	54 25	52 68
74.....	36	36 00	39 46	38 59
86.....	24	24 00	25 51	24 99
98.....	12	12 00	12 39	12 25

No. 9—COVINA.

COVINA MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated February 11, 1899.)

J. H. MATTHEWS, Secretary.

J. D. REED, President.

Fiscal year ended February 28, 1906.

No. of series, 13.

No. of shares, 609.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock...	\$21,600 00	Installment stock—dues	\$15,107 00
Cash in office and bank	44 60	Installment stock—profits ...	4,178 27
All other assets.....	49 24	Overdrafts and bills payable.	1,800 00
		Reserve and undivided profits	8 57
		Loans due and incomplete...	600 00
Total assets.....	\$21,693 84	Total liabilities	\$21,693 84

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
1.....	84	\$42 00	\$55 31	\$50 97
3.....	70	35 00	44 55	41 21
4.....	60	30 00	37 05	34 57
6.....	46	23 00	27 06	25 95
8.....	34	17 00	19 94	19 07
10.....	24	12 00	13 17	12 75
12.....	10	5 00	5 24	5 14

No. 10—FORT BRAGG.

MUTUAL LOAN AND INVESTMENT SOCIETY.

(Incorporated October 14, 1889.)

JOHN E. WELLER, Secretary.

ERI HUGGINS, President.

Fiscal year ended December 31, 1905.

No. of series, none.

No. of shares, 319.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock	\$17,660 70	Installment stock—dues	\$7,441 00
Arrearages	604 50	Installment stock—profits	934 77
On interest	\$604 50	Paid-up and prepaid stock—capital	6,000 00
Advances—secured	718 50	Paid-up and prepaid stock—dividends	262 50
All other assets	2,807 78	Overdrafts and bills payable	2,519 53
		Reserve and undivided profits	51
		Sundry ledger accounts	4,633 17
Total assets	\$21,791 48	Total liabilities	\$21,791 48

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Dayton Plan. Dues—\$1.00 per share per month.

Dividend, last fiscal year—6 per cent.

Book value—Dues plus dividend.

Withdrawal value—Same as book value.

No. 11—FORTUNA.

FORTUNA BUILDING AND LOAN ASSOCIATION.

(Incorporated April 30, 1889.)

C. A. FRIEDENBACH, Secretary.

C. A. EASTMAN, President.

Fiscal year ended May 31, 1906.

No. of series, 13.

No. of shares, 502.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock	\$20,400 00	Installment stock—dues	\$18,300 00
Arrearages	206 26	Installment stock—profits	3,167 97
On shares	\$107 00	Advance payments	10 00
On interest	65 13	Reserve and undivided profits	87 55
On premium	12 60		
On fines	21 53		
Cash in office and bank	959 26		
Total assets	\$21,565 52	Total liabilities	\$21,565 52

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
22	72	\$72 00	\$88 38	\$88 38
24	60	60 00	71 30	71 30
26	48	48 00	54 06	54 06
28	36	36 00	38 77	38 77
30	24	24 00	24 98	24 98
32	12	12 00	12 20	12 20

No. 12—FRESNO.

MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated March 17, 1892.)

A. V. LISEBY, Secretary.

W. T. MATTINGLY, President.

Fiscal year ended March 1, 1906.

No. of series 19.

No. of shares, 1,527.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$98,212 53	Installment stock—dues.....	\$55,672 20
Arrearages.....	621 00	Installment stock—profits...	16,611 05
On shares.....	\$109 00	Overdrafts and bills payable..	25,000 00
On interest.....	373 70	Reserve and undivided profits	3,463 54
On def. cort.....	138 30	All other liabilities.....	917 49
Cash in office and bank.....	2,830 75		
Total assets.....	\$101,664 28	Total liabilities.....	\$101,664 28

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
9.....	120	\$120 00	\$191 88	-----
11.....	108	108 00	164 74	-----
13.....	96	96 00	139 80	\$137 50
15.....	84	84 00	117 23	115 50
17.....	72	72 00	96 13	94 00
19.....	60	60 00	76 53	74 00
21.....	48	48 00	58 33	55 50
23.....	36	36 00	41 67	39 00
25.....	24	24 00	26 48	25 00
27.....	12	12 00	12 61	12 00

No. 13—HEALDSBURG.

HEALDSBURG MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated December 31, 1894.)

E. B. SNOOK, Secretary.

J. B. PRINCE, President.

Fiscal year ended December 31, 1905.

No. of series, 20.

No. of shares, 586.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$38,250 00	Installment stock—dues.....	\$16,428 00
Cash in office and bank.....	613 75	Installment stock—profits...	5,849 24
All other assets.....	159 66	Advance payments.....	57 00
		Overdrafts and bills payable..	16,465 25
		Reserve and undivided profits	90
		Sundry ledger accounts.....	100 00
		All other liabilities.....	123 02
Total assets.....	\$39,023 41	Total liabilities.....	\$39,023 41

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
3.....	120	\$60 00	\$93 87	Dues, plus profits, as per by-laws.
5.....	108	54 00	80 31	
7.....	96	48 00	68 03	
9.....	84	42 00	56 72	
11.....	72	36 00	46 40	
13.....	60	30 00	36 94	
15.....	48	24 00	28 22	
17.....	36	18 00	20 23	
19.....	24	12 00	12 97	
21.....	12	6 00	6 24	

No. 14—KERN.

KERN COUNTY MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated July 29, 1901.)

ARTHUR L. CRITES, Secretary.

J. F. DUGAN, President.

Fiscal year ended December 31, 1905.

No. of series, none.

No. of shares, 1,758.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$49,800 00	Installment stock—dues	\$34,176 82
Cash in office and bank.....	2,492 98	Installment stock—profits	3,630 79
All other assets.....	60 50	Paid-up and prepaid stock— capital	5,400 00
		Overdrafts and bills payable..	8,000 00
		Reserve and undivided profits	502 37
		Loans due and incomplete...	643 50
Total assets.....	\$52,353 48	Total liabilities	\$52,353 48

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Dayton Plan. Dues—50 cents per share per month.

Dividend, last fiscal year, 10 per cent.

Book value—Dues plus dividend.

Withdrawal value—Same as book value.

No. 15—LOS ANGELES.

FRATERNAL MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated April 17, 1895.)

HERBERT J. GOUDGE, Secretary.

WM. MEEK, President.

Fiscal year ended May 15, 1906.

No. of series, 28.

No. of shares, 759.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$40,787 50	Installment stock—dues.....	\$18,093 00
Arrearages.....	622 10	Installment stock—profits...	5,290 27
On shares.....	\$338 50	Paid-up and prepaid stock—	
On interest.....	186 00	capital.....	8,000 00
On premium.....	97 60	Paid-up and prepaid stock—	
Cash in office and bank.....	371 52	dividends.....	74 00
Advances—secured.....	75 00	Advance payments.....	193 55
All other assets.....	13 00	Overdrafts and bills payable.	8,000 00
		Reserve and undivided profits	708 30
		Loans due and incomplete..	496 50
		Sundry ledger accounts.....	1,013 50
Total assets.....	\$41,869 12	Total liabilities.....	\$41,869 12

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
D.....	120	\$60 00	\$91 05	\$83 29
K.....	96	48 00	66 29	61 72
O.....	84	42 00	55 48	51 11
R.....	72	36 00	45 69	43 27
V.....	60	30 00	36 64	34 43
Y.....	48	24 00	28 18	26 78
28.....	39	19 50	22 23	21 32
33.....	24	12 00	13 02	12 51
35.....	12	6 00	6 26	6 13

No. 16—LOS ANGELES.

HOME INVESTMENT BUILDING AND LOAN ASSOCIATION.

(Incorporated August 21, 1888.)

W. A. BONYNGE, Secretary.

J. B. NEWTON, President.

Fiscal year ended September 30, 1905.

No. of series, 20.

No. of shares, 674.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$77,440 00	Installment stock—dues.....	\$42,750 00
Arrearages.....	851 41	Installment stock—profits...	13,946 45
On shares.....	\$247 00	Advance payments.....	720 00
On interest.....	604 41	Overdrafts and bills payable.	19,450 00
Cash in office and bank.....	997 04	Reserve and undivided profits	704 50
All other assets.....	209 50	Loans due and incomplete...	1,927 00
Total assets.....	\$79,497 95	Total liabilities.....	\$79,497 95

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
13.....	120	\$120 00	\$176 84	\$174 00
17.....	96	96 00	122 69	121 36
19.....	84	84 00	104 36	103 35
21.....	72	72 00	87 21	84 17
23.....	60	60 00	70 41	68 33
25.....	48	48 00	54 57	53 26
27.....	36	36 00	39 62	38 90
29.....	24	24 00	25 51	25 21
31.....	12	12 00	12 36	12 28

No. 17—LOS ANGELES.

METROPOLITAN LOAN ASSOCIATION.

(Incorporated July 30, 1886.)

ISAAC NORTON, Secretary.

CHAS. SEYLER, President.

Fiscal year ended June 30, 1906.

No. of series, 18.

No. of shares, 3,135.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$229,800 00	Installment stock—dues.....	\$172,488 00
Arrearages.....	110 00	Installment stock—profits...	52,842 19
On shares.....	\$47 00	Advance payments.....	110 00
On interest.....	63 00	Reserve and undivided profits	9,690 60
Cash in office and bank.....	18,152 79	Loans due and incomplete ..	12,932 00
Total assets.....	\$248,062 79	Total liabilities.....	\$248,062 79

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
12.....	120	\$120 00	\$187 46	\$187 46
13.....	108	108 00	159 35	146 51
15.....	96	96 00	134 41	122 88
17.....	84	84 00	112 10	102 26
19.....	72	72 00	91 88	83 93
21.....	60	60 00	73 37	68 02
23.....	48	48 00	56 38	52 19
25.....	36	36 00	40 61	38 30
27.....	24	24 00	26 00	25 00
29.....	12	12 00	12 50	12 25

No. 18—LOS ANGELES.

SOUTHERN CALIFORNIA LOAN ASSOCIATION.

(Incorporated March 11, 1887.)

JULIUS H. MARTIN, Secretary.

C. E. DONNATIN, President.

Fiscal year ended August 31, 1905.

No. of series, 21.

No. of shares, 3,871.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$410,215 00	Installment stock—dues.....	\$204,312 00
Arrearages.....	841 00	Installment stock—profits....	61,096 61
On shares.....	\$841 00	Paid-up and prepaid stock—	
Cash in office and bank.....	2,090 41	capital.....	130,200 00
Advances—secured.....	103 00	Advance payments.....	697 00
All other assets.....	388 30	Reserve and undivided profits	9,140 47
		Loans due and incomplete....	8,107 63
		Sundry ledger accounts.....	84 00
Total assets.....	\$413,637 71	Total liabilities.....	\$413,637 71

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
13.....	120	\$120 00	\$178 24	\$178 24
15.....	108	108 00	152 80	152 80
17.....	96	96 00	129 68	129 68
19.....	84	84 00	108 82	102 61
21.....	72	72 00	89 75	82 65
23.....	60	60 00	71 84	67 10
25.....	48	48 00	55 50	51 75
27.....	36	36 00	40 09	38 04
29.....	24	24 00	25 79	24 89
31.....	12	12 00	12 45	12 22

No. 19—LOS ANGELES.

FIDELITY SAVINGS AND LOAN ASSOCIATION.

(Incorporated January 23, 1891.)

G. H. WADLEIGH, Secretary.

C. C. BOYNTON, President.

Fiscal year ended December 31, 1906.

No. of series, 24.

No. of shares, 15,581.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$372,201 90	Installment stock—dues.....	\$141,355 71
Arrearages.....	378 00	Installment stock—profits....	40,603 28
On interest.....	\$378 00	Paid-up and prepaid stock—	
Cash in office and bank.....	13,957 52	capital.....	131,250 00
Real estate.....	2,000 00	Paid-up and prepaid stock—	
Advances—secured.....	497 97	dividends.....	3,061 65
All other assets.....	1,029 00	Overdrafts and bills payable.	22,849 89
		Reserve and undivided profits	18,422 80
		Loans due and incomplete....	29,475 30
		Sundry ledger accounts.....	1,544 69
		All other liabilities.....	1,501 07
Total assets.....	\$390,064 39	Total liabilities.....	\$390,064 39

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Loan Fund Dues per Share.	Book Value per Share.	Withdrawal Value.
1.....	72	\$50 40	\$43 56	\$68 79	\$68 79
2.....	60	42 00	36 00	52 42	52 42
3.....	48	33 60	28 44	38 15	38 15
4.....	36	25 20	20 88	25 85	25 85
5.....	24	16 80	13 32	15 25	15 25
6.....	12	8 40	5 76	6 11	6 11

No. 20—LOS ANGELES.

PROVIDENT MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated October 14, 1895.)

J. M. HUNTER, Secretary.

L. W. BLINN, President.

Fiscal year ended October 31, 1905.

No. of series, 40.

No. of shares, 41,795.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock.....	\$1,223,096 10	Installment stock—dues.....	\$605,655 75
Arrearages.....	13,367 90	Installment stock—profits.....	331,607 84
On interest.....	\$8,240 65	Paid-up and prepaid stock—capital.....	181,500 00
On premium.....	5,127 25	Paid-up and prepaid stock—dividends.....	3,664 89
Cash in office and bank.....	13,623 04	Overdrafts and bills payable.....	104,800 00
Real estate.....	15,600 00	Reserve and undivided profits.....	38,257 11
Advances—secured.....	12,085 38	Sundry ledger accounts.....	933 72
All other assets.....	1,000 00	All other liabilities.....	12,353 11
Total assets.....	\$1,278,772 42	Total liabilities.....	\$1,278,772 42

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

CLASS "B"—Dues 70 cents per share per month.

Serial No.	Age, in Months.	Total Dues per Share.	Loan Fund Dues per Share.	Book Value per Share.	Withdrawal Value.
13.....	84	\$58 80	\$51 12	\$88 46	\$88 46
17.....	72	50 40	43 56	69 22	69 22
21.....	60	42 00	36 00	52 63	52 63
25.....	48	33 60	28 44	38 34	38 34
29.....	36	25 20	20 88	26 01	26 01
33.....	24	16 80	13 32	15 38	15 38
37.....	12	8 40	5 76	6 22	6 22

No. 21—LOS ANGELES.

PROTECTIVE SAVINGS MUTUAL BUILDING AND LOAN
ASSOCIATION.

(Incorporated January 2, 1896.)

W. G. BLEWETT, Secretary.

FERD. K. RULE, President.

Fiscal year ended February 28, 1906.

No. of series, none.

No. of shares, 8,414.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$345,539 83	Installment stock—dues	\$105,760 85
Arrearages	6,627 25	Installment stock—profits	6,063 65
On shares	\$2,011 80	Paid-up and prepaid stock—	
On interest	2,187 08	capital	243,726 41
On premium	2,187 07	Paid-up and prepaid stock—	
On fines	241 30	dividends	2,415 82
Cash in office and bank	6,080 73	Advance payments	1,041 23
Real estate	26,731 73	Overdrafts and bills payable	24,600 00
Advances—secured	4,083 50	Reserve and undivided profits	396 22
All other assets	1,560 32	Loans due and incomplete	31 95
		Sundry ledger accounts	6,030 03
		All other liabilities	557 20
Total assets	\$390,623 36	Total liabilities	\$390,623 36

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

	Age, in Months.	Total Dues per Share.	Loan Fund Dues per Share.	Book Value per Share.	Withdrawal Value.
Class "D." Dues, 60c per month.	96	\$57 60	\$46 92	\$65 91	Loan fund dues plus 1/2 of net profits.
	84	50 40	40 68	56 13	
	72	43 20	34 44	45 09	
	60	36 00	28 20	36 12	
	48	28 80	22 32	27 78	
	36	21 60	16 56	19 57	
	24	14 40	10 80	12 16	
	12	7 20	5 04	5 34	

No. 22—LOS ANGELES.

STATE MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated June 20, 1889.)

C. J. WADE, Secretary.

W. G. COCHRAN, President.

Fiscal year ended December 31, 1905.

No. of series, none.

No. of shares, 43,943.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$1,542,071 15	Installment stock—dues	\$546,480 70
Arrearages	1,332 10	Installment stock—profits	93,880 65
On interest	\$1,177 75	Paid-up and prepaid stock—	
On fines	154 35	capital	694,122 50
Cash in office and bank	39,333 08	Paid-up and prepaid stock—	
Advances—secured	3,894 33	dividends	81,656 20
All other assets	2,595 14	Advance payments	274 05
		Reserve and undivided profits	132,382 60
		Loans due and incomplete	25,000 00
		Sundry ledger accounts	480 05
		All other liabilities	14,949 15
Total assets	\$1,589,225 80	Total liabilities	\$1,589,225 80

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

	Age, in Months.	Total Dues per Share.	Loan Fund Dues per Share.	Book Value per Share.	Withdrawal Value.
Class "A." Dues 60 cents per share per month.	114	\$68 40	\$67 40	\$98 05	\$98 05
	108	64 80	63 80	90 85	90 85
	96	57 60	56 60	77 34	77 34
	84	50 40	49 40	64 98	64 98
	72	43 20	42 20	53 49	53 49
	60	36 00	35 00	43 02	43 02
	48	28 80	27 80	32 64	32 64
	36	21 60	20 60	23 23	23 23
	24	14 40	13 40	14 51	14 51
	12	7 20	6 20	6 43	6 43

No. 23—LOS ANGELES.

UNION MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated October 9, 1891.)

H. STURDEVANT, Secretary.

W. H. MATHER, President.

Fiscal year ended October 31, 1905.

No. of series, 52.

No. of shares, 3,577.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$116,502 11	Installment stock—dues	\$58,911 71
Arrearages	6,316 34	Installment stock—profits	1,912 39
On shares	\$3,754 02	Paid-up and prepaid stock—	
On interest	2,361 27	capital	56,700 00
On premium	145 62	Paid-up and prepaid stock—	
On fines	55 43	dividends	324 25
Cash in office and bank	1,057 65	Overdrafts and bills payable	11,800 00
Real estate	1,494 45	Reserve and undivided profits	7,490 73
Advances—secured	8,306 36	Loans due and incomplete	4,439 95
All other assets	7,902 12		
Total assets	\$141,579 03	Total liabilities	\$141,579 03

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total dues per Share.	Loan Fund Dues per Share.	Book Value per Share.	Withdrawal Value.
13	132	\$79 20	\$74 40	\$86 00	Varies with age of shares.
17	120	72 00	68 40	71 00	
21	108	64 80	62 00	68 00	
25	96	57 60	56 00	61 10	
29	84	50 40	50 00	54 00	
33	72	43 20	42 80	45 10	
37	60	36 00	35 60	37 10	
1	48	28 80	28 80	30 00	
5	36	21 60	21 60	23 00	
9	24	14 40	14 40	15 00	
3	12	7 20	7 20	7 20	

No. 24—LONG BEACH.

MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated August 4, 1904.)

E. H. VAN SITLERT, Secretary.

J. B. HEARTWELL, President.

Fiscal year ended December 31, 1905.

No. of series, none.

No. of shares, 1,678.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$11,400 00	Installment stock—dues.....	\$10,985 00
Cash in office and bank.....	542 29	Paid-up and prepaid stock— capital.....	800 00
All other assets.....	1,242 71	Overdrafts and bills payable..	1,400 00
Total assets.....	\$13,185 00	Total liabilities.....	\$13,185 00

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Dayton Plan. Dues—50 cents per share per month.

Book value—Dues plus dividend.

Withdrawal value—Book value less 1 month's dues.

No. 25—LOS GATOS.

LOS GATOS BUILDING AND LOAN ASSOCIATION.

(Incorporated April 27, 1889.)

A. BERRYMAN, Secretary.

E. E. SPRINGER, President.

Fiscal year ended April 30, 1906.

No. of series, 8.

No. of shares, 102.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$10,650 00	Installment stock—dues.....	\$6,573 00
Cash in office.....	455 12	Installment stock—profits...	2,334 72
		Advance payments.....	69 50
		Overdrafts and bills payable..	2,000 00
		Reserve and undivided profits	127 90
Total assets.....	\$11,105 12	Total liabilities.....	\$11,105 12

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
4.....	120	\$120 00	\$177 80	Dues plus 3 to 6 per cent for average time.
5.....	108	108 00	153 90	
6.....	84	84 00	110 30	
7.....	60	60 00	73 01	
8.....	48	48 00	56 43	
9.....	36	36 00	40 87	
10.....	24	24 00	26 27	
11.....	12	12 00	12 61	

No. 26—MERCED.

MERCED MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated June 22, 1891.)

S. C. CORNELL, Secretary.

JOHN B. OLEESE, President.

Fiscal year ended June 30, 1906.

No. of series, 11.

No. of shares, 963.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$53,300 00	Installment stock—dues....	\$46,368 00
Arrearages.....	169 43	Installment stock—profits...	10,499 58
On shares.....	\$120 00	Advance payments.....	10 00
On interest.....	15 38	Reserve and undivided profits	12 86
On fines.....	34 05	Sundry ledger accounts.....	1,870 00
Cash in office and bank.....	12,596 50	Unearned premium.....	7,305 49
Total assets.....	\$66,065 93	Total liabilities.....	\$66,065 93

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
8	120	\$120 00	\$174 95	\$156 30
9	108	108 00	150 90	137 43
10	96	96 00	128 68	119 28
11	84	84 00	108 09	101 85
12	72	72 00	89 17	85 14
13	60	60 00	71 64	69 15
14	48	48 00	55 24	53 88
15	36	36 00	39 98	39 33
16	24	24 00	25 77	25 50
17	12	12 00	12 46	12 39

No. 27—NAPA.

NAPA BUILDING AND LOAN ASSOCIATION.

(Incorporated April 22, 1886.)

T. N. MOUNT, Secretary.

E. D. BEARD, President.

Fiscal year ended May 18, 1906.

No. of series, 11.

No. of shares, 1,737.

<i>Assets.</i>		<i>Liabilities.</i>	
Money on mortgage on stock..	\$91,918 45	Installment stock—dues	\$81,461 00
Arrearages.....	83 88	Installment stock—profits...	15,931 52
On shares.....	\$55 00	Advance payments.....	496 00
On interest.....	28 88	Reserve and undivided profits	34 43
Cash in office and bank.....	5,763 12		
Advances—secured	7 50		
All other assets.....	150 00		
Total assets.....	\$97,922 95	Total liabilities.....	\$97,922 95

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
11.....	125	\$125 00	\$185 88	\$156 81
12.....	113	113 00	160 60	139 70
13.....	101	101 00	137 21	122 25
14.....	89	89 00	115 70	117 50
15.....	77	77 00	96 01	89 35
16.....	65	65 00	78 27	73 80
17.....	53	53 00	61 53	58 85
18.....	41	41 00	46 00	44 33
19.....	29	29 00	31 45	30 75
20.....	17	17 00	17 83	17 46
21.....	5	5 00	5 07	5 00

No. 28—NEWCASTLE.

NEWCASTLE BUILDING AND LOAN ASSOCIATION.

(Incorporated May 23, 1889.)

C. H. KELLOGG, Secretary.

GEO. W. BISBEE, President.

Fiscal year ended May 26, 1906.

No. of series, 10.

No. of shares, 360.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$23,050 00	Installment stock—dues.....	\$19,848 00
Arrearages.....	174 55	Installment stock—profits....	6,649 68
On shares.....	\$64 00	Advance payments.....	30 00
On interest.....	74 60	Reserve and undivided profits	44 65
On premium.....	24 35		
On fines.....	4 60		
On rent.....	7 00		
Cash in office and bank.....	1,546 67		
Real estate.....	1,751 11		
All other assets.....	50 00		
Total assets.....	\$26,572 33	Total liabilities.....	\$26,572 33

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
8.....	120	\$120 00	\$185 50	\$178 95
9.....	108	108 00	161 05	155 75
10.....	96	96 00	137 92	133 73
11.....	84	84 00	116 10	109 68
12.....	72	72 00	95 58	88 51
13.....	60	60 00	76 37	68 19
14.....	48	48 00	58 40	52 20
15.....	36	36 00	41 90	37 77
16.....	24	24 00	26 62	24 52
17.....	12	12 00	12 65	12 03

No. 29—OAKLAND.

HOME SECURITY LOAN SOCIETY.

(Incorporated December 20, 1875.)

C. P. HOAG, Secretary.

C. W. KINSEY, President.

Fiscal year ended June 30, 1906.

No. of series, none.

No. of shares, 2,060.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$181,692 07	Installment stock—dues.....	\$59,789 42
Arrearages.....	1,017 43	Installment stock—profits....	14,529 55
On interest.....	\$1,009 08	Paid-up and prepaid stock—	
On fines.....	8 35	capital.....	80,057 00
Real estate.....	5,448 35	Paid-up and prepaid stock—	
Advances—secured.....	180 85	dividends.....	7,990 63
All other assets.....	200 00	Overdrafts and bills payable..	19,871 48
		Reserve and undivided profits	1,500 74
		Loans due and incomplete....	2,241 68
		Sundry ledger accounts.....	2,135 20
		All other liabilities.....	423 00
Total assets.....	\$188,538 70	Total liabilities.....	\$188,538 70

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Dayton Plan. Dues—\$1.00 per share per month.

Dividend, last fiscal year—5 per cent.

Book value—Dues plus dividend.

Withdrawal value—Book value less 1 per cent of profits.

No. 30—EAST OAKLAND.

BROOKLYN INVESTMENT AND LOAN ASSOCIATION.

(Incorporated October 14, 1889.)

J. A. WEBSTER, Secretary.

C. H. DALY, President.

Fiscal year ended October 20, 1905.

No. of series, 41.

No. of shares, 1,002.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$43,944 46	Installment stock—dues.....	\$23,049 75
Arrearages.....	1,061 95	Installment stock—profits....	6,145 45
On shares.....	\$251 75	Advance payments.....	30 00
On interest.....	797 20	Overdrafts and bills payable	18,700 00
On premium.....	13 00	Reserve and undivided profits	2,060 90
Cash in office and bank.....	445 12	All other liabilities.....	236 50
Real estate.....	4,596 07		
All other assets.....	175 00		
Total assets.....	\$50,222 60	Total liabilities.....	\$50,222 60

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
23-----	120	\$60 00	\$78 14	\$73 50
27-----	108	54 00	68 39	64 90
39-----	72	36 00	42 02	40 82
43-----	60	30 00	34 14	33 36
47-----	48	24 00	26 62	26 16
51-----	36	18 00	19 45	19 18
55-----	24	12 00	12 61	12 32
59-----	12	6 00	6 16	6 13

No. 31—EAST OAKLAND.

COSMOPOLITAN MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated August 4, 1879.)

W. S. GOULD, Secretary.

D. SYMMES, President.

Fiscal year ended July 31, 1905.

No. of series, 24.

No. of shares, 3,259.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$172,699 24	Installment stock—dues.....	\$106,527 89
Arrearages	5,256 10	Installment stock—profits...	17,540 72
On shares	\$2,450 56	Advance payments	31,260 78
On interest	2,555 54	Overdrafts and bills payable.	22,500 00
On fines.....	250 00	Reserve and undivided profits	626 73
Cash in office and bank.....	1,992 24	Loans due and incomplete...	2,330 33
Real estate	1,930 00	All other liabilities.....	2,238 85
Advances—secured	247 72		
All other assets	900 00		
Total assets.....	\$183,025 30	Total liabilities.....	\$183,025 30

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
34-----	120	\$120 00	\$154 50	\$152 81
36-----	105	105 00	134 96	130 92
38-----	96	96 00	116 48	111 36
40-----	84	84 00	99 47	94 06
42-----	72	72 00	83 18	78 15
44-----	60	60 00	67 67	63 83
46-----	48	48 00	52 82	50 41
48-----	36	36 00	38 64	37 32
50-----	24	24 00	25 16	24 58
52-----	12	12 00	12 30	12 15

No. 32—WEST OAKLAND.

WEST OAKLAND MUTUAL LOAN ASSOCIATION.

(Incorporated July 21, 1875.)

A. SBARBORO, Secretary.

C. A. MALM, President.

Fiscal year ended August 31, 1905.

No. of series, 13.

No. of shares, 370.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock...	\$25,866 60	Installment stock—dues.....	\$27,642 00
Arrearages.....	6,436 85	Installment stock—profits...	4,412 81
On shares.....	\$456 50	Advance payments.....	31 00
On interest.....	517 50	Reserve and undivided profits	952 52
On premium.....	8 50		
On fines.....	200 00		
On def. cont.....	5,254 35		
Cash in office and bank.....	638 57		
All other assets.....	96 31		
Total assets.....	\$33,038 33	Total liabilities.....	\$33,038 33

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
19.....	120	\$120 00	\$141 89	\$139 05
20.....	108	108 00	125 75	123 24
21.....	96	96 00	110 10	107 90
22.....	84	84 00	94 88	92 98
23.....	72	72 00	80 00	78 40
24.....	60	60 00	65 53	64 20
25.....	48	48 00	51 53	50 50
26.....	36	36 00	37 94	37 18
27.....	24	24 00	24 87	24 37
28.....	12	12 00	12 25	12 12

No. 33—ONTARIO.

PEOPLE'S MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated June 24, 1891.)

I. S. MILLER, Secretary.

A. P. HARWOOD, President.

Fiscal year ended May 31, 1906.

No. of series, none.

No. of shares, 4,362.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock...	\$156,400 00	Installment stock—dues.....	\$75,540 06
Real estate—home office.....	7,600 00	Installment stock—profits...	4,767 66
		Paid-up and prepaid capital—stock.....	35,400 00
		Overdrafts and bills payable.	46,921 61
		Reserve and undivided profits	159 28
		Loans due and incomplete...	1,211 39
Total assets.....	\$164,000 00	Total liabilities.....	\$164,000 00

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Dayton Plan. Dues—60 cents per share per month.

Dividend, last fiscal year—7¼ per cent.

Book value—Dues plus dividend.

Withdrawal value—Book value less 1 per cent.

No. 34—ORANGE.

ORANGE BUILDING AND LOAN ASSOCIATION.

(Incorporated September 17, 1887.)

D. R. COLLINGS, Secretary.

D. C. PINLEY, President.

Fiscal year ended October 31, 1905.

No. of series, 11.

No. of shares, 1,795.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$144,975 00	Installment stock—dues.....	\$94,769 25
Arrearages.....	870 55	Installment stock—profits.....	31,633 84
On shares.....	\$369 87	Advance payments.....	208 45
On interest.....	281 73	Overdrafts and bills payable.....	17,750 00
On premium.....	111 68	Reserve and undivided profits.....	539 81
On fines.....	107 27	Loans due and incomplete...	3,609 75
Cash in office and bank.....	2,404 00		
Advances—secured.....	8 65		
All other assets.....	252 90		
Total assets.....	\$148,511 10	Total liabilities.....	\$148,511 10

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
2.....	126	\$126 00	\$200 00	\$200 00
3.....	114	114 00	172 96	161 16
4.....	102	102 00	148 48	136 86
5.....	90	90 00	125 46	114 82
6.....	78	78 00	103 95	94 86
7.....	66	66 00	84 29	76 97
8.....	54	54 00	66 04	60 02
9.....	42	42 00	49 20	44 88
10.....	30	30 00	33 68	30 73
11.....	18	18 00	19 28	18 13
12.....	6	6 00	6 15	6 00

No. 35—PALO ALTO.

PALO ALTO MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated November 14, 1892.)

MARSHALL BLACK, Secretary.

D. L. SLOAN, President.

Fiscal year ended November 30, 1905.

No. of series, 35.

No. of shares, 3,504.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$257,445 92	Installment stock—dues.....	\$83,367 90
Arrearages.....	561 20	Installment profits.....	24,266 48
On shares.....	\$561 20	Paid-up and prepaid stock—capital.....	69,600 00
Cash in office and bank.....	1,414 33	Advance payments.....	5,019 40
Advances—secured.....	232 64	Overdrafts and bills payable.....	71,809 50
All other assets.....	412 90	Reserve and undivided profits.....	1,706 41
		Loans due and incomplete..	4,297 30
Total assets.....	\$260,066 99	Total liabilities.....	\$260,066 99

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
6.....	117	\$117 00	\$190 54	\$190 54
7.....	108	108 00	168 69	168 69
10.....	96	96 00	142 32	142 32
14.....	84	84 00	118 22	118 22
18.....	72	72 00	96 61	88 12
22.....	60	60 00	76 86	70 50
26.....	48	48 00	58 38	53 76
30.....	36	36 00	41 54	39 24
34.....	24	24 00	26 20	25 44
38.....	12	12 00	12 41	12 36

No. 36—PASADENA.

LOS ANGELES COUNTY MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated February 16, 1899.)

H. H. KLAMROTH, Secretary.

SOLON BRIGGS, President.

Fiscal year ended December 31, 1905.

No. of series, none.

No. of shares, 10,005.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$127,988 50	Installment stock—dues.....	\$74,226 94
Arrearages.....	546 99	Installment stock—profits....	8,277 40
On interest.....	\$497 10	Paid-up and prepaid stock—	
On fines.....	49 89	capital.....	26,350 00
Cash in office and bank.....	1,522 78	Overdrafts and bills payable..	17,000 00
All other assets.....	492 25	Reserve and undivided profits	4,686 78
		Loans due and incomplete ..	6 00
		All other liabilities.....	3 40
Total assets.....	\$130,550 52	Total liabilities.....	\$130,550 52

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Dayton Plan. Dues—50 cents per share per month.

Dividend, last fiscal year—8 per cent.

Book value—Dues plus dividend.

Withdrawal value—Same as book value.

No. 37—PASADENA.

MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated July 18, 1892.)

R. H. PINNEY, Secretary.

A. K. NASH, President.

Fiscal year ended June 30, 1906.

No. of series, 14.

No. of shares, 5,056.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$188,692 40	Installment stock—dues.....	\$46,850 64
Arrearages.....	982 75	Installment stock—profits...	10,411 46
On shares.....	\$450 00	Paid-up and prepaid stock—	
On interest.....	488 70	capital.....	103,996 00
On fines.....	44 05	Paid-up and prepaid stock—	
Cash in office and bank.....	2,796 46	dividends.....	12,051 52
All other assets.....	600 00	Advance payments.....	53 30
		Overdrafts and bills payable..	10,056 45
		Reserve and undivided profits	9,605 46
		All other liabilities.....	46 78
Total assets.....	\$193,071 61	Total liabilities.....	\$193,071 61

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
9	120	\$60 00	\$93 13	\$89 81
11	108	54 00	79 44	76 89
13	96	48 00	67 14	65 22
15	84	42 00	56 00	54 60
17	72	36 00	45 95	43 46
19	60	30 00	36 71	34 02
21	48	24 00	28 27	26 08

Also—

Dayton Plan. Dues—50 cents per share per month.

Dividend, last fiscal year—8 per cent.

Book value—Dues plus dividend.

Withdrawal value—Same as book value.

No. 38—PETALUMA.

PETALUMA MUTUAL LOAN ASSOCIATION.

(Incorporated September 27, 1889.)

F. A. CROMWELL, Secretary.

F. H. DENMAN, President.

Fiscal year ended September 30, 1905.

No. of series, 10.

No. of shares, 530.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$28,480 00	Installment stock—dues.....	\$23,168 00
Arrearages.....	500 75	Installment stock—profits...	3,804 28
On shares.....	\$144 10	Overdrafts and bills payable..	4,600 00
On interest.....	196 65	Reserve and undivided profits	22 61
On premium.....	152 05		
On fines.....	7 55		
Cash in office and bank.....	2,614 14		
Total assets.....	\$31,594 89	Total liabilities.....	\$31,594 89

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
6	144	\$144 00	\$198 30	Dues plus 4%.
7	132	132 00	176 58	
8	120	120 00	155 81	
9	108	108 00	136 38	
12	72	72 00	84 12	
13	60	60 00	68 33	
14	48	48 00	53 35	
15	36	36 00	39 05	
16	24	24 00	25 38	
17	12	12 00	12 36	

No. 39—PLEASANTON.

PLEASANTON MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated March 1, 1895.)

THOS. H. SILVER, Secretary.

WM. HENRY COKE, President.

Fiscal year ended March 28, 1906.

No. of series, 18.

No. of shares, 419.

Assets.		Liabilities.	
Loans on mortgage on stock..	\$16,850 00	Installment stock—dues.....	\$16,170 00
Cash in office and bank.....	2,287 99	Installment stock—profits...	2,967 99
Total assets.....	\$19,137 99	Total liabilities.....	\$19,137 99

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
2	120	\$120 00	\$176 10	Book value, less 1% of profits.
4	108	108 00	151 78	
8	84	84 00	108 85	
10	72	72 00	89 90	
12	60	60 00	72 17	
14	48	48 00	55 57	
16	36	36 00	40 12	
18	24	24 00	25	
20	12	12 00	12 43	

No. 40—POMONA.

MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated December 24, 1892.)

C. I. LORBEER, Secretary.

J. T. BRADY, President.

Fiscal year ended December 31, 1905.

No. of series, 25.

No. of shares, 5,033.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$184,600 00	Installment stock—dues.....	\$83,598 00
Arrearages.....	687 25	Installment stock—profits....	19,602 95
On shares.....	\$276 00	Paid-up and prepaid stock—	
On interest.....	239 30	capital.....	83,500 00
On premium.....	110 35	Advance payments.....	184 50
On fines.....	61 60	Reserve and undivided profits	953 91
Cash in office and bank.....	2,635 61	Loans due and incomplete...	2,777 50
Real estate.....	2,034 10	Sundry ledger accounts.....	40 00
All other assets.....	699 90		
Total assets.....	\$190,656 86	Total liabilities.....	\$190,656 86

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
7.....	120	\$60 00	\$89 80	\$89 80
9.....	108	54 00	77 12	71 02
11.....	96	48 00	65 65	61 16
13.....	84	42 00	55 22	51 87
15.....	72	36 00	45 52	43 10
17.....	60	30 00	36 48	34 84
19.....	48	24 00	28 09	27 04
21.....	36	18 00	20 26	19 67
23.....	24	12 00	12 98	12 73
25.....	12	6 00	6 24	6 18

No. 41—REDWOOD CITY.

SAN MATEO COUNTY BUILDING AND LOAN ASSOCIATION.

(Incorporated May 8, 1890.)

GEO. W. LOVIE, Secretary.

P. P. CHAMBERLIN, President.

Fiscal year ended May 31, 1906.

No. of series, 40.

No. of shares, 3,128.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$195,474 44	Installment stock—dues.....	\$125,626 50
Arrearages.....	3,392 57	Installment stock—profits....	43,945 04
On shares.....	\$908 00	Advance payments.....	175 17
On interest.....	2,443 82	Overdrafts and bills payable.	23,407 09
On premium.....	40 75	Reserve and undivided profits	3,009 56
Cash in office and bank.....	197 71	Loans due and incomplete...	4,132 80
Real estate.....	150 00		
Advances secured.....	881 44		
All other assets.....	200 00		
Total assets.....	\$200,296 16	Total liabilities.....	\$200,296 16

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
15.....	120	\$120 00	\$187 12	\$163 30
19.....	108	108 00	161 46	142 39
23.....	96	96 00	136 95	122 63
27.....	84	84 00	114 41	104 00
31.....	72	72 00	93 68	86 42
35.....	60	60 00	74 62	69 84
39.....	48	48 00	57 10	54 20
43.....	36	36 00	40 98	39 44
47.....	24	24 00	26 17	25 52
51.....	12	12 00	12 55	12 26

No. 42—RIVERSIDE.

RIVERSIDE COUNTY MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated April 5, 1901.)

M. S. BOWMAN, Secretary.

W. B. CLANCY, President.

Fiscal year ended May 1, 1906.

No. of series, none.

No. of shares, 1,700.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$68,700 00	Installment stock—dues.....	\$18,429 13
Cash in office and bank.....	3,033 69	Installment stock—profits....	2,806 27
All other assets.....	71 71	Paid-up and prepaid stock—capital.....	46,700 00
		Paid-up and prepaid stock—dividends.....	1,616 79
		Advance payments.....	400 00
		Reserve and undivided profits.....	1,051 06
		Loans due and incomplete....	802 15
Total assets.....	\$71,805 40	Total liabilities.....	\$71,805 40

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Dayton Plan. Dues—50 cents per share per month.

Dividend, last fiscal year—7 per cent.

Book value—Dues plus dividend.

Withdrawal value—Same as book value.

No. 43—SACRAMENTO.

GERMANIA BUILDING AND LOAN ASSOCIATION.

(Incorporated December 31, 1872.)

H. J. GOETHE, Secretary.

CHAS. SCHMITT, President.

Fiscal year ended December 31, 1905.

No. of series, 14.

No. of shares, 2,062.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$145,936 38	Installment stock—dues	\$145,454 05
Arrearages.....	4,058 02	Installment stock—profits...	4,171 81
On interest.....	\$4,058 02	Advance payments	57 75
Cash in office and bank.....	2,702 92	Overdrafts and bills payable.	12,500 00
Real estate.....	19,985 09	Reserve and undivided profits	10,498 80
Total assets.....	\$172,682 41	Total liabilities	\$172,682 41

INSTALLMENT STOCK, WITH AGE, AND VALUE PER SHARE.

Serial No.	Age, in Months.	Total Value per Share.	Book Value per Share.
9.....	144	\$144 00	\$179 10
10.....	132	132 00	164 29
11.....	120	120 00	145 66
12.....	108	108 00	128 13
13.....	96	96 00	111 38
14.....	84	84 00	95 37
15.....	72	72 00	80 07
16.....	60	60 00	65 42
17.....	48	48 00	51 35
21.....	24	24 00	24 75
23.....	12	12 00	12 16

No. 44—SACRAMENTO.

SACRAMENTO BUILDING AND LOAN ASSOCIATION.

(Incorporated August 26, 1874.)

FRANK HICKMAN, Secretary.

J. H. ARNOLD, President.

Fiscal year ended August 31, 1905.

No. of series, none.

No. of shares, 2,931.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$192,125 29	Installment stock—dues.....	\$132,564 95
Arrearages.....	2,292 15	Installment stock—profits...	33,899 04
On interest.....	\$2,292 15	Paid-up and prepaid stock—capital.....	9,800 00
Real estate.....	21,113 40	Paid-up and prepaid stock—dividends.....	216 70
All other assets.....	315 50	Advance payments	75 00
		Overdrafts and bills payable.	20,359 79
		Reserve and undivided profits	18,833 36
		All other liabilities.....	97 50
Total assets.....	\$215,846 34	Total liabilities.....	\$215,846 34

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Dayton Plan. Dues—\$1.00 per share per month.

Dividend, last fiscal year—5.4 per cent.

Book value—Dues plus dividend.

Withdrawal value—Same as book value.

No. 45—SAN BERNARDINO.

SANTA FE BUILDING AND LOAN ASSOCIATION.

(Incorporated January 8, 1890.)

JOHN FLAGG, Secretary.

J. F. PARKER, President.

Fiscal year ended December 31, 1905.

No. of series, 11.

No. of shares, 4,649.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$278,330 00	Installment stock—dues.....	\$159,323 00
Arrearages.....	1,082 20	Installment stock—profits....	41,952 63
On shares.....	\$455 00	Paid-up and prepaid stock—	
On interest.....	523 60	capital.....	63,250 00
On fines.....	103 60	Overdrafts and bills payable..	6,056 87
All other assets.....	499 00	Reserve and undivided profits	3,286 00
		Loans due and incomplete ..	6,037 70
Total assets.....	\$279,911 20	Total liabilities.....	\$279,911 20

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
5.....	120	\$120 00	\$192 44	\$192 44
6.....	108	108 00	164 58	161 75
7.....	96	96 00	139 36	135 02
8.....	84	84 00	116 32	109 85
9.....	72	72 00	95 14	88 19
10.....	60	60 00	75 63	69 37
11.....	48	48 00	57 76	52 88
12.....	36	36 00	41 37	38 68
13.....	24	24 00	26 35	25 17
14.....	12	12 00	12 59	12 30

No. 46—SAN DIEGO.

SAN DIEGO BUILDING AND LOAN ASSOCIATION.

(Incorporated July 14, 1885.)

THEO. FINTZELBERG, Secretary.

A. BLOCHMAN, President.

Fiscal year ended July 1, 1905.

No. of series, 15.

No. of shares, 4,803.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$311,260 00	Installment stock—dues.....	\$246,595 00
Arrearages.....	167 30	Installment stock—profits....	56,059 50
On shares.....	\$81 00	Advance payments.....	2,623 25
On interest.....	81 75	Reserve and undivided profits	5,396 15
On premium.....	4 55	Loans due and incomplete....	2,350 00
Cash in office and bank.....	1,221 60	All other liabilities.....	1,000 00
Real estate.....	1,000 00		
All other assets.....	375 00		
Total assets.....	\$314,023 90	Total liabilities.....	\$314,023 90

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
8	131	\$131 00	\$195 64	\$167 97
9	119	119 00	170 30	149 21
10	107	107 00	147 32	131 17
11	95	95 00	126 02	113 85
12	83	83 00	106 11	97 25
13	71	71 00	87 43	81 38
14	59	59 00	70 08	66 15
15	47	47 00	53 89	51 52
17	36	36 00	39 92	38 64
19	24	24 00	25 65	25 16
21	12	12 00	12 37	12 28

No. 47—SAN DIEGO.

SILVER GATE BUILDING AND LOAN ASSOCIATION.

(Incorporated May 22, 1890.)

H. A. CROGHAN, Secretary.

W. M. HERBERT, President.

Fiscal year ended May 31, 1906.

No. of series, 19.

No. of shares, 2,197.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$113,370 00	Installment stock—dues	\$64,980 00
Cash in office and bank.....	2,373 83	Installment stock—profits...	12,641 46
		Overdrafts and bills payable..	36,700 00
		Reserve and undivided profits	364 87
		Loans due and incomplete...	1,057 50
Total assets	\$115,743 83	Total liabilities	\$115,743 83

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
5	120	\$120 00	\$169 03	\$150 00
7	105	105 00	141 61	128 02
8	93	93 00	120 96	111 05
9	84	84 00	106 28	98 70
11	72	72 00	88 22	82 80
13	60	60 00	71 44	67 50
15	48	48 00	55 46	52 80
17	36	36 00	40 39	38 70
19	24	24 00	26 02	25 20
21	12	12 00	12 52	12 30

No. 48—SAN DIEGO.

STATE OF CALIFORNIA MUTUAL BUILDING AND LOAN
ASSOCIATION.

(Incorporated March 8, 1888.)

F. S. LOOMIS, Secretary.

E. J. SWAN, President.

Fiscal year ended March 31, 1906.

No. of series, none.

No. of shares, 369.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock.	\$6,775 00	Installment stock—dues.....	\$2,219 90
Cash in office and bank.....	34 55	Installment stock—profits....	60 70
All other assets.....	600 00	Paid-up and prepaid stock— capital.....	300 00
		Overdrafts and bills payable.	4,409 63
		Reserve and undivided profits	419 32
Total assets.....	\$7,409 55	Total liabilities.....	\$7,409 55

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Dayton Plan. Dividend—5 per cent.

Book value—Dues plus dividend.

Withdrawal value—Dues plus three-fourths of profits, less membership fee.

No. 49—SAN FRANCISCO.

ACME BUILDING AND LOAN ASSOCIATION.

(Incorporated March 14, 1891.)

OSCAR HEYMAN, Secretary.

D. DAVIS, President.

Fiscal year ended March 1, 1906.

No. of series, 19.

No. of shares, 264.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$42,105 33	Installment stock—dues.....	\$21,105 60
Arrearages.....	1,099 60	Installment stock—profits....	4,318 49
On shares.....	\$629 80	Overdrafts and bills payable.	15,916 59
On interest.....	439 05	Reserve and undivided profits	3,787 49
On premium.....	30 75	Sundry ledger accounts.....	929 90
Cash in office and bank.....	2,130 26	All other liabilities.....	182 95
Real estate.....	679 35		
Advances—secured.....	112 58		
All other assets.....	113 90		
Total assets.....	\$46,241 02	Total liabilities.....	\$46,241 02

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
9.....	132	\$132 00	\$187 03	\$187 03
13.....	108	108 00	145 04	145 04
15.....	96	96 00	125 55	125 55
17.....	84	84 00	106 75	106 75
19.....	72	72 00	88 91	88 91
21.....	60	60 00	72 09	72 09
23.....	48	48 00	56 27	56 27
25.....	36	36 00	41 17	41 17
27.....	18	18 00	19 57	19 57

No. 51—SAN FRANCISCO.

ARGONAUT MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated February, 1891.)

E. GUNZBURGER, Secretary.

E. MESSENGER, President.

Fiscal year ended February 11, 1906.

No. of series, 11.

No. of shares, 579.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgages on stock..	\$69,043 56	Installment stock—dues.....	\$30,396 00
Arrearages	3,167 10	Installment stock—profits...	7,820 11
On shares	\$1,396 00	Advance payments.....	118 00
On interest	1,209 60	Overdrafts and bills payable..	28,784 29
On premium	561 50	Reserve and undivided profits	6,717 26
Real estate	2,045 19	Loans due and incomplete...	643 70
Advances—secured	293 51	Sundry ledger accounts.....	70 00
Total assets	\$74,549 36	Total liabilities	\$74,549 36

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
5.....	132	\$132 00	\$186 38	\$175 50
6.....	120	120 00	164 43	153 32
7.....	108	108 00	143 55	132 88
8.....	96	96 00	123 71	114 00
9.....	84	84 00	104 96	96 58
10.....	72	72 00	87 42	80 48
11.....	60	60 00	70 91	65 45
12.....	48	48 00	55 19	51 60
13.....	36	36 00	39 96	37 98
14.....	24	24 00	25 78	24 89
15.....	12	12 00	12 45	12 2

No. 52—SAN FRANCISCO.

BAY CITY BUILDING AND LOAN ASSOCIATION.

(Incorporated May 9, 1889.)

E. GUNZBURGER, Secretary.

H. LEVY, President.

Fiscal term ended August 27, 1906.

No. of series, 13.

No. of shares, 534.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$60,200 75	Installment stock—dues.....	\$26,775 00
Arrearages	3,434 05	Installment stock—profits...	5,545 04
On shares	\$2,430 00	Overdrafts and bills payable..	21,496 87
On interest	736 75	Reserve and undivided profits	8,857 89
On premium	267 30	Loans due and incomplete...	1,100 00
Advances—secured	160 00	Sundry ledger accounts.....	20 00
Total assets	\$63,794 80	Total liabilities	\$63,794 80

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Sérial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
8	123	\$123 00	\$169 07	\$157 55
9	111	111 00	147 38	136 41
10	99	99 00	127 28	117 38
11	87	87 00	108 44	99 86
12	75	75 00	90 94	83 77
13	63	63 00	75 22	69 11
14	51	51 00	58 35	54 67
15	39	39 00	43 18	41 09
16	27	27 00	28 85	27 93
17	15	15 00	15 45	15 23

No. 53—SAN FRANCISCO.

CALIFORNIA MUTUAL SAVINGS FUND LOAN AND BUILDING ASSOCIATION.

(Incorporated March 26, 1887.)

WM. E. LUTZ, Secretary.

E. L. HEAD, President.

Fiscal year ended March 31, 1906.

No. of series, 18.

No. of shares, 801.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock	\$76,982 61	Installment stock—dues	\$39,127 72
Arrearages	88 40	Installment stock—profits	13,308 45
On shares	\$35 00	Advance payments	95 00
On interest	53 40	Overdrafts and bills payable	20,701 92
Real estate	4,504 81	Reserve and undivided profits	3,000 00
All other assets	21 60	Sundry ledger accounts	1,802 17
		All other liabilities	3,562 16
Total assets	\$81,597 42	Total liabilities	\$81,597 42

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
19	120	\$120 00	\$183 75	Dues plus 4 per cent to 80 per cent of profits according to age.
21	108	108 00	158 86	
23	96	96 00	135 60	
25	84	84 00	113 85	
27	72	72 00	93 16	
29	60	60 00	74 37	
31	48	48 00	57 01	
33	36	36 00	41 03	
35	24	24 00	26 25	
37	12	12 00	12 58	

No. 54—SAN FRANCISCO.

CITY BUILDING AND LOAN ASSOCIATION.

(Incorporated March 28, 1891.)

J. M. ELLIS, Secretary.

A. H. LISSAK, President.

Fiscal year ended March 31, 1906.

No. of series, 12.

No. of shares, 599.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$59,265 91	Installment stock—dues	\$33,499 20
Arrearages	970 40	Installment stock—profits...	8,522 95
On shares	\$459 00	Overdrafts and bills payable..	18,021 54
On interest	408 65	Reserve and undivided profits	709 55
On premium	102 75		
Cash in office and bank	372 78		
Advances—secured	144 15		
Total assets	\$60,753 24	Total liabilities	\$60,753 24

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
7.....	120	\$120 00	\$159 38	Dues plus 85 per cent of profits.
8.....	108	108 00	140 19	
9.....	96	96 00	121 68	
10.....	84	84 00	104 40	
11.....	72	72 00	87 17	
12.....	60	60 00	70 83	
13.....	48	48 00	55 23	
14.....	36	36 00	40 36	
15.....	24	24 00	26 20	
16.....	12	12 00	12 72	

No. 55—SAN FRANCISCO.

CITIZENS' BUILDING AND LOAN ASSOCIATION.

(Incorporated January 14, 1885.)

FREMONT WOOD, Secretary.

THOS. M. GARDINER, President.

Fiscal year ended February 28, 1906.

No. of series, 44.

No. of shares, 7,853.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$481,605 77	Installment stock—dues	\$265,921 60
Arrearages	1,267 71	Installment stock—profits...	64,980 34
On shares	\$309 00	Advance payments	2,021 80
On interest	708 31	Overdrafts and bills payable..	62,215 16
On premium	8 75	Reserve and undivided profits	16,770 77
On fines	241 65	Loans due and incomplete...	15,469 00
Cash in office and bank	964 58	All other liabilities	59,494 96
Real estate	2,919 72		
All other assets	115 85		
Total assets	\$486,873 63	Total liabilities	\$486,873 63

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
44.....	120	\$120 00	\$169 02	\$158 83
48.....	108	108 00	146 79	137 97
52.....	96	96 00	126 10	119 20
56.....	84	84 00	106 85	101 42
60.....	72	72 00	88 78	80 60
64.....	60	60 00	71 71	64 91
68.....	48	48 00	55 60	49 94
72.....	36	36 00	40 26	39 21
76.....	24	24 00	25 92	25 45
80.....	12	12 00	12 53	12 39

No. 56—SAN FRANCISCO.

COLUMBIA BUILDING AND LOAN ASSOCIATION.

(Incorporated May 2, 1890.)

E. GUNZBURGER, Secretary.

H. LEVY, President.

Fiscal year ended September 27, 1906.

No. of series, 2.

No. of shares, 80.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$17,476 00	Installment stock—dues.....	\$5,725 00
Arrearages.....	3,600 00	Paid-up and prepaid stock—capital.....	9,000 00
On shares.....	\$3,600 00	Reserve and undivided profits.....	7,973 72
Cash in office and bank.....	1,622 72		
Total assets.....	\$22,698 72	Total liabilities.....	\$22,698 72

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
4.....	167	\$167 00	\$167 00	\$167 00
5.....	161	161 00	161 00	161 00

No. 57—SAN FRANCISCO.

ECONOMY BUILDING AND LOAN ASSOCIATION.

(Incorporated December 31, 1889.)

M. V. KIRKETERP, Secretary.

GEO. A. NEWHALL, President.

Fiscal year ended February 28, 1906.

No. of series, 27.

No. of shares, 687.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock ..	\$45,788 76	Installment stock—dues.....	\$29,304 60
Arrearages.....	771 01	Installment stock—profits...	7,119 29
On shares.....	\$80 60	Advance payments.....	810 50
On interest.....	672 41	Overdrafts and bills payable.	11,200 00
On premium.....	18 00	Reserve and undivided profits	1,075 00
Cash in office and bank.....	131 12	Sundry ledger accounts.....	173 20
Real estate.....	3,300 00	All other liabilities.....	350 00
Advances—secured.....	41 70		
Total assets.....	\$50,032 59	Total liabilities.....	\$50,032 59

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
20.....	120	\$120 00	\$167 91	Dues plus $4\frac{1}{3}$ per cent, for average time.
24.....	108	108 00	146 85	
28.....	96	96 00	126 73	
34.....	78	78 00	98 33	
39.....	63	63 00	76 30	
44.....	48	48 00	55 76	
48.....	36	36 00	40 39	
53.....	21	21 00	22 53	
56.....	12	12 00	12 51	

No. 58—SAN FRANCISCO.

EL DORADO LOAN ASSOCIATION.

(Incorporated March 14, 1890.)

E. GUNZBURGER, Secretary.

H. LEVY, President.

Fiscal year ended March 15, 1906.

No. of series, 2.

No. of shares, 102.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock.....	\$18,902 50	Installment stock—dues.....	\$8,040 00
Arrearages.....	24 40	Paid-up and prepaid stock—capital.....	9,400 00
On shares.....	\$24 40	Overdrafts and bills payable.....	787 92
Real estate.....	11,582 51	Reserve and undivided profits.....	15,131 59
Advances—secured.....	534 50	Sundry ledger accounts.....	100 00
Total assets.....	\$33,459 51	Total liabilities.....	\$33,459 51

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
4.....	156	\$156 00	\$156 00	\$156 00
8.....	48	48 00	48 00	48 00

No. 59—SAN FRANCISCO.

EMPIRE BUILDING AND LOAN ASSOCIATION.

(Incorporated August 24, 1889.)

W. E. LUTZ, Secretary.

MARION LEVENTRITT, President.

Fiscal year ended August 31, 1905.

No. of series, 10.

No. of shares, 683.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock.....	\$58,100 00	Installment stock—dues.....	\$29,767 98
Arrearages.....	40 00	Installment stock—profits.....	8,861 79
On shares.....	\$40 00	Advance payments.....	55 35
Real estate.....	3,700 00	Overdrafts and bills payable.....	16,593 22
Advances—secured.....	15 30	Reserve and undivided profits.....	6,000 00
Total assets.....	\$61,855 30	Sundry ledger accounts.....	576 96
		Total liabilities.....	\$61,855 30

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
7.....	120	\$120 00	\$173 20	Dues plus 4 to 6 per cent.
8.....	108	108 00	151 13	
9.....	96	96 00	130 12	
10.....	84	84 00	110 16	
12.....	60	60 00	73 41	
13.....	48	48 00	56 61	
14.....	36	36 00	40 88	
15.....	24	24 00	26 20	
16.....	12	12 00	12 57	

No. 60—SAN FRANCISCO.

EUREKA BUILDING AND LOAN ASSOCIATION.

(Incorporated November 3, 1890.)

SOL. J. LEVY, Secretary.

GEO. FREDRICKS, President.

Fiscal year ended October 31, 1905.

No. of series, 18.

No. of shares, 523.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$41,918 13	Installment stock—dues.....	\$27,398 80
Arrearages.....	321 64	Installment stock—profits ..	7,537 71
On shares.....	\$152 40	Overdrafts and bills payable..	2,000 00
On interest.....	150 74	Reserve and undivided profits	1,560 86
On premium.....	18 50	Loans due and incomplete...	3,750 00
Cash in office and bank.....	7 60		
Total assets.....	\$42,247 37	Total liabilities.....	\$42,247 37

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
10.....	120	\$120 00	\$182 71	\$169 60
12.....	108	108 00	157 55	140 00
14.....	96	96 00	134 56	115 00
18.....	72	72 00	94 13	83 00
20.....	60	60 00	75 74	67 50
22.....	48	48 00	58 29	52 50
24.....	36	36 00	41 94	38 00
26.....	24	24 00	26 80	24 80
28.....	12	12 00	12 78	12 25

No. 61—SAN FRANCISCO.

FAIRMOUNT LOAN ASSOCIATION.

(Incorporated March 2, 1891.)

JOHN H. GRADY, Secretary.

JOHN H. DAWSON, President.

Fiscal year ended April 30, 1906.

No. of series, 23.

No. of shares, 747.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$63,582 25	Installment stock—dues.....	\$41,755 50
Arrearages	5,177 60	Installment stock—profits...	11,457 72
On shares	\$2,489 25	Advance payments	10 00
On interest	1,930 70	Overdrafts and bills payable..	10,578 71
On premium	757 65	Reserve and undivided profits	5,260 77
Real estate.....	361 25	Loans due and incomplete...	146 20
Advances—secured	276 35	All other liabilities	188 55
Total assets.....	\$69,397 45	Total liabilities	\$69,397 45

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
9.....	131	\$131 00	\$191 70	\$189 03
11.....	119	119 00	164 94	166 20
13.....	107	107 00	147 55	145 16
15.....	95	95 00	126 96	125 08
17.....	83	83 00	107 40	105 96
19.....	71	71 00	88 85	85 70
21.....	59	59 00	71 32	68 75
23.....	47	47 00	55 83	52 52
25.....	35	35 00	39 34	37 55
27.....	23	23 00	24 79	24 10
29.....	11	11 00	11 29	11 25

No. 62—SAN FRANCISCO.

FIDELITY BUILDING AND LOAN ASSOCIATION.

(Incorporated March 19, 1887.)

WM. E. LUTZ, Secretary.

W. A. BARLAGE, President.

Fiscal year ended March 31, 1906.

No. of series, 18.

No. of shares, 1,678.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$165,113 13	Installment stock—dues.....	\$71,120 68
Arrearages	3,171 00	Installment stock—profits...	19,880 75
On shares	\$3,171 00	Advanced payments	115 00
Cash in office and bank.....	45 25	Overdrafts and bills payable..	61,192 88
Real estate.....	10,859 66	Reserve and undivided profits	10,000 00
All other assets	643 39	Loans due and incomplete...	14,073 48
Total assets.....	\$179,832 43	All other liabilities	3,449 64
		Total liabilities	\$179,832 43

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
10.....	120	\$120 00	\$173 00	Dues plus 4 to 7 per cent, according to age.
12.....	108	108 00	150 27	
14.....	96	96 00	129 99	
16.....	84	84 00	110 06	
18.....	72	72 00	91 18	
20.....	60	60 00	73 36	
22.....	48	48 00	56 58	
24.....	36	36 00	40 86	
26.....	24	24 00	26 12	
28.....	12	12 00	12 57	

No. 63—SAN FRANCISCO.

FRANKLIN SAVINGS AND BUILDING ASSOCIATION.

(Incorporated November 18, 1875.)

B. FEDDE, Secretary.

F. LUDEMANN, President.

Fiscal term ended April 20, 1906.

No. of series, 2.

No. of shares, 1,121.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock...	\$68,600 00	Installment stock—dues.....	\$92,560 00
Cash in office and bank.....	27,570 85	Installment stock—profits...	2,719 50
		Reserve and undivided profits	891 35
Total assets.....	\$96,170 85	Total liabilities.....	\$96,170 85

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
7.....	61	\$122 00	\$126 50	\$126 00
8.....	27	54 00	54 75	54 00

No. 65—SAN FRANCISCO.

GLOBE MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated March 30, 1898.)

E. B. CLARK, Secretary.

FRANK OTIS, President.

Fiscal year ended March 31, 1906.

No. of series, 28.

No. of shares, 3,581.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock...	\$125,890 72	Installment stock—dues....	\$92,247 00
Arrearages.....	298 35	Installment stock—profits...	19,418 44
On shares.....	\$298 35	Advance payments.....	1,615 00
Cash in office and bank.....	4,833 44	Overdrafts and bills payable	11,446 45
Advances secured.....	90 25	Reserve and undivided profits	2,493 47
All other assets.....	10 00	Loans due and incomplete...	1,432 77
		All other liabilities.....	2,469 63
Total assets.....	\$131,122 76	Total liabilities.....	\$131,122 76

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
1	96	\$48 00	\$59 40	\$57 90
3	84	42 00	50 46	49 39
7	72	36 00	42 04	41 27
11	60	30 00	34 12	33 58
15	48	24 00	26 50	25 90
19	36	18 00	19 41	19 21
23	24	12 00	12 60	12 30
27	12	6 00	6 14	6 08

No. 66—SAN FRANCISCO.

GRANITE MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated August 18, 1893.)

M. L. CULVER, Secretary.

M. C. NUNAN, President.

Fiscal year ended August 31, 1906.

No. of series, 15.

No. of shares, 257.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$21,215 00	Installment stock—dues.....	\$18,624 00
Arrearages.....	1,300 00	Overdrafts and bills payable..	5,618 87
On shares.....	\$857 00	All other liabilities.....	1,000 00
On interest.....	303 75		
On premium.....	139 25		
Cash in office and bank.....	73 30		
Advances—secured.....	2,130 00		
All other assets.....	524 57		
Total assets.....	\$25,242 87	Total liabilities.....	\$25,242 87

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.
5	132	\$132 00	\$132 00
7	120	120 00	120 00
13	84	84 00	84 00
16	66	66 00	66 00
18	54	54 00	54 00
21	36	36 00	36 00
23	24	24 00	24 00
25	12	12 00	12 00

Restoration of records incomplete.

No. 67—SAN FRANCISCO.

HOME MUTUAL DEPOSIT LOAN COMPANY.

(Incorporated December 2, 1885.)

E. B. CLARK, Secretary.

GEO. M. MITCHELL, President.

Fiscal year ended December 31, 1905.

No. of series, none.

No. of shares, 4,140.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$316,980 19	Installment stock—dues.....	\$165,963 64
Arrearages.....	654 77	Installment stock—profits....	40,149 64
On interest.....	\$654 77	Paid-up and prepaid stock—	
Real estate.....	8,983 62	capital.....	18,000 00
Advances—secured.....	163 55	Paid-up and prepaid stock—	
All other assets.....	600 00	dividends.....	814 23
		Overdrafts and bills payable..	86,503 77
		Reserve and undivided profits	4,790 10
		Loans due and incomplete..	10,720 75
		All other liabilities.....	440 00
Total assets.....	\$327,382 13	Total liabilities.....	\$327,382 13

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Dayton Plan. Dues—\$1.00 per share per month.

Dividend, last fiscal year—6 per cent.

Book value—Dues plus dividend.

Withdrawal value—Book value less 2 per cent.

No. 68—SAN FRANCISCO.

HOUSEHOLDERS' BUILDING AND LOAN ASSOCIATION.

(Incorporated October 5, 1889.)

M. V. KIRKÉTERP. Secretary.

D. COFFIN, President.

Fiscal year ended October 31, 1905.

No. of series, 17.

No. of shares, 253.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$16,400 00	Installment stock—dues.....	\$8,883 90
Arrearages.....	53 36	Installment stock—profits....	2,157 65
On shares.....	\$7 40	Advance payments.....	10 00
On interest.....	45 96	Overdrafts and bills payable..	4,300 00
Cash in office and bank.....	43 61	Reserve and undivided profits	975 17
Real estate.....	1,688 00	All other liabilities.....	1,864 25
Advances—secured.....	6 00		
Total assets.....	\$18,190 97	Total liabilities.....	\$18,190 97

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
23.....	117	\$117 00	\$158 40	Dues plus $4\frac{1}{2}$ per cent.
25.....	108	108 00	143 30	
29.....	96	96 00	123 93	
37.....	72	72 00	87 76	
45.....	48	48 00	55 05	
52.....	24	24 00	25 80	
56.....	12	12 00	12 60	

No. 71—SAN FRANCISCO.

ITALIAN-SWISS MUTUAL LOAN ASSOCIATION.

(Incorporated April 1, 1887.)

A. SEARBORO, Secretary.

P. C. ROSSI, President.

Fiscal year ended March 31, 1906.

No. of series, 13.

No. of shares, 840.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$83,402 37	Installment stock—dues.....	\$82,068 00
Arrearages.....	1,203 50	Installment stock—profits....	16,036 47
On shares.....	\$881 00	Advance payments.....	25 00
On interest.....	316 75	Reserve and undivided profits	3,350 00
On premium.....	5 75	All other liabilities.....	673 90
Cash in office and bank.....	14,483 99		
Real estate.....	3,009 00		
Advances—secured.....	54 51		
Total assets.....	\$102,153 37	Total liabilities.....	\$102,153 37

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
9.....	132	\$132 00	\$159 37	\$156 19
10.....	120	120 00	142 02	139 18
11.....	108	108 00	125 42	122 92
12.....	96	96 00	109 65	107 46
13.....	84	84 00	94 39	92 50
14.....	72	72 00	79 67	78 02
15.....	60	60 00	65 39	64 09
16.....	48	48 00	51 43	50 41
17.....	36	36 00	37 93	37 18
18.....	24	24 00	24 81	24 40
19.....	12	12 00	12 20	12 10

No. 72—SAN FRANCISCO.

MECHANICS' BUILDING AND LOAN ASSOCIATION.

(Incorporated January 6, 1891.)

WM. E. LUTZ, Secretary.

FREDERICK FILLMORE, President.

Fiscal year ended December 31, 1905.

No. of series, 15.

No. of shares, 846.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$82,025 00	Installment stock—dues.....	\$36,273 41
Arrearages.....	106 65	Installment stock—profits..	5,590 97
On shares.....	\$45 00	Overdrafts and bills payable	34,793 15
On interest.....	61 65	Reserve and undivided profits	4,200 00
Cash in office and bank.....	5 05	Loans due and incomplete..	823 60
Advances—secured.....	16 00	All other liabilities.....	471 57
Total assets.....	\$82,152 70	Total liabilities.....	\$82,152 70

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
6.....	120	\$120 00	\$172 30	Dues plus such per cent of profits as the by-laws provide.
8.....	108	108 00	150 40	
10.....	96	96 00	129 54	
12.....	84	84 00	109 72	
14.....	72	72 00	90 93	
16.....	60	60 00	73 18	
18.....	48	48 00	56 47	
20.....	36	36 00	40 80	
22.....	24	24 00	26 16	
24.....	12	12 00	12 56	

No. 73—SAN FRANCISCO.

MISSION HOME AND LOAN ASSOCIATION.

(Incorporated March 12, 1889.)

JOHN H. GRADY, Secretary.

JOHN H. DAWSON, President.

Fiscal year ended March 30, 1906.

No. of series, 22.

No. of shares, 970.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$70,698 65	Installment stock—dues.....	\$56,980 00
Arrearages.....	6,736 10	Installment stock—profits....	15,931 84
On shares.....	\$2,704 50	Advance payments.....	87 50
On interest.....	2,778 70	Overdrafts and bills payable..	8,570 68
On premium.....	1,252 90	Reserve and undivided profits	3,820 68
Real estate.....	7,641 89	Sundry ledger accounts.....	30
Advances—secured.....	295 90		
All other assets.....	18 46		
Total assets.....	\$85,391 00	Total liabilities.....	\$85,391 00

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
12.....	120	\$120 00	\$168 00	\$168 00
14.....	108	108 00	146 88	146 88
16.....	96	96 00	126 72	126 72
18.....	84	84 00	107 52	107 52
20.....	72	72 00	89 28	87 12
22.....	60	60 00	72 00	69 00
24.....	48	48 00	55 68	53 76
26.....	36	36 00	40 32	38 70
28.....	24	24 00	25 92	25 20
30.....	12	12 00	12 48	12 30

No. 74—SAN FRANCISCO.

MISSION IMPROVED BUILDING AND LOAN ASSOCIATION.

(Incorporated January 22, 1902.)

H. H. LINCOLN, Secretary.

D. COFFIN, President.

Fiscal year ended February 28, 1906.

No. of series, 7.

No. of shares, 222.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$5,873 09	Installment stock—dues.....	\$7,659 00
Arrearages	2,708 25	Installment stock—profits....	464 65
On shares.....	\$2,542 70	Overdrafts and bills payable..	2,300 00
On interest	165 55	Reserve and undivided profits	6 55
Cash in office and bank.....	1,668 70		
All other assets.....	180 16		
Total assets.....	\$10,430 20	Total liabilities.....	\$10,430 20

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
1.....	48	\$48 00	\$51 40	
2.....	42	42 00	44 50	Dues plus one
3.....	36	36 00	37 75	half of profits.
4.....	30	30 00	31 15	

No. 76—SAN FRANCISCO.

OCCIDENTAL LOAN ASSOCIATION.

(Incorporated August 24, 1885.)

E. GUNZBURGER, Secretary.

A. G. LYLE, President.

Fiscal year ended September 4, 1905.

No. of series, 11.

No. of shares, 593.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$72,709 30	Installment stock—dues	\$31,992 00
Arrearages.....	1,657 70	Installment stock—profits....	7,222 04
On shares.....	\$813 00	Advance payments.....	70 00
On interest	663 20	Overdrafts and bills payable	22,277 70
On premium.....	181 50	Reserve and undivided profits	13,666 31
Advances secured.....	1,391 05	Loans due and incomplete...	530 00
Total assets.....	\$75,758 05	Total liabilities.....	\$75,758 05

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
11.....	120	\$120 00	\$160 64	\$150 48
13.....	96	96 00	121 88	112 82
14.....	84	84 00	103 88	95 93
15.....	72	72 00	86 73	80 10
16.....	60	60 00	70 39	65 20
17.....	48	48 00	54 83	51 42
18.....	36	36 00	40 02	38 01
19.....	24	24 00	25 90	24 95
20.....	12	12 00	12 52	12 26

No. 77—SAN FRANCISCO.

PACIFIC LOAN ASSOCIATION.

(Incorporated December 8, 1884.)

E. GUNZBURGER, Secretary.

H. LEVY, President.

Fiscal term ended September 1, 1906.

No. of series, 9.

No. of shares, 630.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$88,963 96	Installment stock—dues.....	\$26,778 00
Arrearages	5,700 40	Installment stock—profits ..	4,532 65
On shares	\$2,879 00	Overdrafts and bills payable..	43,045 09
On interest	2,108 75	Reserve and undivided profits	12,106 82
On premium	712 65	Loans due and incomplete...	6,898 80
Advances—secured	36 00	Sundry ledger accounts.....	170 00
		All other liabilities	1,169 00
Total assets.....	\$94,700 36	Total liabilities	\$94,700 36

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
12.....	129	\$129 00	\$165 96	\$156 72
15.....	81	81 00	95 92	89 95
16.....	69	69 00	79 82	74 95
17.....	57	57 00	63 92	60 46
18.....	45	45 00	48 96	46 98
19.....	33	33 00	34 78	33 89
20.....	21	21 00	21 45	21 23

No. 78—SAN FRANCISCO.

PROVIDENT MUTUAL LOAN ASSOCIATION.

(Incorporated September 24, 1887.)

N. STEINBERGER, Secretary.

SAM WEIL, President.

Fiscal year ended September 30, 1905.

No. of series, 12.

No. of shares, 1,418.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$102,229 16	Installment stock—dues	\$62,418 00
Advances—secured	100 00	Installment stock—profits ..	20,875 80
		Overdrafts and bills payable..	11,389 64
		Reserve and undivided profits	2,003 07
		Loans due and incomplete...	3,909 25
		All other liabilities	1,733 40
Total assets.....	\$102,329 16	Total liabilities	\$102,329 16

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
9	120	\$120 00	\$172 12	\$168 00
10	108	108 00	150 26	144 50
11	96	96 00	129 43	123 00
13	84	84 00	109 63	103 00
14	72	72 00	90 87	84 00
15	60	60 00	73 14	67 50
17	42	42 00	48 48	45 75
18	36	36 00	40 70	38 75
19	24	24 00	26 15	25 20
20	12	12 00	12 56	12 00

No. 79—SAN FRANCISCO.

PROGRESS MUTUAL LOAN ASSOCIATION.

(Incorporated December 31, 1894.)

N. STEINBERGER, Secretary.

JAS. A. WHITE, President.

Fiscal year ended December 30, 1905.

No. of series, 10.

No. of shares, 725.

<i>Assets.</i>			<i>Liabilities.</i>	
Loans on mortgage on stock	\$51,803 85		Installment stock—dues	\$34,657 20
Arrearages	69 80		Installment stock—profits	13,712 84
On shares	\$69 80		Paid-up and prepaid stock—capital	6,600 00
Cash in office and bank	4,798 04		Reserve and undivided profits	1,604 15
Advances—secured	4 50		All other liabilities	102 00
Total assets	\$56,676 19		Total liabilities	\$56,676 19

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
2	120	\$120 00	\$173 57	\$168 00
3	108	108 00	151 43	144 50
4	96	96 00	130 36	123 00
5	84	84 00	110 34	103 00
6	66	66 00	82 31	76 90
7	60	60 00	73 50	67 50
9	36	36 00	40 91	38 75
10	24	24 00	26 21	25 20
11	12	12 00	12 57	12 00

No. 81—SAN FRANCISCO.

RICHMOND MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated August, 1897.)

W. H. DAVIS, Secretary.

F. W. BOOLE, President.

Fiscal term ended April 18, 1906.

No. of series, 8.

No. of shares, 211.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$12,956 15	Installment stock—dues	\$10,707 00
Arrearages	405 63	Installment stock—profits	3,127 19
On shares	\$209 00		
On interest	142 63		
On premium	54 00		
Cash in office and bank	44 99		
Advances—secured	427 42		
Total assets	\$13,834 19	Total liabilities	\$13,834 19

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
2.....	99	\$99 00	\$99 00	Dues plus 6 per cent.
6.....	75	75 00	75 00	
7.....	69	69 00	69 00	
10.....	51	51 00	51 00	
12.....	39	39 00	39 00	
15.....	27	27 00	27 00	
17.....	15	15 00	15 00	
19.....	3	3 00	3 00	

No. 82—SAN FRANCISCO.

SAFETY MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated May 12, 1894.)

M. V. KIRKETERP, Secretary.

E. W. NEWHALL, President.

Fiscal year ended October 31, 1905.

No. of series, 21.

No. of shares, 1,683.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$71,068 68	Installment stock—dues	\$56,897 40
Arrearages	755 93	Installment stock—profits	13,543 76
On shares	\$450 80	Advance payments	843 97
On interest	286 68	Overdrafts and bills payable	6,825 00
On premium	18 45	Reserve and undivided profits	1,455 15
Cash in office and bank	323 17		
Real estate	7,417 50		
Total assets	\$79,565 28	Total liabilities	\$79,565 28

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
4.....	120	\$120 00	\$167 86	\$153 03
6.....	108	108 00	145 17	134 15
8.....	96	96 00	124 47	116 00
10.....	84	84 00	105 20	96 86
12.....	72	72 00	87 37	82 46
14.....	60	60 00	70 60	66 90
16.....	48	48 00	54 78	52 11
18.....	36	36 00	39 81	38 21
20.....	24	24 00	25 73	24 94
22.....	12	12 00	12 42	12 19

No. 83—SAN FRANCISCO.

SAN FRANCISCO MUTUAL LOAN ASSOCIATION.

(Incorporated October 28, 1882.)

A. SBARBORO, Secretary.

C. A. MALM, President.

Fiscal year ended October 31, 1905.

No. of series, 13.

No. of shares, 197.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$18,968 26	Installment stock—dues....	\$16,785 50
Arrearages.....	1,145 00	Installment stock—profits...	2,832 75
On shares.....	\$595 00	Reserve and undivided profits	2,665 00
On interest.....	545 00	Sundry ledger accounts.....	1,302 70
On premium.....	15 00	All other liabilities.....	100 00
Cash in office and bank.....	3,196 23		
All other assets.....	376 46		
Total assets.....	\$23,685 95	Total liabilities.....	\$23,685 95

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
12.....	144	\$144 00	\$170 91	\$167 49
15.....	108	108 00	122 25	119 81
16.....	96	96 00	107 63	105 49
17.....	84	84 00	92 72	91 07
18.....	72	72 00	78 71	77 14
19.....	60	60 00	64 76	63 47
20.....	48	48 00	51 14	50 12
21.....	36	36 00	37 81	37 06
22.....	24	24 00	24 86	24 43
23.....	12	12 00	12 25	12 12

No. 84—SAN FRANCISCO.

SAN FRANCISCO AND OAKLAND MUTUAL LOAN ASSOCIATION.

(Incorporated January 3, 1889.)

A. SBARBORO, Secretary.

C. A. MALM, President.

Fiscal year ended December 31, 1905.

No. of series, 13.

No. of shares, 758.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$70,139 25	Installment stock—dues.....	\$61,559 00
Arrearages.....	480 00	Installment stock—profits...	10,972 30
On shares.....	\$303 00	Advance payments.....	12 00
On interest.....	118 00	Reserve and undivided profits	6,170 00
On premium.....	59 00	Sundry ledger accounts.....	1,260 17
Cash in office and bank.....	4,236 99		
Real estate.....	5,020 09		
All other assets.....	97 14		
Total assets.....	\$79,973 47	Total liabilities.....	\$79,973 47

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
8.....	120	\$120 00	\$145 23	\$142 33
9.....	108	108 00	128 17	125 61
10.....	96	96 00	111 68	109 45
11.....	84	84 00	95 96	94 04
12.....	72	72 00	80 59	78 98
13.....	60	60 00	65 94	64 62
14.....	48	48 00	51 78	50 75
15.....	36	36 00	38 11	37 35
16.....	24	24 00	24 87	24 43
17.....	12	12 00	12 20	12 10

No. 85—SAN FRANCISCO.

SAN FRANCISCO HOME MUTUAL LOAN ASSOCIATION.

(Incorporated November 7, 1890.)

A. SBARBORO, Secretary.

C. A. MALM, President.

Fiscal year ended October 31, 1905.

No. of series, 11.

No. of shares, 225.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$20,990 43	Installment stock—dues.....	\$23,598 00
Arrearages.....	12 50	Installment stock—profits...	4,685 05
On shares.....	\$5 00	Advance payments.....	10 00
On interest.....	5 00	Reserve and undivided profits	2,150 00
On premium.....	2 50	Sundry ledger accounts.....	988 85
Cash in office and bank.....	10,522 36	All other liabilities.....	200 00
All other assets.....	106 61		
Total assets.....	\$31,631 90	Total liabilities.....	\$31,631 90

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
5.....	132	\$132 00	\$160 59	\$157 38
6.....	120	120 00	142 53	139 68
7.....	108	108 00	125 97	123 45
8.....	96	96 00	110 26	108 06
9.....	84	84 00	94 87	92 97
10.....	72	72 00	79 82	78 23
11.....	60	60 00	65 35	64 05
13.....	36	36 00	37 95	37 19
15.....	12	12 00	-----	-----

No. 86—SAN FRANCISCO.

TRIUMPH LOAN ASSOCIATION.

(Incorporated January 13, 1891.)

JOHN BRUCKMAN, Secretary.

H. EPSTEIN, President.

Fiscal year ended January 31, 1906.

No. of series, 10.

No. of shares, 630.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$45,171 09	Installment stock—dues.....	\$17,782 80
Arrearages.....	2 60	Installment stock—profits....	3,394 22
On shares.....	\$2 60	Overdrafts and bills payable.	26,894 65
Real estate.....	5,897 98	Reserve and undivided profits	3,000 00
Total assets.....	\$51,071 67	Total liabilities.....	\$51,071 67

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
10.....	126	\$126 00	\$161 19	\$156 00
14.....	102	102 00	125 06	122 00
15.....	96	96 00	116 43	112 00
17.....	84	84 00	99 64	96 64
21.....	60	60 00	67 98	64 98
22.....	48	48 00	53 10	52 00
25.....	18	18 00	18 71	18 45
26.....	12	12 00	12 32	12 15

No. 87—SAN FRANCISCO.

UNION LOAN ASSOCIATION.

(Incorporated May 6, 1881.)

E. GUNZBURGER, Secretary.

ISAAC UPHAM, President.

Fiscal term ended September 10, 1906.

No. of series, 7.

No. of shares, 364.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$60,669 00	Installment stock—dues....	\$21,664 00
Arrearages.....	2,326 10	Installment stock—profits...	4,923 13
On shares.....	\$1,180 00	Overdrafts and bills payable.	30,353 53
On interest.....	940 00	Reserve and undivided profits	6,420 97
On premium.....	206 00	Sundry ledger accounts.....	107 60
Real estate.....	300 00	All other liabilities.....	1,070 00
Advances—secured.....	1,244 13		
Total assets.....	\$64,539 23	Total liabilities.....	\$64,539 23

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
16.....	120	\$120 00	\$158 97	\$149 23
19.....	84	84 00	103 28	95 57
21.....	60	60 00	70 59	66 35
22.....	48	48 00	54 93	51 46
23.....	36	36 00	39 96	37 98
24.....	24	24 00	25 78	24 89
25.....	12	12 00	12 45	12 23

No. 88—SAN FRANCISCO.

WESTERN LOAN ASSOCIATION.

(Incorporated November 12, 1886.)

E. GUNZBURGER, Secretary.

D. SAMUELS, President.

Fiscal year ended November 19, 1905.

No. of series, 11.

No. of shares, 794.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$83,060 69	Installment stock—dues....	\$40,596 00
Arrearages.....	4,229 10	Installment stock—profits...	9,777 06
On shares.....	\$1,729 00	Advance payments.....	252 10
On interest.....	2,110 55	Overdrafts and bills payable.	21,814 03
On premium.....	389 55	Reserve and undivided profits	10,065 20
Advances—secured.....	118 50	Loans due and incomplete...	4,903 90
Total assets.....	\$87,408 29	Total liabilities.....	\$87,408 29

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
10.....	120	\$120 00	\$169 94	\$157 46
11.....	108	108 00	147 42	135 60
12.....	96	96 00	126 92	116 10
13.....	84	84 00	106 52	97 51
14.....	72	72 00	88 18	80 90
15.....	60	60 00	71 46	65 73
16.....	48	48 00	55 66	51 83
17.....	36	36 00	40 30	38 15
18.....	24	24 00	25 97	24 98
19.....	12	12 00	12 52	12 26

No. 89—SAN FRANCISCO.

WEST SHORE MUTUAL LOAN ASSOCIATION.

(Incorporated August 4, 1890.)

H. K. STARKWEATHER, Secretary.

C. L. ROBINSON, President.

Fiscal year ended December 31, 1905.

No. of series, none.

No. of shares, 381.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$15,079 31	Installment stock—dues.....	\$9,474 00
Arrearages.....	479 30	Installment stock—profits....	2,087 87
On shares.....	\$286 50	Overdrafts and bills payable..	3,754 03
On interest.....	185 70	Reserve and undivided profits	465 35
On fines.....	7 10	Loans due and incomplete...	559 45
Cash in office and bank.....	180 72		
Advances—secured.....	158 37		
All other assets.....	443 00		
Total assets.....	\$16,340 70	Total liabilities.....	\$16,340 70

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Dayton Plan. Dues—\$1.00 per share per month.

Dividend, last fiscal year—4.7 per cent.

Book value—Dues plus dividend.

Withdrawal value—Same as book value.

No. 90—SAN FRANCISCO.

CALIFORNIA HOME BUILDING-LOAN COMPANY.

(Incorporated July 8, 1899.)

R. L. HANDY, Secretary.

P. B. ROBERTS, President.

Fiscal year ended June 30, 1906.

No. of series, none.

No. of shares, 4,746.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$297,993 10	Installment stock—dues.....	\$100,706 10
Arrearages.....	1,596 43	Installment stock—profits....	17,041 33
On interest.....	\$1,596 43	Paid-up and prepaid stock—	
Cash in office and bank.....	6,398 12	capital.....	23,806 71
Real estate.....	4,843 94	Paid-up and prepaid stock—	
Advances—secured.....	2,832 06	dividends.....	713 30
All other assets.....	5,702 56	Overdrafts and bills payable..	173,936 07
		Reserve and undivided profits	1,637 99
		All other liabilities.....	1,524 71
Total assets.....	\$319,366 21	Total liabilities.....	\$319,366 21

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

	Age, in Months.	Total Dues per Share.	Loan Fund Dues per Share.	Book Value per Share.	Withdrawal Value.
	75.....	\$45 00	\$37 50	\$53 84	\$49 76
Old Class	63.....	37 80	31 50	41 58	39 06
"A." Issue	51.....	30 60	25 50	31 66	30 12
discontin-	39.....	23 40	19 50	22 84	22 01
ued.	27.....	16 20	13 50	14 97	14 61
	15.....	9 00	7 50	7 90	7 90

Also—

Dayton Plan. Dues—50 cents per share per month.

Dividend, last fiscal year—6 per cent.

Book value—Dues plus dividend.

Withdrawal value—After three years, same as book value.

No. 91—SAN FRANCISCO.

CONTINENTAL BUILDING AND LOAN ASSOCIATION.

(Incorporated July 17, 1889.)

WM. CORBIN, Secretary.

WASHINGTON DODGE, President.

Fiscal year ended June 30, 1906.

No. of series, none.

No. of shares, 74,404.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock	\$1,835,957 28	Installment stock—dues	\$1,097,510 79
Arrearages	35,138 12	Installment stock—profits	234,376 19
On interest	\$31,489 27	Paid-up and prepaid stock—capital	608,680 11
On premium	3,648 85	Paid-up and prepaid stock—dividends	9,820 50
Cash in office and bank	57,176 56	Advance payments	22,125 77
Real estate	474,367 66	Overdrafts and bills payable	299,500 00
Advances—secured	36,841 51	Reserve and undivided profits, and life ins. reserve	86,435 63
All other assets	19,491 65	Loans due and incomplete	82,535 31
		Sundry ledger accounts	13,704 49
		All other liabilities	4,283 99
Total assets	\$2,458,972 78	Total liabilities	\$2,458,972 78

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

	Age, in Months.	Total Dues per Share.	Loan Fund Dues per Share.	Book Value per Share.	Withdrawal Value.
Class "F." Dues 50c. per share per month.	84	\$42 00	\$42 00	\$55 15	\$53 68
	72	36 00	36 00	46 18	44 37
	60	30 00	30 00	37 13	35 67
	48	24 00	24 00	28 53	27 54
	36	18 00	18 00	20 57	19 93
	24	12 00	12 00	13 23	12 83
	12	6 00	6 00	6 18	6 18

Classes "A," "E" and "G"—Expense fund stock—not now being issued.

No. 92—SAN FRANCISCO.

PACIFIC STATES SAVINGS AND LOAN COMPANY.

(Incorporated June, 1889.)

WM. PARDY, Secretary.

CHRISTIAN REIS, President.

Fiscal year ended July 31, 1905.

No. of series, 117.

No. of shares, 31,062.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock	\$1,234,589 92	Installment stock—dues	\$744,475 22
Arrearages	16,267 35	Installment stock—profits	228,838 91
On shares	\$5,557 60	Paid-up and prepaid stock—capital	245,190 00
On interest	10,709 75	Paid-up and prepaid stock—dividends	20,208 15
Cash in office and bank	102,899 80	Advance payments	7,414 90
Real estate	39,621 70	Reserve and undivided profits	58,572 25
Advances—secured	3,445 95	Loans due and incomplete	17,391 33
All other assets	1,875 12	Sundry ledger accounts	74,409 17
		All other liabilities	2,199 91
Total assets	\$1,398,699 84	Total liabilities	\$1,398,699 84

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Class "C."	Serial No.	Age, in Months.	Total Dues per Share.	Loan Fund Dues per Share.	Book Value per Share.	Withdrawal Value.
	61-----	108	\$64 80	\$64 80	\$91 10	\$91 10
	73-----	96	57 60	57 60	76 85	76 85
	85-----	84	50 40	50 40	64 67	64 67
	97-----	72	43 20	43 20	53 43	53 43
	109-----	60	36 00	36 00	42 95	41 21
	121-----	48	28 80	28 80	33 16	36 43
	133-----	36	21 60	21 60	24 01	25 41
	145-----	24	14 40	14 40	15 46	15 20
	157-----	12	7 20	7 20	7 47	7 40

No. 93—SAN JOSE.

NUCLEUS BUILDING AND LOAN ASSOCIATION.

(Incorporated April, 1889.)

C. H. JOHNSON, Secretary.

GEO. B. MCKEE, President.

Fiscal year ended April 2, 1906.

No. of series, none.

No. of shares, 941.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$45,665 22	Installment stock—dues.....	\$20,406 73
Arrearages.....	240 67	Installment stock—profits ..	3,161 00
On shares.....	\$10 00	Paid-up and prepaid stock—	
On interest.....	230 67	capital.....	26,100 00
Cash in office and bank.....	4,684 23	Paid-up and prepaid stock—	
Real estate.....	400 00	dividends.....	499 00
All other assets.....	300 00	Advance payments.....	50 00
		Reserve and undivided profits	539 56
		Sundry ledger accounts.....	533 83
Total assets.....	\$51,290 12	Total liabilities.....	\$51,290 12

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Dayton Plan. Dues—\$1.00 per share per month.

Dividend, last fiscal year—6 per cent.

Book value—Dues plus dividend.

Withdrawal value—Book value less 2 per cent.

No. 94—SAN JOSE.

MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated August 12, 1891.)

GEO. N. JONES, Secretary.

JAMES BEAN, President.

Fiscal year ended December 31, 1905.

No. of series, none.

No. of shares, 1,738.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$120,326 19	Installment stock—dues....	\$35,440 12
Advances—secured	214 14	Installment stock—profits...	7,963 30
		Paid-up and prepaid stock—capital.....	66,975 00
		Paid-up and prepaid stock—dividends.....	2,398 15
		Overdrafts and bills payable..	2,610 37
		Reserve and undivided profits	3,449 04
		Loans due and incomplete ..	1,694 35
		Sundry ledger accounts.....	10 00
Total assets.....	\$120,540 33	Total liabilities	\$120,540 33

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Dayton Plan. Dues—\$1.00 per share per month.

Dividend, last fiscal year—6 per cent.

Book value—Dues plus dividend.

Withdrawal value—Dues plus 95 per cent of profits.

No. 95—SAN JOSE.

SAN JOSE BUILDING AND LOAN ASSOCIATION.

(Incorporated January 30, 1885.)

A. K. WHITTON, Secretary.

J. M. PITMAN, President.

Fiscal year ended December 31, 1905.

No. of series, 4.

No. of shares, 1,693.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$98,812 69	Installment stock—dues.....	\$47,812 11
Arrearages	914 32	Installment stock—profits...	1,171 75
On shares	\$25 00	Paid-up and prepaid stock—capital.....	9,500 00
On interest	824 82	Paid-up and prepaid stock—dividends.....	43 37
On fines	64 50	Overdrafts and bills payable..	42,620 00
Cash in office and bank.....	523 76	Reserve and undivided profits	925 15
Real estate	2,400 00	Sundry ledger accounts.....	805 49
Advances—secured	57 34		
All other assets.....	169 76		
Total assets.....	\$102,877 87	Total liabilities	\$102,877 87

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
11.....	131	\$131 00	\$183 24	\$183 24
12.....	119	119 00	160 47	160 47
16.....	107	107 00	139 45	139 45
17.....	104	104 00	134 47	134 47

Also—

Dayton Plan. Dues—\$1.00 per share per month.

Dividend, 1905—6 per cent.

Book value—Dues plus dividend.

Surrender value—Dues plus 80 to 100 per cent of profits.

No. 96—SAN LUIS OBISPO.

SAN LUIS BUILDING AND LOAN ASSOCIATION.

(Incorporated March 1, 1888.)

M. LEWIN, Secretary.

BENJAMIN BROOKS, President.

Fiscal year ended March 1, 1906.

No. of series, 10.

No. of shares, 1,871.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$115,120 00	Installment stock—dues	\$89,556 00
Arrearages	206 98	Installment stock—profits...	19,974 99
On shares	\$55 00	Advance payments	805 73
On interest	85 90	Overdrafts and bills payable.	4,290 20
On premium	66 08	Reserve and undivided profits	06
		Loans due and incomplete ..	700 00
Total assets	\$115,326 98	Total liabilities	\$115,326 98

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
7	120	\$120 00	\$189 28	\$185 81
8	108	108 00	150 72	145 38
9	96	96 00	128 83	122 26
10	84	84 00	108 74	101 94
11	72	72 00	89 49	83 37
12	60	60 00	71 97	66 88
13	48	48 00	55 50	51 75
14	36	36 00	40 12	38 06
15	24	24 00	25 76	24 88
16	12	12 00	12 46	12 23

No. 97—SAN MATEO.

SAN MATEO MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated May 22, 1896.)

C. H. KIRKBRIDE, Secretary.

E. A. HUSING, President.

Fiscal year ended December 31, 1905.

No. of series, 35.

No. of shares, 1,293.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$103,020 00	Installment stock—dues	\$54,563 00
Arrearages	779 10	Installment stock—profits...	15,306 39
On shares	\$309 00	Advance payments	1,021 88
On interest	361 70	Overdrafts and bills payable.	28,457 25
On premium	73 60	Reserve and undivided profits	1,424 14
On fines	34 80	Loans due and incomplete ..	3,513 49
Cash in office and bank	596 00	Sundry ledger accounts	50 00
Advances—secured	90 00	All other liabilities	167 70
All other assets	18 75		
Total assets	\$104,503 85	Total liabilities	\$104,503 85

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
1.....	115	\$115 00	\$170 13	\$159 10
3.....	108	108 00	155 32	145 86
7.....	96	96 00	131 71	124 57
11.....	84	84 00	110 05	102 23
15.....	72	72 00	90 18	84 73
19.....	60	60 00	71 95	67 17
23.....	48	48 00	55 22	52 33
27.....	36	36 00	39 88	37 94
31.....	24	24 00	25 69	24 84
35.....	12	12 00	12 42	12 21

No. 98—SAN RAFAEL.

MARIN COUNTY MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated July 19, 1886.)

L. A. LANCEL, Secretary.

GEORGE M. DODGE, President.

Fiscal year ended July 31, 1905.

No. of series, 13.

No. of shares, 3,493.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$177,721 40	Installment stock—dues.....	\$114,486 00
Arrearages.....	104 70	Installment stock—profits....	29,645 08
On shares.....	\$35 00	Advance payments.....	389 00
On interest.....	47 30	Overdrafts and bills payable..	29,678 11
On premium.....	4 50	Reserve and undivided profits	287 51
On fines.....	17 90	Loans due and incomplete....	3,360 00
Advances—secured.....	19 60		
Total assets.....	\$177,845 70	Total liabilities.....	\$177,845 70

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
11.....	108	\$108 00	\$183 36	\$179 60
12.....	96	96 00	151 52	145 97
13.....	84	84 00	124 50	116 40
14.....	72	72 00	100 22	91 75
15.....	60	60 00	78 88	71 32
16.....	48	48 00	59 90	53 95
18.....	36	36 00	42 58	39 29
20.....	24	24 00	26 76	25 38
22.....	12	12 00	12 64	12 32

No. 99—SANTA ANA.

HOME MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated April 1, 1893.)

THOS. MCKEEVER, Secretary.

JOHN McFADDEN, President.

Fiscal year ended December 31, 1905.

No. of series, 15.

No. of shares, 3,062.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$219,045 00	Installment stock—dues.....	\$135,484 00
Arrearages	346 55	Installment stock—profits....	41,838 18
On shares.....	\$143 50	Paid-up and prepaid stock—	
On interest	203 05	capital.....	12,850 00
Cash in office and bank.....	2 32	Advance payments	28 20
All other assets.....	314 15	Overdrafts and bills payable..	23,487 76
		Reserve and undivided profits	3,809 88
		Loans due and incomplete....	2,210 00
Total assets.....	\$219,708 02	Total liabilities	\$219,708 02

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
3.....	120	\$120 00	\$182 80	\$168 60
4.....	108	108 00	158 26	147 06
5.....	96	96 00	135 39	126 75
6.....	84	84 00	114 06	107 60
7.....	72	72 00	94 17	86 74
8.....	60	60 00	75 61	70 56
10.....	48	48 00	58 31	54 35
12.....	36	36 00	42 16	39 98
14.....	24	24 00	27 12	26 16
16.....	12	12 00	13 08	12 84

No. 100—SANTA ANA.

ORANGE COUNTY MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated March 7, 1901.)

N. A. ULM, Secretary.

C. D. BALL, President.

Fiscal year ended February 28, 1906.

No. of series, none.

No. of shares, 1,189.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$37,925 00	Installment stock—dues.....	\$11,957 93
Cash in office and bank	7,865 02	Installment stock—profits....	648 21
All other assets.....	506 91	Paid-up and prepaid stock—	
		capital.....	19,500 00
		Overdrafts and bills payable..	12,400 00
		Reserve and undivided profits	1,390 79
		Loans due and incomplete....	400 00
Total assets	\$46,296 93	Total liabilities	\$46,296 93

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Dayton Plan. Dues—50 cents per share per month.
 Dividend, last fiscal year—6 per cent.
 Book value—Dues plus dividend.
 Withdrawal value—Same as book value.

No. 101—SANTA BARBARA.

LOAN AND BUILDING ASSOCIATION.

(Incorporated May 23, 1887.)

J. T. JOHNSON, Secretary.

H. L. STAMBACH, President.

Fiscal year ended July 3, 1905.

No. of series, 15.

No. of shares, 4,415.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$268,280 00	Installment stock—dues.....	\$222,539 00
Arrearages.....	2,731 55	Installment stock—profits..	48,798 45
On shares.....	\$1,180 00	Advance payments.....	521 25
On interest.....	1,412 60	Reserve and undivided profits	425 65
On fines.....	138 95	Loans due and incomplete...	2,153 00
Cash in office and bank.....	1,257 90		
Real estate.....	1,802 00		
All other assets.....	365 90		
Total assets.....	\$274,437 35	Total liabilities.....	\$274,437 35

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
7.....	126	\$126 00	\$178 30	\$178 30
8.....	114	114 00	155 55	155 55
9.....	102	102 00	134 10	134 10
10.....	90	90 00	114 15	113 00
11.....	78	78 00	95 55	94 00
12.....	66	66 00	78 00	76 80
14.....	48	48 00	53 80	52 65
16.....	36	36 00	39 15	38 40
18.....	24	24 00	25 30	24 85
20.....	12	12 00	12 30	12 20

No. 102—SANTA BARBARA.

SANTA BARBARA MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated May 20, 1901.)

J. M. WARREN, Secretary.

E. C. ROEDER, President.

Fiscal year ended March 1, 1906.

No. of series, none.

No. of shares, 4,687.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$143,629 65	Installment stock—dues.....	\$133,360 96
Arrearages.....	736 63	Installment stock—profits..	6,960 24
On interest.....	\$736 63	Reserve and undivided profits	1,106 98
Cash in office and bank.....	5,551 40	Loans due and incomplete...	8,520 00
All other assets.....	30 50		
Total assets.....	\$149,948 18	Total liabilities.....	\$149,948 18

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Dayton Plan. Dues—50 cents per share per month.

Dividend, last fiscal year—6 per cent.

Book value—Dues plus dividend.

Withdrawal value—Same as book value.

No. 103—SANTA CLARA.

SANTA CLARA BUILDING AND LOAN ASSOCIATION.

(Incorporated March 19, 1889.)

F. O. ROLL, Secretary.

J. B. O'BRIEN, President.

Fiscal year ended March 31, 1906.

No. of series, 11.

No. of shares, 1,763.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$113,700 00	Installment stock—dues.....	\$79,155 00
Arrearages.....	657 25	Installment stock—profits...	21,600 35
On shares.....	\$438 50	Paid-up and prepaid stock—	
On interest.....	141 05	capital.....	9,050 00
On premium.....	8 75	Advance payments.....	70 00
On fines.....	68 95	Overdrafts and bills payable..	1,500 00
Cash in office and bank.....	5,978 62	Reserve and undivided profits	5,448 21
Advances—secured.....	13 90	Loans due and incomplete..	1,478 90
		Sundry ledger accounts.....	1,381 25
		All other liabilities.....	666 06
Total assets.....	\$120,349 77	Total liabilities.....	\$120,349 77

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
8.....	120	\$120 00	\$180 00	\$180 00
9.....	108	108 00	156 60	155 00
10.....	96	96 00	134 40	129 00
11.....	84	84 00	113 40	109 00
12.....	72	72 00	93 60	88 00
13.....	60	60 00	75 00	70 00
14.....	48	48 00	57 60	52 50
15.....	36	36 00	41 40	38 00
16.....	24	24 00	26 40	25 00
17.....	12	12 00	12 60	12 25

No. 104—SANTA PAULA.

SANTA PAULA BUILDING AND LOAN ASSOCIATION.

(Incorporated April 21, 1890.)

H. H. YOUNGKEN, Secretary.

JOSEPH R. HOUGH, President.

Fiscal year ended May 16, 1906.

No. of series, 12.

No. of shares, 2,423.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$104,300 00	Installment stock—dues.....	\$65,773 80
Arrearages.....	296 22	Installment stock—profits...	10,276 12
On shares.....	\$163 20	Overdrafts and bills payable..	28,450 00
On interest.....	80 06	Reserve and undivided profits	256 67
On premium.....	21 80	Loans due and incomplete...	414 74
On fines.....	31 16		
Cash in office and bank.....	398 78		
Advances—secured.....	25 81		
All other assets.....	150 52		
Total assets.....	\$105,171 33	Total liabilities.....	\$105,171 33

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
11.....	72	\$72 00	\$94 88	\$94 88
12.....	60	60 00	75 58	75 58
13.....	48	48 00	57 64	54 24
14.....	36	36 00	41 32	39 36
15.....	24	24 00	26 33	25 50
16.....	12	12 00	12 59	12 39

No. 105—SANTA ROSA.

SANTA ROSA BUILDING AND LOAN ASSOCIATION.

(Incorporated October 3, 1888.)

C. D. BARNETT, Secretary.

ALLEN B. LEMMON, President.

Fiscal year ended October 31, 1905.

No. of series, 15.

No. of shares, 2,090.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$130,340 97	Installment stock—dues.....	\$87,983 40
Arrearages.....	782 23	Installment stock—profits...	17,599 14
On shares.....	\$133 35	Advance payments.....	571 56
On interest.....	577 80	Overdrafts and bills payable..	19,764 00
On fines.....	71 08	Reserve and undivided profits	11 39
Cash in office and bank.....	334 27	Loans due and incomplete...	2,278 40
Advances—secured.....	5 00	All other liabilities.....	3,254 58
Total assets.....	\$131,462 47	Total liabilities.....	\$131,462 47

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
8.....	120	\$120 00	\$157 25	\$157 00
9.....	108	108 00	137 15	137 10
10.....	96	96 00	118 53	118 08
11.....	84	84 00	100 91	100 17
12.....	72	72 00	84 20	83 34
13.....	60	60 00	68 42	67 50
16.....	24	24 00	25 37	25 02
17.....	12	12 00	12 34	12 25

No. 106—SAUSALITO.

SAUSALITO MUTUAL LOAN ASSOCIATION.

(Incorporated December 1, 1887.)

T. PENLINGTON, Secretary.

C. H. BECKER, President.

Fiscal year ended October 31, 1905.

No. of series, 8.

No. of shares, 1,042.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$41,450 00	Installment stock—dues	\$37,254 00
Arrearages	305 32	Installment stock—profits ..	6,996 64
On shares	\$127 00	Advance payments	10 00
On interest	105 58	Reserve and undivided profits	1,155 44
On premium	45 00		
On fines	27 74		
Cash in office and bank	1,401 56		
Real estate	2,215 00		
Advances—secured	24 20		
All other assets	20 00		
Total assets	\$45,416 08	Total liabilities	\$45,416 08

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
13	72	\$72 00	\$92 14	\$90 00
14	60	60 00	73 50	71 00
15	48	48 00	56 41	53 92
16	36	36 00	40 64	38 80
17	24	24 00	26 04	25 02
18	12	12 00	12 52	12 26

No. 107—SAUSALITO.

TAMALPAIS MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated March 16, 1897.)

J. A. McPHERSON, Secretary.

T. W. JACKSON, President.

Fiscal year ended April 30, 1906.

No. of series, 16.

No. of shares, 725.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$33,600 00	Installment stock—dues	\$13,504 95
Arrearages	752 99	Installment stock—profits ..	1,892 05
On shares	\$752 99	Paid-up and prepaid stock—	
Cash in office and bank	603 31	capital	6,760 00
Advances—secured	4 80	Paid-up and prepaid stock—	
All other assets	30 00	dividends	196 60
		Overdrafts and bills payable ..	7,700 00
		Reserve and undivided profits	223 22
		Loans due and incomplete...	4,486 26
		All other liabilities	228 02
Total assets	\$34,991 10	Total liabilities	\$34,991 10

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Dayton Plan. Dues—\$1.00 per share per month.

Dividend, last fiscal year—9½ per cent.

Book value—Dues plus dividend.

Withdrawal value—Dues plus 6 per cent.

No. 108—STOCKTON.

SAN JOAQUIN VALLEY BUILDING AND LOAN ASSOCIATION.

(Incorporated June 17, 1889.)

A. M. NOBLE, Secretary.

S. N. CROSS, President.

Fiscal year ended December 31, 1905.

No. of series, none.

No. of shares, 6,351.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$300,769 41	Installment stock—dues.....	\$122,454 59
Arrearages.....	2,513 25	Installment stock—profits....	15,567 52
On interest.....	\$2,513 25	Paid-up and prepaid stock—	
Advances—secured.....	416 42	capital.....	133,331 90
All other assets.....	35 00	Paid-up and prepaid stock—	
		dividends.....	10,031 90
		Overdrafts and bills payable..	12,150 55
		Reserve and undivided profits	8,162 12
		Loans due and incomplete....	1,890 50
		Sundry ledger accounts.....	145 00
Total assets.....	\$303,734 08	Total liabilities.....	\$303,734 08

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Dayton Plan. Dues—\$1.00 and 50 cents per share per month.

Dividend, last fiscal year—6 per cent.

Book value—Dues plus dividend.

Withdrawal value—Same as book value.

No. 109—STOCKTON.

STOCKTON LAND, LOAN, AND BUILDING ASSOCIATION.

(Incorporated February, 1887.)

CHAS. E. LITTLEHALE, Secretary.

J. D. YOUNG, President.

Fiscal year ended January 31, 1906.

No. of series, none.

No. of shares, 7,535.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$464,670 51	Installment stock—dues.....	\$328,501 91
Arrearages.....	7,364 50	Installment stock—profits....	71,398 19
On interest.....	\$7,364 50	Paid-up and prepaid stock—	
Cash in office and bank.....	19,317 35	capital.....	73,134 18
Real estate.....	1,060 59	Paid-up and prepaid stock—	
Advances—secured.....	2,387 47	dividends.....	2,484 01
All other assets.....	491 85	Reserve and undivided profits	11,390 25
		Loans due and incomplete....	8,333 73
		Sundry ledger accounts.....	50 00
Total assets.....	\$495,292 27	Total liabilities.....	\$495,292 27

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Age, in Months.	Total Dues Per share.	Book Value Per share.	Withdrawal Value.
120.....	\$120 00	\$175 92	\$175 92
108.....	108 00	150 52	150 52
96.....	96 00	129 20	129 20
84.....	84 00	105 72	105 72
72.....	72 00	89 55	89 55
60.....	60 00	71 73	71 73
48.....	48 00	55 02	55 02
36.....	36 00	39 95	39 95
24.....	24 00	26 00	26 00
12.....	12 00	12 43	12 43

Dayton Plan. Dues—\$1.00 per share.
 Dividend, 1905—7.08 per cent.
 Book value—Dues plus dividend.
 Withdrawal value—Same as book value.

No. 110—TULARE.

TULARE BUILDING AND LOAN ASSOCIATION.

(Incorporated January, 1889.)

H. M. SHREVE, Secretary.

A. W. WHEELER, President.

Fiscal year ended December 31, 1905.

No. of series, 7.

No. of shares, 222.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock.....	\$14,862 85	Installment stock—dues.....	\$11,814 00
Arrearages.....	385 72	Installment stock—profits....	2,358 11
On shares.....	\$383 00	Advance payments.....	2,376 95
On fines.....	2 72	Overdrafts and bills payable..	3,000 00
Cash in office and bank.....	2,030 09	Reserve and undivided profits	111 33
Real estate.....	2,200 00	All other liabilities.....	125 27
All other assets.....	307 00		
Total assets.....	\$19,785 66	Total liabilities.....	\$19,785 66

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Serial No.	Age, in Months.	Total Dues per Share.	Book Value per Share.	Withdrawal Value.
F.....	138	\$138 00	\$193 93	\$179 94
I.....	90	90 00	110 08	105 06
K.....	48	48 00	53 19	50 59
L.....	24	24 00	25 24	24 62
N.....	12	12 00	12 24	12 12

No. 111—UPLAND.

MAGNOLIA MUTUAL BUILDING AND LOAN ASSOCIATION.

(Incorporated September 24, 1901.)

M. F. PALMER, Secretary.

P. E. WALLINE, President.

Fiscal year ended September 30, 1905.

No. of series, none.

No. of shares, 1,585.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock...	\$68,000 00	Installment stock—dues.....	\$30,553 75
Cash in office and bank.....	316 38	Installment stock—profits...	1,945 48
		Paid-up and prepaid stock— capital	33,900 00
		Paid-up and prepaid stock— dividends	1,786 73
		Reserve and undivided profits	130 42
Total assets	\$68,316 38	Total liabilities	\$68,316 38

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Dayton Plan. Dues—\$1.00 per share per month.

Dividend, 1905—7½ per cent.

Book value—Dues plus dividend.

Withdrawal value—Same as book value.

No. 112—VISALIA.

VISALIA BUILDING AND LOAN ASSOCIATION.

(Incorporated January 5, 1887.)

C. L. JOHNSON, Secretary.

C. J. GIDDINGS, President.

Fiscal year ended January 31, 1906.

No. of series, none.

No. of shares, 4,727.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$172,300 00	Installment stock—dues.....	\$94,433 45
Arrearages	95 11	Installment stock—profits...	24,176 47
On interest	\$95 11	Paid-up and prepaid stock— capital	19,100 00
Advances—secured	5 23	Paid-up and prepaid stock— dividends	573 00
		Overdrafts and bills payable.	30,273 35
		Reserve and undivided profits	1,602 89
		Loans due and incomplete...	1,817 00
		All other liabilities	424 18
Total assets	\$172,400 34	Total liabilities	\$172,400 34

INSTALLMENT STOCK, WITH AGE, VALUE, AND WITHDRAWAL VALUE PER SHARE.

Dayton Plan. Dues—50 cents per share per month.

Dividend, last fiscal year—8.40 per cent.

Book value—Dues plus dividend.

Withdrawal value—Same as book value.

REPORTS OF CO-OPERATIVE HOME ASSOCIATIONS.

LOS ANGELES.

CHICAGO HOME BUILDING COMPANY.

(Incorporated March 22, 1902.)

R. D. LAMSON, Secretary.

C. E. BYRKET, President.

Fiscal year ended March 1, 1906.

No. of series, none.

No. of contracts, 200.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$11,000 00	Installment contracts	\$9,849 00
		Reserve and undivided profits	1,083 75
		All other liabilities	67 25
Total assets	\$11,000 00	Total liabilities	\$11,000 00

LOS ANGELES.

CO-OPERATIVE HOMEBUILDERS.

(Incorporated March 19, 1902.)

R. ROSENBERG, Secretary.

JOHN H. FOLEY, President.

Fiscal year ended December 31, 1905.

No. of series, none.

No. of contracts, 1,619.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage on stock..	\$223,485 18	Installment contracts	\$239,253 03
Cash in office and bank	24,195 04	Installment interest	7,360 74
Advances—secured	25,800 23	Capital stock	19,619 00
All other assets	30,886 10	Reserve and undivided profits	30,519 56
		Equalization fund	7,269 99
		Sundry ledger accounts	344 23
Total assets	\$304,366 55	Total liabilities	\$304,366 55

OAKLAND.

OAKLAND HOME COMPANY.

(Incorporated April, 1902.)

L. M. McKENNEY, Secretary.

MAX E. VOCKEL, President.

Fiscal year ended March 31, 1906.

No. of series, none.

No. of contracts, 208.

<i>Assets.</i>		<i>Liabilities.</i>	
Loans on mortgage and advances	\$44,606 77	Installment contracts	\$44,610 67
Cash in office and bank	3 90		
Total assets	\$44,610 67	Total liabilities	\$44,610 67



CALIFORNIA STATE MINING BUREAU

LEWIS E. AUBURY, - - State Mineralogist.

REPORT

OF THE

BOARD OF TRUSTEES

AND

STATE MINERALOGIST

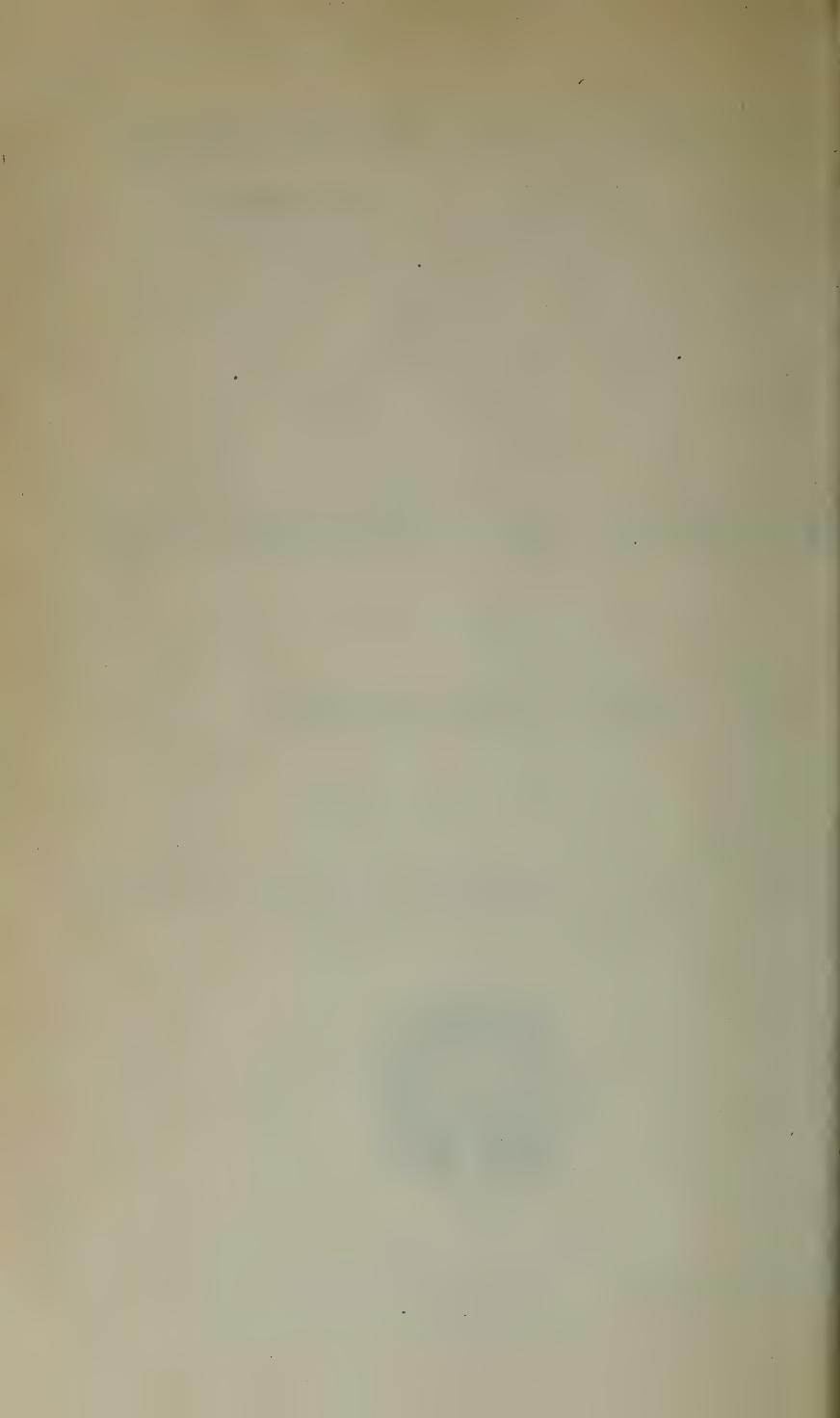
COVERING THE

FIFTY-SIXTH FISCAL YEAR ENDING JUNE 30, 1905, AND FIFTY-SEVENTH
FISCAL YEAR ENDING JUNE 30, 1906.



SACRAMENTO:

W. W. SHANNON, : : : : SUPERINTENDENT STATE PRINTING.
1906.



REPORT OF THE BOARD OF TRUSTEES OF THE STATE MINING BUREAU.

SAN FRANCISCO, November 1, 1906.

To His Excellency, GEORGE C. PARDEE,

Governor of California.

SIR: The Trustees of the State Mining Bureau herewith submit their report, in pursuance of the Act of the Legislature, approved March 23, 1893, entitled "An Act to provide for the establishment, maintenance and support of a bureau, to be known as the State Mining Bureau, and for the appointment and duties of a Board of Trustees, to be known as the Board of Trustees of the State Mining Bureau, who shall have the direction, management, and control of said State Mining Bureau, and to provide for the appointment, duties and compensation of a State Mineralogist, who shall perform the duties of his office under the control, direction and supervision of the Board of Trustees of the State Mining Bureau."

No reports have been printed since the XIIIth (or third biennial), issued September 15, 1896, although numerous bulletins have been issued, as enumerated in the report of the State Mineralogist. The report herewith submitted covers the fifty-sixth and fifty-seventh fiscal years. The Board of Trustees and the State Mineralogist have, however, made biennial reports in accordance with the law above quoted.

[Thirty-sixth session of the Legislature of California, page 729, Statutes of California, 1905.]

GENERAL APPROPRIATION ACT PROVIDING FOR THE SUPPORT OF THE STATE GOVERNMENT FOR THE FIFTY-SEVENTH AND FIFTY-EIGHTH FISCAL YEARS.

[Approved March 22, 1905.]

The clauses relating to the State Mining Bureau are as follows:

"For salary of State Mineralogist, six thousand dollars.

"For support of the State Mining Bureau, including salaries, thirty-five thousand dollars.

"For printing, binding, ruling, and all other work performed and materials furnished by the State Printing Office, five thousand dollars."

The Board of Trustees, in obedience to the mandate of the Legislature and at the request of His Excellency, the Governor, have audited and approved the accounts for traveling, salary, and other incidental expenses incurred by the Field Assistants and other employés, as well as all expenses of the State Mining Bureau.

The appointment of a new Board of Trustees having been made by Your Excellency, a meeting was called for the purpose of organization on December 6, 1905, at which meeting the Board elected Mr. F. W. Bradley, President, and Mr. Louis Janin, Vice-President.

State Mineralogist Aubury informed the Board as to the nature of the work which had been carried on under his administration, funds available for field investigations and support of the Bureau, etc. After discussion, it appeared that under the present appropriation such a small amount was available for field work that the coming Legislature would be asked to increase the amount of Bureau appropriation to such an extent as would allow of necessary field work to be performed.

As stated, the appropriation for field work and the support of the Bureau being inadequate, the Board wishes to suggest that at the coming session of the Legislature the Governor make a recommendation that an increased appropriation be made for the State Mining Bureau, and commensurate with its needs. Also, that a fixed amount should be appropriated for its support. The necessity for larger appropriations than have been made of late years arises from the fact that the work of the Bureau is constantly increasing, and that it is necessary to keep pace with the rapidly developing mineral industry in this State.

To illustrate the advances which have been made in mining in this State of recent years, our reports show that in 1889 the total value of all minerals produced in the State amounted to \$16,681,731, and the ratio of increase from that date up to January 1, 1906, over one and one-half million dollars per year, until at the present time the State's annual output amounts to over \$43,000,000 annually.

In the past nineteen years California has added to the world's mineral product \$505,699,408. These are the official figures of production, and will furnish an idea as to the output of our mines. From this it can be well understood how necessary it is that liberal support should be given to the Bureau, and also that much additional work can be performed to advertise our vast mineral resources.

At the present time California produces over forty mineral substances of economic importance—much in excess of any other State—and on account of their diversity and the immense area over which they are distributed, the necessity for larger appropriations is apparent in order to accomplish proper results.

MUSEUM.

The following list represents those who donated specimens to the Museum during the two years covered by this report. Among the specimens of which particular mention should be made are several very fine free gold specimens donated by Mrs. M. P. MacCrellish; a beautiful sample of carnotite, from the Yellow Bird Mine, Montrose, Colorado,

L. S. Judd; a large and valuable specimen of cerargyrite from Tuscarora, Nevada, J. W. Pew; also numerous exhibits of industrial materials:

Aubury, W. H.	Hooper, R. C.	Pew, J. W.
Aubury, Lewis E.	Hibbard-Elliott	Powers, J. W.
Anthony, James H.	Hadley, G.	Peterson, J.
Boursin, Henry	Henderson, James	Ryall, Andrew
Cross, J. M.	Irelan, Mrs. Wm., Jr.	Raycroft, A. T.
Dolbear, C. E.	Judd, L. S.	Rule, W. J.
Dubois, P.	Kunz, George F.	Robertson, C. N.
Davis, E.	Knox, R. B.	Reisse, R.
Decoto, J. R.	Kirkwood, R. J.	Seitz, Mrs.
Doyle, James, Jr.	Keyes, W. S.	Spencer, Dr. Wm. O.
Draper, Morgan	LeMar, O. W.	Tiron, F. J.
Dolman, W. H.	Luce, A. S.	Turner, J. A.
Eckert, C. E.	Lynch, J. C.	Treat, J. F.
Fairchild, S.	McKnight, J. H.	Thornton, S. K.
Forstner, Wm.	McDonald, J.	Wetherell, Charles E.
Fisher, J. M.	McAllister, G. W.	Westcott, W. H.
Fillbrook, A. H.	Moore, R. E.	Wood, J. P.
Grider, W. F.	Murphy, Dr. W.	Waltington, B. W.
Gibson, F. W.	MacCrellich, Mrs. M. P.	Woltmann, E.
Glendenning, George	Perry, F. R.	Young, P. L.

A complete and interesting model representing the washing and prospect dump, flume and undercurrent at the Hidden Treasure Mine, Placer County, was donated to the Bureau by the Hidden Treasure Mining Company. A model cyanide plant, very complete, was also donated by the Pacific Tank Company, of San Francisco. Both models were exhibited at the Louisiana Purchase Exposition in the California Mining Department, and attracted considerable attention.

LIBRARY.

As previously stated, on account of the smallness of the appropriation, it was possible to purchase but few books for the library. There has been a large demand for works on mining and metallurgical subjects, and the mining library is consulted to a great extent by mining engineers, students, and others interested in mining subjects. It is to be regretted that the Board of Trustees is not in a position to purchase new and up-to-date works, for which there is a constant demand.

The recent disaster destroyed all of the public and most of the private libraries of the city, and an unusual demand has been made for books, particularly those relating to structural and industrial subjects. Should a larger appropriation be available, it will be the aim of the Board of Trustees to endeavor to supply the Bureau with such books as are urgently needed.

The Board of Trustees wishes to extend thanks to the editors and

publishers of the following papers which are regularly forwarded free to the Library of the State Mining Bureau:

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|--|---|
| Amador Dispatch, Jackson. | Mining and Engineering Journal, New York. |
| Amador Ledger, Jackson. | Mining and Engineering Review, San Francisco. |
| Amador Record, Sutter Creek. | Mining Record, Victoria, B. C. |
| Angels Record, Angels Camp. | Mining World, Chicago. |
| Australian Mining Standard, Melbourne. | Mountain Democrat, Placerville. |
| Antelope Valley Gazette, Lancaster. | Mountain Messenger, Downieville. |
| Bee, Sacramento. | Mother Lode Banner, Sonora. |
| Bureau of Science, Manila, P. I. | Mining and Scientific Press, Berkeley. |
| Calaveras Weekly Citizen, San Andreas. | New York Commercial, New York. |
| Chino Valley Champion, Chino. | New Zealand Mines Record, Wellington. |
| Citrograph, Redlands. | News, Red Bluff. |
| Contra Costa Gazette, Martinez. | News, Goldfield, Nev. |
| Commercial News, San Francisco. | News, San Diego. |
| Crescent City News, Crescent City. | News Letter, Oakland. |
| Canadian Min'g Review, Montreal, Canada. | Oceanside Blade, Oceanside. |
| Coal and Coke, Baltimore. | Oregon Mining Journal, Portland, Or. |
| Calaveras Prospect, San Andreas. | Pacific Oil Reporter, San Francisco. |
| Chico Daily Enterprise, Chico. | Placer County Republican, Auburn. |
| Del Norte Record, Crescent City. | Petaluma Weekly Courier. |
| Democrat, Woodland | Porterville Enterprise, Porterville. |
| Dispatch-Democrat, Ukiah. | Press-Democrat, Santa Rosa. |
| Daily Silver State, Winnemucca, Nev. | Profit and Loss, Denver, Colo. |
| El Dorado Republican, Placerville. | Press and Horticulturist, San Francisco. |
| Enquirer, Oakland. | Pacific Empire Magazine, Los Angeles. |
| Enterprise, Healdsburg. | Register, Napa. |
| Free Lance, Hollister. | Republican, Fresno. |
| Courier-Free Press, Redding. | Reveille, Cloverdale. |
| Free Press, Ventura. | River News, Rio Vista. |
| Folsom Telegraph, Folsom. | Rustler, King City. |
| Gazette, Georgetown. | Sun, Tonopah, Nev. |
| Gazette-Mariposan, Mariposa. | San Diego Sun, San Diego. |
| Graphic, Oakdale. | Scott Valley Advance, Etna. |
| Herald, Los Angeles. | Searchlight, Redding. |
| Humboldt Standard, Eureka. | Sentinel, Colfax. |
| Inyo Independent, Independence. | Sun, Colusa. |
| Inyo Register, Bishop. | Stanislaus County Weekly News, Modesto. |
| Institution of Civil Engineers, Westmoreland, S. W. Eng. | San Diego Union, San Diego. |
| Ione Valley Echo, Ione. | Times, Los Angeles. |
| Journal (weekly), Salinas. | Smithsonian Institute, Washington, D. C. |
| Journal of Commerce, San Francisco. | Town and Country Journal, Melbourne, Australia. |
| Jerome News, Jerome, Ariz. | Tribune, Healdsburg. |
| Leslie's Weekly, New York. | Tribune, Oakland. |
| Mercury, Madera. | Town Talk, San Francisco. |
| Mercury, Oroville. | Union-Democrat, Sonora. |
| Middletown Independent, Middletown. | United States Investor, Boston, Mass. |
| Mining Journal, London, England. | U. S. Geological Survey, Washington, D. C. |
| Mining Magazine, New York. | Western Mining World, Chicago. |
| Mining Record, Denver, Colo. | Willows Journal, Willows. |
| Mining Reporter, Denver, Colo. | Weekly Herald, Arroyo Grande. |
| Mining Review, Los Angeles | Weekly Trinity Journal, Weaverville. |
| Mining Review and Metallurgist, Chicago. | Wood River Times, Hailey, Idaho. |
| Mineral Wealth, Redding. | Yolo Semi-Weekly Mail, Woodland. |
| Miner-Transcript, Nevada City. | |
| Mines and Minerals, Scranton, Pa. | |

LABORATORY.

During the past biennial term, the records show that 2,052 samples have been received by mail, and have been determined, aside from an equal number of samples brought in personally and passed upon.

Numerous applications for information appertaining to mining and metallurgical subjects referred to this department have been answered. Since the issuance of the "Structural Bulletin" by the State Mining Bureau an increased interest has been observed by the prospectors in this direction; more especially since the recent fire, the inquiry for localities where suitable lime and clay deposits might be found has been very active, enabling the Bureau to bring several large deposits of this character to the attention of the investing public.

FINANCIAL STATEMENT.

Fifty-sixth Fiscal Year, July 1, 1904, to July 1, 1905.

Balance.....		\$1,698 06
Appropriation.....		22,500 00
Salaries of Geological Assistants.....	\$5,506 50	
Salaries of Bureau employés.....	9,342 55	
Traveling expenses of Geological Assistants.....	4,322 44	
Rent of premises.....	1,620 00	
Laboratory.....	294 59	
Library account.....	1,511 11	
Minerals and Museum.....	461 98	
Postage.....	512 93	
Sundry expenses.....	526 21	
Unexpended—returned to State.....	99 75	
	\$24,198 06	\$24,198 06

Fifty-seventh Fiscal Year—July 1, 1905, to July 1, 1906.

Appropriation.....		\$17,500 00
Received from St. Louis Committee.....		113 50
Salaries of Geological Assistants.....	\$1,555 50	
Salaries of Bureau employés.....	9,776 50	
Traveling expenses of Geological Assistants.....	741 15	
Rent of premises.....	1,620 00	
Laboratory.....	140 95	
Library.....	1,312 32	
Minerals and Museum.....	283 72	
Postage.....	542 77	
Sundry expenses.....	428 47	
Balance.....	1,212 12	
	\$17,613 50	\$17,613 50

According to the custom of the Board of Trustees, the accounts of the Bureau have been audited by Mr. George W. Ade, an expert accountant. Mr. Ade's report shows that the books and accounts are neatly and correctly kept, and that all funds are properly accounted for. This examination is made quarterly.

Respectfully submitted.

F. W. BRADLEY,
LOUIS JANIN,
HAROLD T. POWER,
E. A. STENT,
CURTIS LINDLEY,

Board of Trustees of State Mining Bureau.

REPORT OF THE STATE MINERALOGIST.

To His Excellency, GEORGE C. PARDEE,
Governor of the State of California.

SIR: In pursuance of the provisions of "An Act to provide for the establishment, maintenance and support of a bureau to be known as the State Mining Bureau," etc., approved March 23, 1893, I herewith present my report of the work performed by the State Mining Bureau from November 1, 1904, to November 1, 1906.

Respectfully submitted.

LEWIS E. AUBURY,
State Mineralogist.

SAN FRANCISCO, November 1, 1906.

For reasons stated in the report of the State Mineralogist December 15, 1902, no regular biennial report, embracing all of the literature and work of the State Mining Bureau, was issued for the fifty-second, fifty-third, fifty-fourth, and fifty-fifth fiscal years, and the system adopted of issuing bulletins on special subjects has been continued during the past two years.

PUBLICATIONS.

The publications which have been issued under my direction during the past two years are summarized as follows:

Bulletin No. 36, "Gold Dredging in California," 120 pages, with maps. This bulletin furnishes the location and description of the lands in this State which are adaptable to gold dredging, and which have been so far prospected. It also presents a history of the dredging industry from its inception; the area of dredge gravel already proven; also chapters on "Geology," "Yield of various dredges," "Cost of Operations," "Construction of different types, with descriptions of the different parts of the dredge," "Prospecting and examination of conditions"; also a separate description of each of the dredge mining districts, together with the names and addresses of the different companies operating. The bulletin contains seventy illustrations and tables. Owing to the large demand for this publication, it was found necessary to print a second edition.

Bulletin No. 37, "Gems, Jewelers' Materials, and Ornamental Stones of California," 170 pages. This bulletin deals with the properties of gems, and the localities in this State in which are found the different valuable gem materials, together with a description of the various mines in which they are found, method of handling the product, etc.; also furnishes the names and addresses of the owners. The work contains fifty-one illustrations, with four additional color plates. A second edition of this bulletin has also been issued.

Bulletin No. 38, "Structural and Industrial Materials of California," 412 pages, with 149 illustrations. The bulletin treats of the "Uses of stone," "Classification and kinds of building-stones in California," "Points to be considered in selection of a building-stone," "Artificial preservatives," "Selection of quarry sites"; also, the definition, uses and occurrence in California; production and description of different quarries of granite and granitic rocks; limestone, marble, sandstone, serpentine, slate, and volcanic and intrusive rocks; also, a chapter on "Artificial stone."

Considerable attention is given to the Portland cement industry in California, together with its history, production, uses, testing, composition, materials used, methods of manufacture, analyses, and description of the Portland cement factories in California.

Clays and clay-working industries are also treated in detail in this work, under the following heads: Definition, Origin, Chemical Composition, and Physical Properties of Clays. A classification of the high and low grade clays, with a description of their occurrences in the State, and a description of the various plants where clay products are manufactured, are given.

A description is given, together with the uses and occurrences, of thirty different structural and industrial materials, other than those above enumerated, and which are of economic importance, and all of which are produced in California.

A list is furnished of specimens of mineral substances (enumerated in this bulletin) which are to be found in the Museum of the State Mining Bureau. There is also a list furnished of quarries, mines, and works, in addition to those mentioned in the body of the bulletin, together with the names and addresses of the owners.

Bulletin No. 39, statistical sheet, showing the mineral production by counties for the year 1904.

Bulletin No. 40, statistical sheet, showing the mineral production for the past eighteen years, inclusive of 1904.

Bulletin No. 41, "California Mines and Minerals," 55 pages, with illustrations. This bulletin also includes the mineral production for

1904, a brief description of the State Mining Bureau, its objects, etc., with illustrations of its departments. Also includes statistics of production of the different counties, arranged by both substance and county. In the bulletin, a map of each county in the State is included, showing railroad and stage lines, together with distances between points.

"Gold Production," statistical sheet, showing the amount of gold produced in California from 1848 to 1905.

Bulletin No. 42, statistical sheet, showing the mineral production by counties for the year 1905.

Bulletin No. 43, statistical sheet, showing the mineral production for past nineteen years, including 1905.

Bulletin No. 44, "California Mines and Minerals," 55 pages, with illustrations, and which includes the mineral production for 1905. (Same arrangement as Bulletin No. 41.)

"Gold Production," statistical sheet, showing the amount of gold produced in California from 1848 to 1906.

MAPS AND REGISTERS.

In addition to the mineral maps and registers already issued under my direction, and mentioned in my last report, those of the following counties have been published: Yuba and Santa Barbara.

The maps of the counties are compiled from the most accurate data obtainable, and besides showing the location of the railroads, county roads, trails, creeks, rivers, ditches, transmission power lines, bridges, pipe lines, reservoirs, etc., the location of each mineral deposit is also shown by number. In the Yuba and Santa Barbara maps, the boundaries of forest reserves are also shown.

In the Register (or key) which accompanies the maps the names of the mines are arranged alphabetically and by number, according to character. Oil wells are arranged in the same manner. A general description of each mineral deposit is also given, together with the name of the individual or company operating the same.

IN PREPARATION.

Up to the present time, there have been created permanent Forest Reserves in this State of a total of 19,035,810 acres, or one fifth of the total National Forest Reserves. As a large portion of this acreage in California is embraced in the various mining districts, and considerable demand has been made for information on this subject, a map of the reserves, in color, showing the boundaries of them, has been prepared from data furnished by the United States Forest Service, and the same will be ready for distribution in a short time.

SALE OF MINING BUREAU PUBLICATIONS.

At my suggestion, an amendment was drawn up, which amended Section 8 of the Mining Bureau Act, relating to sale of Mining Bureau publications, and having been passed by the Legislature, was approved March 10, 1903, by your Excellency.

The amendment recites as follows: "The Board (Board of Trustees) is hereby empowered to fix a price upon, and to dispose of to the public at such prices, any and all publications of the Bureau, including reports, bulletins, maps, registers, etc. The sum derived from such disposition must be accounted for, and used as a revolving printing and publishing fund for other reports, bulletins, maps, registers, etc. The prices fixed must approximate the actual cost of printing and issuing the respective reports, bulletins, maps, registers, etc., without reference to the cost of obtaining and preparing the information embraced therein."

Since the above went into effect it has been found that the sum derived from sales of publications has enabled the Bureau to issue a large amount of literature, and at the same time decrease the amount of appropriation heretofore made for the Bureau in the State printing appropriation. It has also been found that the Mining Bureau literature, since the amendment went into effect, has reached only those for whom it was intended, and that there has not been the wasteful distribution of the same which existed formerly.

WORK OF THE BUREAU.

A large number of inquiries are daily made, both by letter and in person, from parties desiring information on subjects not covered by the publications. In addition to answering the same, the Bureau has gathered data concerning the different mineral interests of the State, and published the same in the form of bulletins, and maps and registers of the different counties.

SCHOOL COLLECTIONS.

The system of furnishing school collections of the more common minerals which California produces to the advanced grades of the public schools, mention of which was made in my last report, has been continued, and a large number of collections, together with Bureau literature, have been forwarded to the schools, with a view of interesting students in our mineral resources.

PROTECTION OF MINING INTERESTS.

In my last report it was suggested that beneficial laws, looking toward the suppression of illegitimate mining companies, might be enacted, and at the suggestion of your Excellency, a bill was drawn

which it was thought would meet with the requirements, and at my request was introduced by Senator Thomas H. Selvage. The bill passed both houses of the Legislature without a dissenting vote, and was approved by your Excellency in March, 1905. The bill provides as follows:

SECTION 1. Any superintendent, director, secretary, manager, agent or other officer, of any corporation formed or existing under the laws of this State, or transacting business in the same, and any person pretending or holding himself out as such superintendent, director, secretary, manager, agent, or other officer, who shall willfully subscribe, sign, endorse, verify, or otherwise assent to the publication, either generally or privately, to the stockholders or other persons dealing with such corporation or its stock, any untrue or willfully and fraudulently exaggerated report, prospectus, account, statement, of operations, values, business, profits, expenditures or prospects, or other paper or document intended to produce or give, or having a tendency to produce or give, to the shares of stock in such corporation a greater or less apparent or market value than they really possess, or with the intention of defrauding any particular person or persons, or the public, or persons generally, shall be deemed guilty of a felony, and on conviction thereof, shall be punished by imprisonment in State prison, or a county jail, not exceeding two years, or by fine not exceeding five thousand dollars, or by both.

SEC. 2. All Acts and parts of Acts in conflict with this Act are hereby repealed.

That the Act has proven beneficial is attested by the fact that the glittering and exaggerated statements which were so plentiful in the published advertisements and prospectuses of some mining companies before the law went into effect are no longer seen, and the legitimate promotion of mining properties in this State is now meeting with more success than formerly, owing to the elimination of the mining faker, which was made possible by this law.

As in the past, the Bureau continues to furnish information and assistance to the postal authorities concerning doubtful mining concerns, so that between the State law above referred to and the United States postal laws the illegitimate mining promoter has found it to his best interests to operate elsewhere.

PROTECTION OF FORESTS AND THE ILLEGAL LOCATION OF MINERAL AND NON-MINERAL LANDS.

While it may be presumed by some that the protection of our forested areas from illegal location or entry should not come within the jurisdiction of the Mining Bureau, and that the Mining Bureau Act did not provide that the State Mineralogist should interest himself in matters not directly connected with Bureau affairs, I have attempted to meet a situation not provided for in the statutes, and which I consider of great importance not only to California's mining interests, but to all other interests as well. It is my opinion that the protection of our forests, from whatever cause, should be the aim of every State and county official, as well as our citizens, as our forests are our most valuable assets. The depredations of timber speculators, who have been particularly

active during the past six years in this State, should receive our most earnest consideration, and it has been against this class of operators that my efforts have been directed.

In looking toward the future welfare of our mining interests in connection with the preservation of our forests, we must protect the source from which our supply of timber and lumber for mining purposes is to be drawn. To successfully operate our mines, a large and cheap supply of timber must be available. For the conservation of water which is essential in mining operations for power and other purposes, our forests must be protected. Further, from the insatiable greed of timber speculators the miner is amply protected in his rights, where his claim lies within the boundaries of a temporary or permanent Forest Reserve; whereas, where there is desirable timber land containing mineral, and the land is unreserved, he stands little chance to protect his claim against the corporate wealth of the timber speculators.

Under the broad policy of Hon. Gifford Pinchot, United States Forester, every reasonable privilege is granted the miner, and while efforts were made by the timber men when the reserves were created to antagonize the miners against the creation of the reserves, the miners are now content to remain under the protecting arm of the Government Forest Service.

In view of the protection afforded the miner in the Forest Reserves, my efforts have been directed toward assisting in the preservation of the temporary and permanent reserves, and also toward the enlargement of the present permanent ones.

Undoubtedly, strong attempts will be made in future by the timber speculators to encroach upon temporary and permanent reserves. The demand for timber is constantly on the increase since the disaster which befell San Francisco; this has been demonstrated by the material advance in the price of lumber, and a consequent advance in the price of mining timber.

For the reasons heretofore mentioned, in my opinion it behooves not only the miner, but all other classes as well, to use every legitimate means to protect our forested areas, and to uphold the forest system so ably advocated by President Roosevelt.

Many times have the illegal actions of these speculators been called to the attention of the Government authorities at Washington by reports made by Field Assistants of this Bureau. Our Senators and Representatives to Congress have likewise been appealed to. One result of these constant appeals is that a commission was appointed by the United States Forest Service, consisting of geologists and law officers, for the purpose of investigating the wholesale location of timber land in Butte and Plumas counties, by placer locations. This commission commenced their investigations on September 1st last, and are continuing the same at this writing.

Approximately 500,000 acres of timber land have been located under the placer laws in the above-named counties, and many blanket placer locations have also been made over the claims of miners who have been in peaceable possession of their claims for from five to forty years.

From reports of Field Assistants, not over twenty per cent of these wholesale locations have been made on mineral land, and evidence submitted to me shows that the majority of these lands were located solely for their timber or other privileges, and not for mining purposes. Placer locations on these lands were only a subterfuge, as a portion of the lands, being in temporary or permanent Forest Reserves, were not open for entry other than by mineral location. After many placer locations had been made in the Plumas Forest Reserve, an attempt was made by the timber speculators, in September, 1905, to have six well-timbered townships in this reserve again thrown open to entry.

After being advised that a Special Agent of the U. S. Land Office had recommended to Hon. W. S. Richards, Commissioner of the General Land Office, that these lands be again thrown open, I at once entered a protest against such action, and upon request of the Commissioner for a report upon these lands, I detailed Mr. J. A. Edman as Special Field Assistant to examine and report on the townships in question.

Upon receipt of Mr. Edman's report, the same was forwarded to your Excellency; also to Mr. Richards, Commissioner of the General Land Office; Secretary of the Interior Hitchcock; Hon. Gifford Pinchot, U. S. Forester; and to Hon. George C. Perkins and other officials. Upon receipt of my letter and report, your Excellency advised me that you had entered a protest against the restoration of these lands to the public domain. The protest received the consideration of the Secretary of the Interior, and you were advised that the lands would not be thrown open.

Other attempts have recently been made to have certain lands again thrown open which are in temporary reserves in the counties of Placer, El Dorado, Tuolumne, and Mariposa, to which I also entered protest, and I have been lately advised that these lands would not be thrown open.

DESERT GUIDEPOSTS.

Owing to the many mineral discoveries during 1904 in the State of Nevada, and near the California State line, an impetus was given to prospecting for minerals in the desert section of the State. Realizing that a large number of persons would prospect in this region who were ignorant of desert perils, and with a personal knowledge of the danger to be encountered by persons unacquainted with the territory in question, I considered these dangers might be minimized were guideposts erected at various points in the desert region, which would show the

traveler the distance and direction to drinkable water, and other information of value. On the advice of your Excellency, a bill was framed and, at my request, it was introduced in the Assembly by Hon. Jesse R. Dorsey. The bill provides as follows:

SECTION 1. The sum of five thousand dollars is hereby appropriated from any money in the State treasury, not otherwise appropriated, for the purpose of procuring metallic guideposts, upon which are to be indicated the distance and direction of wells, springs, or tanks of water fit for drinking purposes and other information of value, in the desert sections of California, particularly in the counties of Kern, Ventura, Los Angeles, Inyo, Riverside, San Bernardino, and San Diego; *providing, however*, that each of said counties (for its own county) shall bear the expense of the proper erection of said guideposts at such points in the county as may be designated by the Department of Highways, and shall pay all expenses attendant upon the placing of said posts, as well as the expense incurred in placing the directions above mentioned upon said posts.

SEC. 2. The purchase and distribution of such posts is hereby placed under the management and control of the Department of Highways of the State of California, and it is made the duty of said Department of Highways to designate the points at which said posts shall be placed. Said posts shall be at least ten feet in length and shall be made of not less than two-inch nor more than three-inch iron pipe, to be set in metallic crosspieces of such size and to be sunk in the earth at such depth as will insure proper anchorage. Said posts shall have iron crossarms, on which shall be affixed metallic letters stating the information mentioned in section one of this Act.

SEC. 3. Any person removing, defacing or in any manner injuring said guideposts shall be deemed guilty of a felony.

SEC. 4. The State Controller is hereby directed to draw his warrant in favor of the Highway Commissioner for the sum of five thousand dollars, and the State Treasurer is hereby directed to pay the same.

The bill was approved by your Excellency on March 22, 1905, and after it went into effect I conferred with the Supervisors in the counties named, and received assurances from most of them of their coöperation.

Up to the present time, the Supervisors of the counties of Kern, Inyo, Riverside, and San Bernardino have received from Hon. N. Ellery, State Highway Commissioner, all of the guideposts which they requested, and the same have been erected in their respective counties. These posts and guide arms are substantially constructed of galvanized iron pipe and sheet iron, with perforated letters, and will last for many years. That they fully serve the purposes intended, and that their benefits are fully realized, is attested by the letters I have received from desert travelers. During the year 1904, and previous to the erection of these posts, about thirty deaths occurred on the desert, caused by the inability of these persons to find water or the means to direct them to water.

During the past year, the number of prospectors on the desert has materially increased, and, so far as I have heard, few fatalities have occurred from thirst in those counties in which guideposts have been erected. Now that this fear has abated, and the prospectors realize that a trip to the desert may be made with safety since the roads and trails are properly marked, there is a lively prospect of the wealth of the desert being developed by the present generation.

PRESENT CONDITION OF THE BUREAU.

I wish to report that while every other public institution in San Francisco met with either a partial or total loss of their effects in the disaster which befell San Francisco on April 18, 1906, the Bureau was particularly fortunate, having escaped the fire, and outside of the loss by breakage of a few specimens of aragonite (onyx marble), four show-cases, and a few minor losses, the large mineral collection in the Museum was not damaged. The earthquake shock disarranged the collection considerably, and advantage was taken of the necessary closing of the Bureau Museum to rearrange and relabel the entire exhibit. This work has been practically finished, and by the time repairs have been completed on the Museum room, the exhibit will be again ready for inspection by the public.

In the Library, while a number of bookcases were thrown to the floor and the doors and glasses broken, but little damage to their contents resulted.

In the Draughting-room, but slight damage was done to the material.

In the Laboratory, some chemical glassware was broken, but otherwise the damage was insignificant.

In the Store-room, the publications were thrown from the shelves, owing to falling partitions, but fortunately few were so damaged as to preclude their being salable.

Owing to conditions affecting the city subsequent to April 18 of this year, the Bureau remained closed until April 23, when it was reopened in all departments, with the exception of the Museum, and notwithstanding the many inconveniences to which the employés were subjected, caused by repairs to the Ferry Building, up to the present time the work of the Bureau has proceeded as usual.

CONDITION OF THE MINING INDUSTRY IN CALIFORNIA.

The condition of the mining industry in California was never more prosperous than at the present time. While in late years the total annual products have been increasing at the rate of two million dollars per year, the production for the year 1905 shows a decrease of approximately half a million dollars over that of the year 1904. This decrease was caused principally by the falling off in copper production, which was due to the temporary shutting down of the copper smelters in Shasta County, and the removal of one of them to another point. However, most of the more important mineral products show a general increase in quantity and valuation, and, owing to the increased demand for copper, and the opening of many new mines of that mineral, as well as the construction of new copper smelters, the year 1906 will show a marked increase in copper production, and make up for the losses in copper production for the year 1905.

The disaster which befell San Francisco has given an impetus to the mining of structural and industrial substances; particularly is this the case with cement-making materials, building-stone, brick, rubble for concrete, lime, slate for roofing, gypsum, infusorial earth (used in buildings where a sound deadener is required), glass sand and soda (used in the manufacture of window and bottle glass). There has also been a demand for magnesite, California being the only State in the Union which produces this substance. Factories have been lately established to manufacture firebrick and tiling of this material, which has heretofore been imported in large quantities.

The demand for fire-proofing material has caused a renewed activity in the mining of asbestos, and many prospects of this material are being opened.

Good qualities of talc are in demand, this substance being used by the paper mills. It is also used for a variety of other purposes, and several promising properties have been opened during the past year.

Of the rarer minerals, gold has shown an increased production for the year 1905 over that of 1904 of \$87,443. Platinum also shows an increase of \$1,471 over the preceding year. There was an increase in the gold production of the gold dredges, which were also responsible for the increase in platinum production.

Gold mining is active in California, and many new prospects are being opened up, particularly in Mono, Inyo, and San Bernardino counties, and adjacent to the Nevada State line. The desert section of the State is receiving more attention from the prospectors and investors than at any time in its history, and this has been brought about partly by the new railroad lines which have been constructed through that region during the past year.

A new mineral product has been added to the already long list of minerals of economic importance which California produces, *i. e.*, tungsten, principally in the form of scheelite, of which 52 tons, valued at \$18,800, were shipped to Europe in 1905. Most of this mineral was produced in Kern County.

The petroleum industry showed a marked increase in production for 1905, there having been produced 4,539,698 barrels in excess of that produced in 1904, the excess production being valued at \$690,011. If necessary, the output for 1905 could have been materially increased were better prices obtainable. A stronger demand for petroleum exists at the present time, owing to large contracts which have lately been consummated with the Japanese Government, the construction of a pipeline across the Isthmus of Panama, which, when completed, will enable California operators to ship their product to the eastern side of the continent at greatly reduced rates, and the greater consumption by railroad and steamship lines, as well as manufactories. Thus the outlook for better prices for the coming year is encouraging.

The production of quicksilver during 1905 was curtailed, owing to the lack of demand, the production of 1904 exceeding it by 4,221 flasks. During the latter year, a greater demand was occasioned by its use, principally in explosive compounds.

On account of increased building operations in the State, the brick manufacturers in 1905 produced brick of a value of \$279,046 in excess of that produced in 1904.

The total value of the mineral substances produced in the State for 1905 amounted to \$43,069,227.

The relative annual value of the mineral products of the State is now as follows: 1st, Gold; 2d, Petroleum; 3d, Copper; 4th, Clays and their products; 5th, Cement; 6th, Borax; 7th, Macadam; 8th, Quicksilver; and 9th, Rubble.

The quantity and value of each mineral product is herewith appended:

	Quantity.	Value.
Asbestos	112 tons	\$2,625
Asphalt	40,304 tons	285,290
Bituminous Rock	24,753 tons	60,436
Borax	46,334 tons	1,019,158
Cement	1,265,553 bbls.	1,791,916
Chrome	40 tons	600
Clays (Brick)	286,618 M	2,273,788
Clays (Pottery)	133,805 tons	130,146
Coal	46,500 tons	144,500
Copper	16,997,489 lbs.	2,650,605
Fuller's Earth	1,344 tons	38,000
Gems .....	.....	148,500
Glass Sand	9,267 tons	8,121
Gold .....	.....	19,197,043
Granite	228,788 cu. ft.	353,837
Gypsum	12,850 tons	54,500
Infusorial Earth	3,000 tons	15,000
Lead	533,680 lbs.	25,083
Lime	616,995 bbls.	555,322
Limestone	192,749 tons	323,325
Lithia Mica	25 tons	276
Macadam	1,440,455 tons	942,503
Magnesite	3,933 tons	16,221
Marble	73,303 cu. ft.	129,450
Mineral Paint	754 tons	4,025
Mineral Water	2,194,150 gals.	538,700
Natural Gas	148,345 M. cu. ft.	102,479
Paving Blocks	3,408 M.	134,347
Petroleum	34,275,701 bbls.	9,007,820
Platinum	200 oz.	3,320
Pyrites	15,503 tons	63,958
Quicksilver	24,655 flasks	886,081
Rubble	1,183,802 tons	774,267
Salt	77,118 tons	141,925
Sandstone	302,813 cu. ft.	483,263
Silver .....	.....	678,494
Slate	4,000 squares	40,000
Soapstone	300 tons	3,000
Soda	15,000 tons	22,500
Tungsten	52 tons	18,800
Total value .....	.....	\$43,069,227

The above report is published in Bulletin No. 42, now in the hands of the printer, and each mineral product is apportioned to the county in which it was produced. Usually the Annual Statistical Bulletins are issued about July 1st of each year, but owing to the San Francisco disaster, the records of many mining companies having offices in this city were destroyed, hence great difficulty has been encountered in obtaining an accurate record of production, and this has caused an unusual delay in presenting the bulletin to the public.

With this report, copies of all bulletins and maps and registers which have been issued since November, 1904, are presented, and which have been herein described.

Respectfully submitted.

L. E. AUBURY,
State Mineralogist.

Note.—Appended to this report is a list of publications, with their prices, and which can be obtained upon application to the State Mining Bureau, Ferry Building, San Francisco, California.

PUBLICATIONS OF STATE MINING BUREAU.

	Price.	Postage.
Report XI—1892, First Biennial.....	\$1.00	\$0.15
Report XIII—1896, Third Biennial.....	1.00	.20
Bulletin No. 6—"Gold Mill Practices in California" (3d edition) .....	.50	.04
Bulletin No. 9—"Mine Drainage, Pumps, etc." (bound) .....	.60	.08
Bulletin No. 15—"Map of Oil City Oil Fields, Fresno County, Cal." .....	.05	.02
Bulletin No. 16—"Genesis of Petroleum and Asphaltum in California" (3d edition).....	.30	.03
Bulletin No. 23—"Copper Resources of California" (2d edition).....	.50	.12
Bulletin No. 24—"Saline Deposits of California" .....	.50	.10
Bulletin No. 27—"Quicksilver Resources of California" .....	.75	.08
Bulletin No. 30—"Bibliography Relating to the Geology, Palæontology and Mineral Resources of California, including List of Maps" .....	.50	.10
Bulletin No. 31—"Chemical Analysis of California Petroleum"	--	.02
Bulletin No. 32—"Production and Use of California Petroleum" .....	.75	.08
Bulletin No. 36—"Gold Dredging in California" (2d edition).....	.50	.08
Bulletin No. 37—"Gems and Jewelers' Materials of California" (2d edition) .....	.50	.08
Bulletin No. 38—"Structural and Industrial Materials of California" .....	.75	.20
Bulletin No. 39—"Mineral Production of California"—1904.....	--	.02
Bulletin No. 41—"Mines and Minerals of California"—1904.....	--	.05
Bulletin No. 42—"Mineral Production of California"—1905.....	--	.02
Bulletin No. 43—"Mineral Production of California for 19 Years"	--	.02
Bulletin No. 44—"Mines and Minerals of California"—1905.....	--	.04
Gold Production in California from 1848 to 1906.....	--	.02
Register of Mines, with Map, Amador County.....	.25	.08
Register of Mines, with Map, Butte County .....	.25	.08
Register of Mines, with Map, El Dorado County .....	.25	.08
Register of Mines, with Map, Inyo County .....	.25	.08
Register of Mines, with Map, Kern County .....	.25	.08
Register of Mines, with Map, Lake County .....	.25	.08
Register of Mines, with Map, Mariposa County.....	.25	.08
Register of Mines, with Map, Nevada County .....	.25	.08
Register of Mines, with Map, Placer County.....	.25	.08
Register of Mines, with Map, San Bernardino County.....	.25	.08
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Register of Mines, with Map, Siskiyou County25	.08
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Register of Mines, with Map, Yuba County25	.08
Register of Oil Wells, with Map, Los Angeles City35	.02
Map of Mother Lode .....	.05	.02
Map of Desert Region of California .....	.10	.02
Map Showing Copper Deposits in California.....	.05	.02
Map of Calaveras County .....	.25	.08
Map of Plumas County .....	.25	.03
Mineral and Relief Map of California25	.05

In preparation:

Forest Reserve Map of California	--	--
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SECOND BIENNIAL REPORT
OF THE
BOARD OF TRUSTEES
OF THE
CALIFORNIA POLYTECHNIC SCHOOL

COMPRISING THE

Reports of the Director and Secretary of the Board

1904-1906

SAN LUIS OBISPO, CALIFORNIA
NOVEMBER, 1906



SACRAMENTO:

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SAN LUIS OBISPO, November 19, 1906.

*To His Excellency, GEORGE C. PARDEE, Governor,
Sacramento, Cal.*

DEAR SIR: I beg to hand you herewith the report of Mr. Leroy Anderson, Director of the California Polytechnic School, which is submitted as the second biennial report of the Board of Trustees of that school.

The Director has treated of the work and policies of the school so thoroughly that the Board cheerfully transmits his report as its own.

There also accompanies this the report of the Secretary of this Board, showing the principal actions in appointments and permanent improvements and a statement of receipts and disbursements.

By order of the Board of Trustees.

R. M. SHACKELFORD,
President.

REPORT OF THE DIRECTOR.

To the Board of Trustees:

The Director of the Polytechnic School has the honor to submit to the Board of Trustees the following report for the years 1904-5 and 1905-6. The report covers the period from July 1, 1904, to June 30, 1906, and in some instances to November 1, 1906.

FACULTY.

Appointments of instructors have been made as follows:

Miss Harriet Howell was elected instructor in Domestic Art, July 9, 1904. Miss Howell was graduated from the Decatur, Illinois, High School and was a student in Pratt Institute in 1893-4. She was Superintendent of Domestic Art in Mechanics' Institute, Rochester, N. Y., 1894-6; Superintendent of Domestic Art in Kansas Agricultural College 1897-1902; and Superintendent of Domestic Art in Throop Institute 1902-4.

Miss May Secrest, B.S., was elected instructor in Domestic Science and Manager of the Dormitory, April 29, 1905. Miss Secrest is a graduate of the Kansas State College with the class of 1892. She afterwards pursued graduate work in the same college and also taught domestic art two years as an assistant to Miss Howell. In 1902 Miss Secrest was graduated from the course in domestic science at Teachers' College, New York. The following year she organized the department of domestic science and taught the course at Stephen's Point Normal School, Wisconsin. Since 1903 she has been Associate Professor of Domestic Art in the Ohio State University.

Mr. LeRoy Burns Smith, A.B., was elected instructor in English and History, April 29, 1905. Mr. Smith finished his preparation for college at the Ithaca, New York, High School 1897, and previous to that time had taught in the country schools with marked success. He was graduated from Cornell University in 1901 with the degree of A.B., having taken as his major subjects English, history, and political science. During his senior year he taught English ten hours per week to university classes. From 1901 to 1903 he was General Secretary of the Young Men's Christian Association of the University of Wisconsin, and at the same time was a graduate student in the department of education in the university. In August, 1903, Mr. Smith entered the University of California as a graduate student in the department of education. He

was immediately made a Reader in Education by Dr. Brown, head of the department. In January, 1904, Mr. Smith left the University to accept the directorship of educational work of the Young Men's Christian Association of San Francisco.

Mr. Herman Bierce Waters, M.E., was elected instructor in Physics and Electricity, April 29, 1905. Mr. Waters completed the electrical course, with the exception of a thesis, at the Montana State College of Agriculture and Mechanic Arts. The year 1902-3 he spent at Cornell University taking the regular electrical work and was graduated with the degree of M.E. While at the Montana State College he had practical work installing machinery in the shops and electrical laboratory and wiring generators, switchboards, and lights. Since leaving Cornell he has been continuously in the employ of the Missouri River Power Company at their Cañon Ferry station—a 10,000-horsepower hydraulic plant supplying the city of Butte and the copper mines with light and power.

Mr. Chester Wirt Rubel, B.S.A., was elected instructor in Animal and Dairy Husbandry, February 3, 1906. Mr. Rubel is a graduate of the Iowa State College of Agriculture, class of 1904. During 1904-5 he was a fellow in Animal Husbandry and did some teaching. During the summer of 1905 he had charge of the show herd of Holsteins of W. B. Barney, Hampton, Iowa.

Mr. William Ferdinand Ewing, A.B., was elected instructor in Mathematics, May 21, 1906. Mr. Ewing was graduated in 1906 from Stanford University, having taken his major subject in mathematics. He has been a student successively in the Indiana State Normal School, Indiana University, Los Angeles State Normal School, University of the Pacific, and in Stanford University. He has had an experience in teaching ranging over some ten years, beginning with the rural schools of Indiana and finally in the academy of the University of the Pacific and Palo Alto academy, the last two while a student.

Isaac Phillips Roberts, M. Agr., professor emeritus of Agriculture at Cornell University, gave special lectures on Animal Husbandry and Rural Economy topics during the month of May the last two years. His visits to us have been an inspiration to our students and faculty. He has recently become a recipient of the Carnegie Pension Fund, and will not be able to devote any more time to teaching.

Mr. Oscar Leslie Heald tendered his resignation as instructor in Drawing, Forging, and Sloyd, May 21, 1906, in the following letter:

SAN LUIS OBISPO, May 10, 1906.

To the Board of Trustees of the California Polytechnic School:

Having for some time been working and planning with a view to pursuing college work at Stanford University, and having completed plans whereby I will be able to enter the coming semester, I hereby tender you my resignation, to take effect at the close of the present school year.

It has been a pleasure indeed to me during the past three years to be numbered among the faculty of the California Polytechnic School, and in taking leave at this time to prepare myself for better service in the future I have only the kindest feelings and best wishes toward the school and its corps of teachers and advisers.

Very respectfully,

(Signed)

O. L. HEALD.

Mr. Leo Earl Pearson was elected instructor in Drawing, Forging and Sloyd, May 21, 1906. Mr. Pearson was graduated in 1906 from the normal course in drawing and sloyd of the Throop Polytechnic Institute. During his last year he taught mechanical drawing at Occidental College.

Miss Helena Amanda Smith was elected manager of the dormitory, May 21, 1906. Miss Smith is a native of New York, where she was educated in the Ithaca High School, Elmira College, and Mechanics' Institute. She was graduated from the latter institution in 1905, in the normal course in domestic art and science.

STUDENTS.

The number of students has rapidly increased from the beginning. The enrollment according to years is as follows:

1903-4	20	1905-6.....	100
1904-5	60	1906-7.....	117

The enrollment for the first three years is the total for each year. The figures for 1906-7 are to November 1, 1906. Judging from the experience of former years it is safe to say that the enrollment will reach 130 before the close of the year.

The following gives the classification of students as to years and courses of study:

1905-6.				
	1st Year.	2d Year.	3d Year.	Special
Agriculture	17	14	2	1
Mechanics	26	7	2	--
Domestic Science	14	8	4	5
Totals	57	29	8	6

1906-7.				
	1st Year.	2d Year.	3d Year.	Special.
Agriculture	9	13	9	2
Mechanics	29	11	5	--
Domestic Science	21	11	7	--
Totals	59	35	21	2

The following gives the classification of students as to home address—the counties of California or the states from which they register:

1905-6.		1906-7.	
Alameda.....	5	Alameda.....	1
El Dorado.....	1	Amador.....	1
Japan.....	2	Colusa.....	2
Kern.....	2	El Dorado.....	1
Los Angeles.....	5	Fresno.....	1
Monterey.....	2	Japan.....	2
Orange.....	5	Kern.....	5
Riverside.....	1	Los Angeles.....	8
Sacramento.....	2	Mendocino.....	1
Santa Barbara.....	9	Merced.....	2
San Bernardino.....	1	Minnesota.....	1
Santa Clara.....	3	Monterey.....	1
Santa Cruz.....	2	Orange.....	2
San Francisco.....	2	Riverside.....	2
San Luis Obispo.....	49	Sacramento.....	3
San Joaquin.....	1	Santa Barbara.....	12
Solano.....	1	Santa Cruz.....	2
Sonoma.....	2	San Francisco.....	2
Tulare.....	4	San Luis Obispo.....	56
Ventura.....	1	Solano.....	1
Total.....	100	Stanislaus.....	2
		Texas.....	1
		Tulare.....	4
		Ventura.....	3
		Total.....	117

BUILDINGS.

Since the original establishment of the school, each Legislature has made an appropriation to be expended for the construction and equipment of shops, barns, and outbuildings. These appropriations have enabled us to construct the smaller and cheaper buildings which were essential to our needs, such as shops, barns, poultry houses, and the like. The first permanent building to be constructed under this fund was the forge shop, which was begun in the spring of 1904. All of the framing was done by the regular students in carpentry, they working at it three afternoons per week. The school year closed before any more could be done by the students. Accordingly the foundation and the erection of the building was done by contract. The cost of construction was \$1,340, and the cost of equipment \$1,100. The building now stands 40 by 56 feet, and should be increased for another year to 40 by 100 feet and the present equipment duplicated. We could then accommodate 32 students, whereas now only 16 can be accommodated.

Our architect, Mr. W. H. Weeks, drew an elevation plan for a large and commodious barn, consisting of a central portion 50 by 100 feet, with a wing at either end 40 by 80 feet. January 1, 1905, the class in carpentry began the construction of the north wing, which is used for

the dairy herd. By the close of the school year, they had nearly completed the carpentry work. This was finished during the summer by employing two students who had done specially good work. The same two students also erected the silo upon a five-foot foundation, which was built by contract. The total cost of the dairy barn was \$2,500; that of the silo, \$240.

The carpenter shop is the first of our shops to be completed upon the original plan as adopted by your Board. This is 40 by 100 feet, one story in height. It was built by contract during the summer of 1905 at a cost of \$2,985; the equipment consisting of ten double carpenter benches and a full complement of hand tools for students, amounting to \$720.

The poultry plant has grown very much during the past two years. A number of necessary small houses now dot the yards. A new and complete brooder house, 20 by 40 feet, was constructed during the winter of 1905-6. This was done partly by student labor under the guidance of a carpenter working regularly thereon. The original poultry house, which was constructed by students in the winter of 1904, has been remodeled and is used as an incubator and feeding room.

The work in plant propagation and decoration of our grounds will be very much enhanced by the completion of the greenhouse, which is now well on the way. The appropriation of \$1,000 will be entirely needed for its completion. The house is 36 by 40 feet and is divided into two sections each 18 by 40 feet.

The domestic science building, for which contracts amounting to \$24,200 were let in February, 1906, has been progressing slowly. It will probably not be ready for occupancy before January 1, 1907. The plans were carefully drawn by our architect upon suggestions of members of the faculty who were interested and who had made a special study of the departments and equipment which they severally need. I believe that the building will prove itself to have been carefully planned and also prove of great efficiency in carrying on our work in household arts.

GROUND.

When we look back two years it is very evident that a great deal has been done toward the improvement and beautifying of our grounds with the inadequate means at our disposal. During this time all of the roads which we now enjoy were constructed. This means about three fourths of a mile of rock road 10 feet wide, in addition to the wider drives about the buildings. All of this rock was taken from our own quarry. During the summer of 1906 we purchased some 300 yards of crushed rock from the city of San Luis Obispo and found that this could be laid down cheaper than from our own quarry, owing to the large amount of labor necessary to quarry our rock and crush it by hand. The total expense for roads and culverts to July, 1906, is \$1,300.

We have found considerable difficulty in growing some varieties of desirable trees and shrubs. It was our original desire to plant only California natives upon the grounds in front of the main buildings. Our first venture with these was so unsatisfactory that we have given it up, excepting for a few varieties which have proven successful, such as the Christmas berry. It may be that we will need to resort to the eucalyptus for some of our ornamental planting, because of its ability to thrive in shallow soil. Some of the eucalypti are very beautiful and are not out of place in any ornamental grounds.

We have been fortunate in securing the services of Mr. A. D. Sinclair, as gardener, a man who had had several years' experience in Santa Barbara under Mr. W. H. Morse. He came to us February 1, 1906, and has outlined a policy which will show itself in the decoration of our grounds in the near future.

FARM.

The crops produced on the farm have been increased by the growth of corn for the silo. This has been grown chiefly on the bottom soil, except during the present year, when ten or twelve acres of the high land was planted. The yield does not exceed ten tons per acre in any case, and is probably not more than five tons upon the high land. We are barely able to produce sufficient hay for our present stock, the upland yield being only one ton per acre of either barley or oat hay. All of this land should be fertilized, when it would give much larger returns. Thus far we have felt obliged to put most of the stable manure and what could be hauled from town upon the grounds for the lawns and ornamental planting. The immediate needs there are about filled and henceforth we plan to give the farm proper more fertilization.

We have been able to plan a definite system of experimentation upon the plat system to determine carefully the needs of our soil as to fertilization and cultivation and also the most advantageous crops. We have laid out a system of plats upon the bottom land and also upon the high land. Each plat will be one twentieth of an acre in size, with the soil of the plats as nearly uniform as possible.

The need of more good land is very apparent. We can not grow an annual crop of corn even on the bottom land and the upper land is certainly not rich enough. We should have at least thirty or forty acres additional of bottom land, to be used largely for the growth of forage crops, such as corn and alfalfa. This is a need which I trust will be very speedily met.

Another reason for more land is that the buildings are encroaching upon the productive area. The buildings now constructed and others outlined in the fulfillment of the building scheme take up fully forty acres of the best land, with the exception of the black bottom. Very

little of this acreage can be depended upon for crop production, and with the annual addition of buildings the productive area will continue to decrease.

It is not a pleasure to note, in the financial statement, a deficit in the farm account for the year ending June 30, 1906. As indicated elsewhere the farm barely produces enough hay and rough forage for the support of the stock now owned. Therefore, there is practically no revenue from the sale of farm products. The live-stock interest has been one of purchase and building up instead of sales. Thus a possible means of revenue through the sale of stock has not been realized to any extent, and the chief source of revenue for the farm proper is to charge against the dairy, the swine, and the poultry, which are naturally productive lines, the farm products which they consume. There still remains the produce consumed by the horses, for which there is no money return. It happens, however, that nearly one third the work of the teams which is credited to the farm and also to the teamsters is used in grading, road-building, hauling or other general work for the improvement of the buildings and site. This being true, experience has shown me that not enough money has been appropriated from the support fund for the use of the farm.

HOMES FOR EMPLOYÉES.

A very serious obstacle to the efficient administration of the growing amount of labor required by the school is the lack of homes for men regularly employed. A higher class of men with a corresponding greater efficiency of effort could be secured if the school provided homes for them upon its own grounds. A man with a family in a comfortable home near his daily work is a more dependable quantity than a single man who must live from one to two miles distant. We have been fortunate that the farm foreman, Mr. Griffith, has been willing to board one or two men who are employed as teamsters. Mr. Griffith occupies the small cottage which was upon the farm at the time of its purchase and which is one half mile distant from the building site.

The men who most need homes upon the grounds are the farm foreman when the new barn is completed, the gardener, the poultryman, the dairyman, and the teamsters. We should have as soon as possible at least four cottages, which at the present cost of building would require \$2,500 each. I trust that the Board of Trustees may take this matter under serious consideration both as to the need of the cottages and their location.

WATER SYSTEM.

The present system consists of the supply raised from the creek bed by a pumping plant and that which flows from two small springs on the hillside. The latter is piped to a 40,000-gallon concrete reservoir,

which is located 3,000 feet from the buildings and at an elevation of 200 feet above them. This is kept in reserve for safety in fire and when for any reason the other system needs repairs. We aim to keep this reservoir full at all times. The present pumping plant was installed in the fall of 1905. A well 28 feet deep was dug near the creek and is 9 feet inside the curb. Here was installed a No. 3 centrifugal pump, operated by a 16-horsepower engine, which raises the water to an altitude of 100 feet to a 20,000-gallon redwood tank, 80 feet above the main building site. This system affords ample supply for the use of the buildings and grounds, but is not sufficient for irrigation purposes on an economic scale. Our plans for immediate extension of irrigation include the diversion of the water from the creek to the flat land lying near its border, where alfalfa will be planted this coming season. The survey for this system has been made by the students in surveying, and the plan can be carried out at a very reasonable expense.

COMMENCEMENT.

The first commencement exercises were held on June 15 in the Pavilion. The graduating class was eight in number, and a large and representative audience was in attendance. A special musical program was rendered by a double quartet of students. Addresses were given by H. Floyd Tout for the class, and by Director Anderson and Professor I. P. Roberts. The diplomas were presented by Mr. R. M. Shackelford, President of the Board of Trustees, to the following class:

H. FLOYD TOUT and HENRY WADE, in Agriculture.

HERBERT COX and GUSTAVUS WADE, in Mechanics.

LILIAN FOX, IRENE RIGHETTI, LAURA RIGHETTI, and KATHERINE TWOMBLY, in Household Arts.

The commencement exerted a most salutary influence upon the entire school body. Graduation is now looked forward to as an actual thing—a real event in the student's life and one worthy of all effort for achieving.

COURSE OF STUDY.

The three courses in Agriculture, Mechanics, and Domestic Science continue to be the backbone of the institution. Each course has been altered and modified with our enlarged experience and otherwise improved by securing a larger corps of teachers. It is a source of gratification that at least ninety per cent of the students enter for and pursue one of the regular courses. A special course in Agriculture is announced for the year 1906-7 and two candidates have presented themselves. All others desiring Agriculture registered for the regular three-year course. When the Domestic Science building is completed

it is hoped that special courses in sewing or cooking will be given. And if more shops are provided we may be able to offer special or short trade courses in Mechanics. A minimum age limit of at least eighteen years should be required for all special students, for a student younger than that ought to have more of general training.

Inasmuch as my last report gave the course of study then outlined, it seems wise to detail the present courses.

COURSES OF STUDY FOR THE YEAR 1906-1907.

AGRICULTURE.

First Year.

	*PERIODS PER WEEK.		
	1st Term.	2d Term.	3d Term.
English	5	5	5
Arithmetic and Algebra	5	5	5
Botany	4	6	6
Gardening	4	4	4
Soils and Fertilizers	4	5	5
Poultry Culture	--	3	3
Freehand Drawing	5	--	--
Carpentry	8	8	--
Forging	--	--	8
	35	36	36

Second Year.

English	5	5	5
Geometry	5	5	5
Chemistry	8	8	8
Horticulture	5	5	5
Dairying	3	6	6
Animal Husbandry	6	6	6
Forging	8	--	--
Mechanical Drawing	--	4	4
	40	39	39

Third Year.

History and Civics	5	5	5
Trigonometry	5	5	--
Irrigation, Hydraulics	--	--	5
Surveying and Irrigation	4	4	4
Animal Physiology and Agricultural Chemistry	9	9	9
Animal Husbandry	4	4	4
Physics	7	7	7
	34	34	34

MECHANICS.

First Year.

English	5	5	5
Arithmetic	2	2	--
Algebra	5	5	5
Science, Elementary Physics	--	--	6
Freehand Drawing	5	5	--
Mechanical Drawing	5	5	8
Carpentry	12	12	12
	34	34	34

*Each school day is divided into eight 45-minute periods.

	<i>Second Year.</i>	PERIODS PER WEEK.		
		1st Term.	2d Term.	3d Term.
Geometry		5	5	5
English		5	5	5
Electricity		4	4	4
Mechanical Drawing		8	8	8
Chemistry		8	8	8
Shop Work		8	8	8
		<u>38</u>	<u>38</u>	<u>38</u>
<i>Third Year.</i>				
History and Civics		5	5	5
Trigonometry		5	5	--
Irrigation, Hydraulics		--	--	5
Surveying and Irrigation		4	4	4
Physics		6	6	6
Drawing and Design		8	8	8
Engines and Boilers and Electrical Machinery		7	7	7
		<u>35</u>	<u>35</u>	<u>35</u>
HOUSEHOLD ARTS.				
<i>First Year.</i>				
Arithmetic and Algebra		5	5	5
English		5	5	5
Elementary Chemistry		5	5	--
Physiology		--	--	5
Sewing		11	11	11
Drawing		6	6	6
		<u>32</u>	<u>32</u>	<u>32</u>
<i>Second Year.</i>				
English		5	5	5
Dairying		5	5	--
Gardening		--	--	5
Domestic Science I		3	3	3
Cooking Laboratory		8	8	8
Bookkeeping		4	4	4
Chemistry		8	8	8
		<u>33</u>	<u>33</u>	<u>33</u>
<i>Third Year.</i>				
History		5	5	5
Botany		6	6	6
Domestic Science II		3	3	3
Cooking Laboratory		8	8	8
Sloyd		--	5	5
Home Sanitation		5	--	--
Emergency and Home Nursing		--	5	--
Home Economics		--	--	5
Laundry		5	--	--
		<u>32</u>	<u>32</u>	<u>32</u>

The faculty is unanimous in its recommendations that each course be increased to four years, and I trust that it may seem wise to your Board to approve the recommendation, to take effect at the beginning of the year 1907-8.

ADVERTISING.

The chief method which has been used to place the school before the public is by means of an annual circular or catalog, which is issued in the spring. The issue for 1906 was an edition of ten thousand copies of a twenty-page circular. About seven thousand were sent to graduates from the grammar schools, whose names were secured through the kindness of the county superintendents. Thirty counties were covered in this manner. At intervals during the school year we issue short news letters, which are sent to the papers of the State. These letters contain items of interest regarding the school, its activities and development. How widely the letters are published we are not able to say, because it has not seemed best to go to the expense of a membership in a clipping bureau in order to secure a copy of all papers which publish the letter.

The exhibitions of the school have been of much advantage in calling attention to the school at distant points. At the Lewis and Clark Exhibition we displayed an exhibit of carpentry, iron and domestic art work, for which we received a bronze medal. At the 1906 State Fair at Sacramento we showed the Portland exhibition in connection with a larger collection of exercises in wood and iron and a large collection of photographs of the school, together with some of San Luis Obispo and vicinity, which were presented by the Chamber of Commerce. Probably the most attractive portion of our display at this Fair was the exhibit of nine head of Ayrshire cattle and four head of Percheron horses. On these we were awarded premiums amounting to \$263.

During the month of August Mr. LeRoy Burns Smith, our instructor in English and history, visited various sections in Ventura, Los Angeles, Riverside, and Orange counties in a personal presentation of the school to residents of those localities. He carried a collection of photographs of the school and its work and a quantity of our literature. Mr. Smith was cordially received by all whom he visited and his work was successful in bringing to us a number of students. His expenses for twenty-five days were less than \$50. The results of his work will be shown not only during the coming school year, but also in succeeding years, because of the interest which he aroused in the minds of many parents who have children to educate. I believe that this kind of advertising is the best that we have yet undertaken, and I recommend that two or three instructors be sent on a similar mission as early as possible before the next school year.

I trust that the next school year may find it possible for us to issue a regular publication for the purpose of calling attention more closely to the work of the school. The postage upon our annual circular is a large item. By issuing a regular publication quarterly, we would be

enabled to secure a much reduced rate of postage, which would largely offset the increased cost of printing. Three of these bulletins would probably not be more than eight pages in size and would contain reports of our work, such as any experimental work that is being conducted and items of general interest. The fourth number would be our regular catalog.

THE SCHOOL LIFE.

The dormitory has proven itself a very popular feature of the school life. It is still reserved for the male students only and accommodates twenty, in addition to three members of the faculty, the matron and three employés. The popularity of the dormitory is due to three reasons: (1) For students who are employed about the buildings and grounds and who find it necessary to live close to their work. (2) By parents who desire their sons to be under the immediate supervision of the faculty and separated from the city and its temptations. (3) For students who desire a home close to the school and for its more perfect school life. The dormitory provides accommodations for less than twenty per cent of the present student body. The remainder find homes in private families in the city. More than a sufficient number of families desire to take students than there are students to be accommodated. Therefore, as far as finding homes is concerned there is no difficulty. There is difficulty, however, in finding accommodations which are demanded by a growing constituency of the school. Along with applications for admission to the school come requests from parents to have their sons and daughters reside at the school. To fulfill this demand it will be necessary for the State to provide more dormitory accommodations. The school has proven its usefulness to young people and thus to the State, and I believe there is ample justification for the expenditure of the State's funds in this manner. The new dormitories should not be very large; that is, not accommodate more than forty or fifty students in each. It may be possible for them to be constructed more cheaply than the present dormitory, which represents an expenditure of \$750 for each person accommodated. Another possible means of supplying homes near the school would be for private parties to construct large houses near the school grounds and operate them under private management, but have the discipline under faculty supervision. This would afford faculty control of the students equally as well as in the present dormitory and relieve the institution of the business management. Private enterprise will find a safe investment in homes for students if the State should build more dormitories, for by the time dormitory accommodations for one hundred more students are secured the school will have an enrollment of three times that number.

The social life of this school has been most helpful and enjoyable. Frequent receptions are given to the students. At the opening of the year the old students always give a welcome reception to the new students. Whenever there are any visitors in town from the neighboring schools, either representatives of athletic teams or otherwise, a reception is usually given them. The receptions to the graduating class of 1906 by the lower classes were very happily conducted. All these receptions center at the school, and the free use of the assembly room and such adjoining rooms as are needed is accorded the students. Members of the faculty are always present.

A large number of students find it necessary to earn part or all of their living expenses. The school has been able to furnish employment to a number, with a remuneration ranging from \$5 to \$22.50 per month. Only two students are employed at the latter price, and these operate the power plant which furnishes heat and light to the main building and dormitory. All of the janitor work has been done by students, and other work offered is such as carrying the mail and doing errands, caring for the school horse, operating the pumping plant, etc. It is an encouraging sign that many of the students find homes in town, where they earn part or all of their board. The best homes have been opened for students in this way, and the service rendered has been uniformly satisfactory and therefore mutually helpful. At the present time there is a demand for more students than there are available for good service.

It is a custom in some institutions for the governing board to lease land to members of the faculty upon which to build residences. The residence remains the property of the instructor during his incumbency and at his retirement he may sell to another instructor or to the institution upon an appraised valuation. I believe it would greatly enhance the unity and completeness of the school life if a majority of the married members of the faculty could reside upon the grounds and feel that they were building a home near their chosen work. Under the present ruling of the Attorney-General the Board of Trustees has no right to issue a lease of land. I would recommend, therefore, that the next Legislature be petitioned to grant the Board of Trustees such power, and also power to lease private property if necessary for school uses.

STUDENT ACTIVITIES.

Debating began under very promising conditions and was inaugurated by two annual debates with the San Luis Obispo High School. The Alumni of that school offered a silver trophy cup as a prize to be contested for by the Polytechnic School and the High School, and to be won by the school winning at least two out of three successive debates. The Polytechnic won the first two debates, and thus the third was not held. There is at present some prospect for a debate with the

Santa Maria High School. A debating society has been formed as a part of the organized method to train for similar contests and for general efficiency in public speaking.

The year 1906 saw the beginning of a journal published by the student body. In November, 1905, an organization of the students was effected by which an editorial and managing staff for conducting the journal was chosen. Mr. LeRoy B. Smith was appointed to represent the faculty upon this staff. The first number appeared in January, 1906, and monthly thereafter until the close of the year. Nearly all of the matter was furnished by the students; a considerable number of illustrations were inserted, and altogether the publication is most creditable, and has been helpful as a medium of advertising the school.

The faculty has always taken an interest in athletics and endeavored to lead the students to a rational and safe exercise of any athletic ability. During the first year of the school tennis was the only game instituted. The second year the students organized a baseball team, purchased a set of suits and had a series of successful games. During the third year, which has just passed, a football team was organized, and during the first term suits were purchased and considerable practice was done, but no games were secured. In February, 1906, the San Luis Bay Athletic Association, consisting of the secondary schools of San Luis Obispo and northern Santa Barbara counties and the Cambria Grammar School, was organized. Upon the basis of this association several contests in baseball, basketball, and tennis were participated in, and in the track meeting at Santa Maria the Polytechnic team took second place. Thus far there have been no serious injuries to any of the participants and it is hoped by the faculty that all of the athletic contests may be so conducted as in no way to bring injury to the person of those participating.

I am more and more convinced of the need of regular and systematic physical training by our students. A small percentage at best take part in the training for the various contests and in the contests themselves. Although we have a considerable amount of manual labor in the curriculum, still it does not meet the needs for physical development which are apparent in many boys and girls. I believe it is our duty to look as carefully for the health and physical development of the students as for their intellectual development. To this end I hope the time will not be far distant when a regular physical instructor may be employed, whose duty shall be to see that every student takes some regular exercise and that of which the individual stands most in need. This instructor should be one who looks first of all at the proper development of the individual, and secondly at the training of the boy or girl for some particular contest. It may be that the work of such an

instructor would necessitate a gymnasium more or less thoroughly equipped, and so such a building should be one to be counted on in the near future.

The laws and customs of our State do not permit regular religious instruction in State schools. To supply the need of such instruction and to develop proper leadership in religious work and life, practically all institutions of higher learning have established the Christian Association. The Christian Association is in all respects non-sectarian. It has two branches, one for young men and one for young women. The Polytechnic has reached the stage when there are a sufficient number of students to attempt the organization of a Christian Association, and I trust that every possible incentive and encouragement may be given to the establishment and conduct of one.

FINANCIAL NEEDS.

To continue our present rate of growth and to provide for demands that are already made upon us, the coming Legislature should make appropriations for the following objects:

More good farming land and irrigation system.	
Dormitories for 100 students.....	\$50,000 00
Shops and equipment	25,000 00
Completion of barn and equipment	15,000 00
Four cottages for employés	10,000 00
Creamery and equipment	12,000 00
Poultry houses	4,000 00
Swine, feed, store and judging house.....	4,000 00
Tool and work house for gardener and classes in gardening.....	2,000 00
Shed for students' horses.....	1,000 00
Repainting and tinting present buildings.....	4,000 00
Total	\$127,000 00

In reply to a request from the State Controller, the Director has forwarded an estimate of the amounts needed for maintaining the school during the fifty-ninth and sixtieth fiscal years, beginning July 1, 1907. These estimates are as follows:

For salaries of officers, teachers and employés.....	\$65,000 00
For support and maintenance, including purchase of stock and equipment for farm and laboratories.....	25,000 00
For care and improvement of grounds.....	6,000 00
For library	1,000 00
For expenses of Trustees.....	800 00
For printing and binding	1,200 00

In order that I may place before your Board a more definite idea of the actual school work, I have asked each instructor to outline the work of his or her classes. These reports, together with the instructors' recommendations and the report of the Librarian, are herewith appended.

Respectfully submitted.

LEROY ANDERSON, Director.

REPORTS OF INSTRUCTORS.

REPORT OF THE INSTRUCTOR IN DOMESTIC ART.

The following is a report of the Sewing Department for the biennial period ending June 30, 1906:

All first-year girls are assigned to work in the department for sixteen periods a week. The second-year girls spend time not otherwise employed in the sewing department.

The course of work consists of thorough drill in fine handwork. The student makes a set of small models, which are placed in a book, together with a written description of the work. After the handwork has been completed the use and care of a machine is taught. Patterns for undergarments are drafted, and the garments are cut and made. The use of a tailor system is taught and each student is required to draft patterns, cut, fit, and make a woolen dress skirt, fitted lining and shirt waist for herself.

In the third term several weeks are devoted to work in millinery. Students are taught to renovate old hats and materials, wire, braid, face and line hats, also to make and cover both wire and buckram frames.

It is not the purpose of the department to train professional dress-makers and milliners, but to give the training that will be useful to any woman no matter what her future may be. At the beginning of the biennial period the equipment in the department consisted of one sewing-machine. We now have five machines, seven large work tables, a cheval glass, dress forms, and sufficient funds to thoroughly equip the department in the new building.

Respectfully submitted.

HARRIET HOWELL.

REPORT OF THE INSTRUCTOR IN DOMESTIC SCIENCE.

I have the honor to submit the following report of the Domestic Science department of the California Polytechnic School:

Work was begun in this department, in temporary quarters, on September 15, 1905, with a class of thirteen young women. The equipment of the kitchen laboratory consists of a No. 8 Majestic range, six work tables, each containing two drawers, one dozen 24-inch stools, utensils for twelve students, and a case for storing these utensils.

Following the outline of the course of study the students take up cookery in the second year, after completing a course in chemistry. The work this year consisted of class and practical work. The class work consisted of lectures, reference reading, and a study of the Government bulletins bearing on the composition, production, manufacture, and preparation of food materials. In the kitchen laboratory the pupils prepared dishes covering a course in plain cookery. The four young women in the graduating class were given special work in cooking and serving, dietetics, and house construction. They prepared and served a meal to the students living in the dormitory.

The plan for the coming year when the department is housed in its new building is to continue the second-year work as it was given the past year. In the third year of the course the young women will study various methods of preserving fruits and vegetables, the making of pastry, cake, fancy desserts, etc. With this work they will study dietetics. They will learn to plan meals containing the required amount of nutrients at a minimum and also at a maximum cost. They will then purchase the materials for these meals, prepare, and serve them to invited guests in the dining-room of the Domestic Science building. Each girl will also be required to give a representative lesson, with the remainder of the class as spectators and critics.

The third-year students will also study house construction and home sanitation, laundering and home nursing.

It has been the hope in planning this course of study that the girl completing it will be able to make a happier, more healthful and more beautiful home than she otherwise would have done.

Respectfully submitted.

MAY SECREST.

REPORT OF THE INSTRUCTOR IN AGRICULTURE AND CHEMISTRY.

During the past two years my department has given instruction in agriculture, chemistry, animal physiology, and diseases of animals. I have also had charge of the instruction in poultry husbandry.

During the fall term I met first-year students in agriculture and domestic science for consideration of elementary topics in chemistry as preparation for work of the two following terms. This course consisted of daily lectures, demonstrations, and recitations. In the winter and spring terms I met first-year students in agriculture three times a week in elementary agriculture. In connection with this course an afternoon each week was devoted to laboratory work. This time was spent in the study of soils and fertilizers. Two periods a week were given to discussion of topics relating to the poultry industry. At these periods topics were assigned as laboratory work.

Some of the problems investigated in this connection and that yielded interesting and valuable data were the following: Relative value of wheat and barley as food for laying hens; Close confinement versus free range in relation to egg production; Amount of fertilizing material produced annually by hens; Study of incubators and incubator methods of brooding and feeding young chicks, etc.

Second-year students in Agriculture and Domestic Science received instruction in chemistry throughout the year, consisting of lectures and demonstrations four times a week, supplemented by two afternoons per week in the laboratory.

I have given instruction to third-year students in Agriculture in agricultural chemistry, animal physiology, and diseases of domestic animals.

Needs of the department are more storeroom for chemicals and apparatus, and in the poultry department more ample quarters for breeding and laying stock, an incubator house, and quarters for the attendant.

Respectfully submitted.

S. S. TWOMBLY.

REPORT OF THE INSTRUCTOR IN PLANT INDUSTRY AND IRRIGATION.

BOTANY.

The object of the botany course is to give the first-year students in Agriculture a general survey of the plant kingdom and also a thorough knowledge of those plants which have horticultural and economic value; the botany of the farm, the garden, the orchard and the forest. This subject includes a study of the use of fruits and seeds to the plant and the method of seed distribution. Weeds, their control and eradication, are considered. The plant life is traced from the awakening of the seed to maturity, noting the functions of root, stem and leaf. The winter term, when the plants are dormant, is given to bacteria,—their province in the plant world and their importance on the farm and in the home. Field excursions are made from time to time to see the plants under natural conditions. The principles of forestry, economic value, planting, and care and diseases of forest trees are treated in this course.

GARDENING.

All entering students of Agriculture take the course in gardening. The purpose is to raise vegetables for the table the year round. Each student has a plot on which is grown radishes, carrots, onions, beets, lettuce, salsify, celery, and many other vegetables. The more difficult plants are grown on community plats. One afternoon of a week is given to this subject.

PROPAGATION.

During the past year the propagation practice has been out of doors and in hot beds and cold frames. Carnations, roses, and chrysanthemums were grown. In the future the greenhouse will be used. Here the various operations of propagation will be shown, seed testing for purity and viability, germination, the growth, habits, and identification of seedlings, propagation from leaf, stem, and bud, hard and soft wood cuttage, and the creation of new plants. The construction and management of a greenhouse is a part of the course.

HORTICULTURE.

The principles of propagation and handling of fruits under the various conditions of California soil and climate are studied in the second year of the agricultural course. Two morning periods are given to classroom exercises and one afternoon is spent in field and nursery practice. Here the student is taught to prune, bud, graft and spray. The school owns a small orchard. It is proposed to plant a variety orchard for demonstration purposes. In the nursery trees are being grown which will serve to plant the orchard.

SURVEYING AND MAPPING.

In surveying and mapping the object sought is to give Agriculture and Mechanics students training in the use of compass, level and transit, to so fit them that they will be prepared to lay out foundations, roads and property lines, and land for irrigation. The mapping course familiarizes the students with the symbols used on maps. The contour and topographic surveys made in the field are committed to paper in the mapping room. Surveys are made of the school grounds, new roads and lines are run, and the heights of surrounding mountains and hills are measured.

IRRIGATION.

In the senior year the students of both courses take up irrigation, where they learn to measure water in pipes and in open channels, to construct canals, ditches and small reservoirs, and to prepare land for irrigation. The various methods of irrigation—furrow, basin, and contour—are studied and compared as to their adaptation and application. Attention is given to the possible injurious effect of irrigation by the formation of irrigation hardpan, the water-logging of the soil, or the "rise of alkali." A brief study is made of the irrigation laws of this and other Western states. The school water system is used to illustrate pumping for domestic supply and for irrigation.

Respectfully submitted.

J. E. ROADHOUSE.

REPORT OF THE INSTRUCTOR IN ENGLISH AND HISTORY.

The enrollment in the Department of English and History for the school year 1905-6 was as follows:

English, first year.....	49
English, second year.....	22
History	10
Total enrollment	81

Five periods a week throughout the year are assigned for each subject, individual conferences with English students being held as special needs have demanded. English and history being required work for all students in regular standing, between eighty and eighty-five per cent of the total enrollment in the institution will each year be found in these classes.

The amount of time devoted to English, two years, is but one half that allotted to the same subject in the usual high school course. The essentials of a practical course are, therefore, kept uppermost in mind. Oral composition—story-telling, description, and debate—has had a prominent place along with written composition. The fundamental aims of the instruction in English are:

1st. To enable the student to speak and write with clearness and directness;

2d. To acquaint him at first hand with some of the best books of English and American authors;

3d. To build up a correct and increasing vocabulary;

4th. To teach the use of a library.

Books for reading and study are chosen from the list required for college entrance, and include simple narrative poetry, Irving's Sketch-Book, The Alhambra, Ivanhoe, Classic Myths, etc., for first-year students; the Merchant of Venice or Julius Cæsar, Silas Marner, Sir Roger de Coverley, and others for second-year students.

Third-year "history" is American history only. Civil government and the simple elements of political economy are included in the year's work. The instruction in American history aims to show how the present grew out of the past, attempting to give the student a basis on which he may do further intelligent reading and study of the subject. The study of industrial development holds an important place with political development. The instruction in civil government covers the organization of the Federal Government with special attention to California state and local governments.

The closing five weeks of the last school year were given to the simple elements of economics. The meaning of the terms wealth, capital, value, wages, etc., was discussed. The functions of money and credit were studied, also the significance of the terms free trade, protec-

tion, etc., the aim being to bring out the meaning and significance of some of the more common features of national housekeeping.

The proposed extension of our Polytechnic courses from three to four years is heartily indorsed by this department. In addition to greater thoroughness in all of the technical departments, the change will allow a full year for the study of American government and economics, two of the most essential branches of knowledge in the development of intelligent American citizenship.

Respectfully submitted.

LEROY B. SMITH.

REPORT OF THE INSTRUCTOR IN PHYSICS AND ELECTRICITY.

The work in physics in many ways is like the ordinary high school course. Special stress is laid on the principles of mechanics, heat, and electricity. A large number of laboratory experiments are required, which bring out the practical features of the work. We find it advantageous to take up the study of physics earlier than is done in high school courses, as the work in mechanics and electricity is needed as preparation for the courses in engines, boilers, and electrical machinery that are taken up in the second and third years. This work treats of the construction and operation of machinery.

The electrical work is laid out with a view to fitting our men for operating all the common types of electrical apparatus.

Our electrical laboratory equipment includes the more important types of apparatus. The students study the construction of machines and operate and test them. As the special features of a certain type of machine are brought out in the text-book, the laboratory work is planned to illustrate the same points. Throughout this course the aim has been to make a thorough study of only such things as are of the most practical nature.

The work in this department is very much handicapped by having no machine shops, and it will be impossible to do the work justice until they are provided. In the meantime we plan to give the strongest work possible in the theory and operation of the ordinary types of machinery, so that a man finishing this course will be competent to operate any mill, shop, or electric plant.

The students have shown a gratifying interest and industry in these subjects during the past year, and their work in all respects has been excellent. Many of them have expressed a desire to go farther along these lines than we can take them in three years with our present limited equipment. A four-year course with moderate additional equipment would enable us to turn out a strong class of men from our Mechanics course.

Respectfully submitted.

H. B. WATERS.

REPORT OF THE INSTRUCTOR IN DRAWING, FORGING, AND SLOYD.**FREEHAND DRAWING.**

Work involving the principles of perspective, with proportionate lines, angles, etc., and relative value of light and shade, has been attempted. Sketching has been entirely from still life, from actual objects and groups of objects placed in suitable position before the individual student. Proportionate accuracy and neatness have been insisted upon. In the matter of shading, the student has been required to do just enough to make the parts of his object, or group, stand out clearly and form a picture as near like the original as possible with light coming from either the left or the right side. A very little original work has been done.

Recommendation: An increased equipment in the line of group studies, models, casts, and several good art magazines would greatly facilitate improvement in the work of this department.

MECHANICAL DRAWING.

For first-year Mechanics students the work has involved care and correct use of instruments, lettering, line work, geometrical drawing, projections, and development of surfaces. Emphasis has been placed upon neatness, uniformity, and accuracy.

SLOYD.

No work has been given in sloyd during the past year, excepting a very small amount of cardboard work. During 1904-5 a class of freshmen girls did very creditable work in wood sloyd.

FORGING.

The work attempted has been for the most part exercises involving principles of heating, hammering, sledging, curring, welding, swagging, fullering, sharpening and hardening picks, drills, etc.; grinding, drilling, riveting, and many other processes of use in ordinary shop practice. Considerable outside work has been done for the farm and for the several branches of the mechanical department, among the most recent jobs being the iron work for a large hay rack constructed by Agriculture students in the carpenter shop; also an apparatus for gauging the outflow from the septic tank at the dairy barn for irrigating purposes.

Recommendation: That the shop be enlarged as soon as possible, to accommodate more students to a class. Eight forges are not enough, even when two work at the same forge, considering the fact that our ranks are increasing each year in numbers. A student can do more and better work if he can have his own individual forge to work at and care for.

Respectfully submitted.

OSCAR LESLIE HEALD.

REPORT OF THE INSTRUCTOR IN CARPENTRY.

The general lines of instruction as given in the carpenter shop have been toward the construction of buildings and their interior fittings. The preparatory work consists of thirty-one exercises, ranging from the shaping of a rectangular block to the construction of an ornamental newel post. The models, as well as all other work done in the shop, are made from scale drawings which have been designed with two objects in view: first, to teach the proper use and care of tools; and, second, to give the methods of construction of the various joints as met with in practice. The preparatory work includes a course of lectures on the steel square and its practical application to roof framing; in conjunction with these lectures each student is required to frame and brace a hipped roof of such dimensions as to require a practical knowledge of the square. All students registering in the Mechanics and Agriculture courses are required to take a certain amount of wood work; the Mechanics students devote twelve hours per week, out of a possible forty, for the first year and four hours per week for the second year; the Agriculture students have eight hours per week for one school year. The preparatory exercises for the two courses are practically the same and cover the first twelve weeks of instruction; at the completion of the exercises the student is given practical work along the lines that best suit his course. The Agriculture students have constructed a greater part of the poultry plant equipment, including trap nests, brooders, and portable poultry houses. A 40 by 80 foot dairy barn was framed and erected by student labor during the last school year, together with a certain amount of the joinery for the smaller buildings.

A greater part of the school cabinet has been constructed by Mechanics students; a portion of the equipment for the Domestic Science building is now being constructed by first- and second-year students.

On account of an increase in attendance and a call for instruction along more advanced lines, a combination circular saw and four additional sets of tools are now being added to the equipment. In order to successfully pursue the lines of instruction that are being followed it is necessary that several machines be installed; a planer, a buzz-planer, band saw, and lathe would greatly facilitate the work and make it possible to undertake and complete in a reasonable time a large part of the school's work that is now being done by contract. The handling of this work by the school would raise the standard of instruction and make it possible to erect the smaller buildings more cheaply and fit them with a better class of joinery.

Respectfully submitted.

E. W. YOUNT.

REPORT OF THE INSTRUCTOR IN ANIMAL AND DAIRY HUSBANDRY.

The Department of Animal Husbandry stands for those lines of work which pertain to the judging, selecting, breeding, feeding, care and development of the various breeds and classes of live stock, and it is the aim to make equipment for instruction along these lines as complete as possible.

A good library of this nature is being selected, including the herd books of the various breeds of live stock. Already the herd books of all the standard breeds of both beef and dairy cattle have been collected, and those of other classes of animals are to be added in the near future.

The live stock on the farm is being improved and added to constantly. The herd of cattle now numbers twenty, and contains good representatives of the Ayrshire, Shorthorn, and Jersey breeds. Good Percheron horses and Poland-China and Berkshire swine are also maintained on the farm. It is the desire to purchase more good stock this year.

Instruction in judging is given two afternoons per week throughout the second year. Both market and breed types of all the classes of farm animals are studied, and market classification and requirements considered. When possible, outside material is also procured. The horsemen of San Luis Obispo have been very kind to us in this regard.

The students are kept interested in practical work at the barns. Careful records are kept of the performance of animals in the herd, and occasionally tests are instituted. During the past year one of the cows in the herd made the excellent record of 14.99 lbs.—the equivalent of 17.5 lbs. butter—in seven days. Experiments are to be inaugurated the coming year, to be conducted by students, to determine the comparative values of different feeds for milk production and the comparative efficiency of different breeds of cattle and different animals in the same breed.

The most urgent need of the department is more buildings. The present dairy barn was designed to be the wing of a larger structure, and the larger building is now needed in order that we may have a horse barn, and a place where the work in Animal Husbandry can be carried on in coöperation with the work in general agriculture. A building is also needed as a storehouse for grain and to be used as headquarters for the swine-breeding establishment.

In the line of equipment a great many things are needed. It is the hope to put in all the apparatus, such as stock scales, machinery, etc., necessary for experimenting and to do everything possible to keep the students interested in their work and show them results.

DAIRY HUSBANDRY.

The dairy department, in addition to the equipment mentioned in connection with Animal Husbandry, has a creamery in the basement of the Administration building, which is equipped with modern apparatus for milk testing and butter and cheese making. The creamery is 20 by 45 feet, besides a small storeroom and cheese-curing room. It contains a 24-bottle Babcock steam turbine testing machine and all glassware necessary for milk testing, two up-to-date cream separators (a De Laval of 1,200 pounds per hour capacity and a Sharples tubular machine of 900 pounds capacity), a 50-gallon milk vat, cream ripener, Disbrow combined churn and butter-worker, butter mold, ice chest, etc. Apparatus for the manufacture of cheddar cheese has recently been added. Power is supplied by a small electric motor run by a storage battery. Steam is piped from the power house.

The students in dairying study the secretion and composition of milk, separation of cream, the Babcock test for the determination of fat, preparation of starters, cream ripening, and churning and finishing of butter. Practical work in testing milk and in butter and cheese making accompanies this study.

The milk from our own dairy is used for these purposes, and the past season milk and cream were purchased from a neighboring dairyman and the products marketed at the dormitory and in town.

This department needs a building especially designed as a creamery. The present arrangement with the creamery in the basement of the main building is decidedly undesirable for all concerned. A creamery is needed containing a room fitted up for the handling of market milk, testing room, rooms for butter and cheese making, and with an independent heat and power system.

Respectfully submitted.

C. W. RUBEL.

REPORT OF THE INSTRUCTOR IN BOOKKEEPING.

The object of the bookkeeping course is to give the student a general knowledge of accounts and the use and value of commercial papers in order that he may understand the methods of the business world, whether of the shop, the farm, or the home. The budget system is used and the student moves in a little business world of his own while doing this work. The course as given requires four periods per week for one year.

During the year 1905-6 bookkeeping was included in the regular work of the first-year mechanical course, the second-year mechanical and agricultural courses, and the second-year domestic science course. The use of the journal, ledger, cash book, and check book, how to write and issue business papers—in general, all of the principles involved in commercial pursuits were given.

It has been found that our second-year students are better prepared to carry this subject, and it is recommended that it be given a place in the regular work of all second-year students. It is also deemed advisable that six periods per week be devoted to this subject, in order that more supplementary work may be given to strengthen the work given in the budget.

Respectfully submitted.

NAOMI M. LAKE.

REPORT OF THE LIBRARIAN.

The library contains 763 volumes, classified as follows:

Agriculture	27
Animal Husbandry	216
Including 15 vols. American Aberdeen-Angus, 15 vols. Ayrshire, 14 vols. American Galloway, 16 vols. Guernsey, 60 vols. American Jersey, 28 vols. American Hereford, and 24 vols. American Short-horn herd books.	
Bacteriology	13
Chemistry	45
Domestic Art and Science	26
Engineering	10
English	88
Entomology	4
History and Civics	39
Mathematics	9
Mechanics	43
Physics and Electricity	30
Physical Science	13
Plant Industry	70
Poultry Culture	13
Reference, general	41
Miscellaneous	8
Magazines, bound	27
Department of Agriculture	43
Total number to June 30, 1906	763

Fourteen weekly, 10 monthly, and one semi-monthly magazines are being received regularly.

U. S. Department of Agriculture bulletins and reports and Experiment Station bulletins and reports are being received.

Respectfully submitted.

NAOMI M. LAKE.

REPORT OF SECRETARY OF THE BOARD OF TRUSTEES.

To the Board of Trustees:

The Secretary of your Board has the honor to present the following report, covering the period from July 1, 1904, to June 30, 1906:

BOARD OF TRUSTEES.

EX OFFICIO.

HIS EXCELLENCY, GEORGE C. PARDEE	Sacramento
Governor of California.	
HON. THOMAS J. KIRK	Sacramento
Superintendent of Public Instruction.	

APPOINTED TRUSTEES.

HON. WARREN M. JOHN	San Luis Obispo
Term expires 1908.	
F. A. HIHN, Esq.	Santa Cruz
Term expires 1909.	
PROF. E. J. WICKSON, A.M.	Berkeley
Term expires 1910.	
R. M. SHACKELFORD, Esq.	Paso Robles
Term expires 1907.	
GEORGE S. EDWARDS, A.B.	Santa Barbara
Term expires 1907.	

OFFICERS OF THE BOARD OF TRUSTEES.

R. M. SHACKELFORD	President
WARREN M. JOHN	Vice-President
LEROY ANDERSON	Secretary
COMMERCIAL BANK OF SAN LUIS OBISPO	Treasurer

STANDING COMMITTEES OF THE BOARD OF TRUSTEES.

Trustees SHACKELFORD, JOHN, EDWARDS	Finance
Trustees JOHN, HIHN, EDWARDS	Site

Vacancies in the Board were filled, as follows:

F. A. Hihn, term expired January, 1905, and reappointed by Governor Pardee for a term of four years;

Professor E. J. Wickson, term expired January, 1906, and reappointed for a term of four years;

Hon. S. C. Smith resigned July, 1905. George S. Edwards appointed 1905; vice Hon. S. C. Smith, resigned.

FACULTY.

The following instructors have been appointed:

1904—July 9—Miss Harriet Howell, Instructor in Domestic Art, from September 1, 1904, to June 30, 1905.

Nov. 18—H. Floyd Tout, Student Assistant in Arithmetic, from November 1, 1904, to June 30, 1905.

1905—April 29—The following reappointments were made, beginning July 1, 1905:

Sydney S. Twombly, Instructor in Agriculture and Chemistry.

Oscar Leslie Heald, Instructor in Drawing, Sloyd, and Forging.

Harriet Howell, Instructor in Domestic Art.

Edwin Walter Yount, Instructor in Carpentry and Architectural Drawing.

James Edwyn Roadhouse, Instructor in Plant Industry and Irrigation.

Naomi M. Lake, Clerk and Librarian.

New appointments were made on the same date for the ensuing year:

May Secrest, Instructor in Domestic Science and Matron of Dormitory.

LeRoy Burns Smith, Instructor in History, English, and Economics.

Herman Bierce Waters, Instructor in Physics and Electricity.

On the same date Jeanne Tout was appointed Assistant in English for two months, beginning April 15, 1905.

1906—Feb. 3—Chester Wirt Rubel was appointed Instructor in Animal and Dairy Industry, from December 1, 1905, to June 30, 1906.

May 21—The following reappointments were made, beginning July 1, 1906, to June 30, 1907:

Sydney S. Twombly, Instructor in Agriculture and Chemistry.

LeRoy Burns Smith, Instructor in English, History, and Economics.

Herman Bierce Waters, Instructor in Physics and Electricity.

Edwin Walter Yount, Instructor in Carpentry and Architectural Drawing.

Harriet Howell, Instructor in Domestic Art.

May Secrest, Instructor in Domestic Science.

Chester Wirt Rubel, Instructor in Animal and Dairy Husbandry.

James Edwyn Roadhouse, Instructor in Plant Industry and Irrigation.

Naomi M. Lake, Clerk and Librarian.

The following new appointments were made on the same date:

William Ferdinand Ewing, Instructor in Mathematics, from September 1, 1906, to June 3, 1907.

Leo Earl Pearson, Instructor in Forging, Sloyd, and Freehand Drawing, from July 1, 1906, to June 30, 1907.

Helena A. Smith, Manager of Dormitory, from July 1, 1906, to June 30, 1907.

RESIGNATIONS.

Oscar Leslie Heald, as Instructor in Forging, Sloyd, and Freehand Drawing, to take effect July 1, 1906. [Accepted May 21, 1906.]

CONSTRUCTION OF BUILDINGS.

Forge Shop.—The lumber was purchased by the school, and the major portion of the framing done by students in carpentry. Contracts were awarded for carpenter work erection to Stevens & Maino; painting to F. Tercis & Son, and plumbing to E. M. Payne, upon the report of the Committee on Site on its action on the following bids:

Carpenter Work:

Stevens & Maino.....	\$233 00
R. S. Aston.....	238 00

Painting:

E. N. Williams.....	\$133 00
F. Tercis & Son.....	112 00

Plumbing:

Vetterline & Butcher	\$235 00
E. M. Payne	184 50

[Concurred in July 9, 1904.]

Dairy Barn.—The lumber for the dairy barn was purchased by the school, and the major portion of its erection done by students in carpentry. Contracts were awarded by the Committee on Site, as reported to the Board on April 29, 1905, to the Salinas Valley Lumber Company for mill work; F. C. Mitchell for concrete and mason work; E. M. Payne for plumbing; and E. N. Williams for painting, upon the following bids:

Mill Work:

Salinas Valley Lumber Company	\$181 70
H. H. Waite	190 43

Mason Work:

F. C. Mitchell	\$525 00
San Luis Contracting Company	752 80

Plumbing:

E. M. Payne	\$311 00
Vetterline & Butcher	340 00

Painting:

E. N. Williams	\$191 90
F. Tercis & Son	225 00

[Concurred in April 29, 1905.]

Silo.—The contract for excavation and concrete foundation for the silo was awarded to the San Luis Contracting Company, on the following bids, as reported by the Committee on Site:

San Luis Contracting Company	\$139 00
F. C. Mitchell	150 00

[Concurred in April 29, 1905.]

Carpenter Shop.—Bids for the construction of the carpenter shop were opened April 29, 1905, and found as follows:

Mason Work:

San Luis Contracting Company	\$135 00
F. C. Mitchell	230 00

Carpenter and Iron Work:

J. Maino & Son	\$2,200 00
John Darling	2,372 00

Plumbing and Tinning:

Vetterline & Butcher	\$393 50
E. M. Payne	450 00

Painting:

F. Tercis & Son	\$234 00
J. P. Lynch	238 00
E. N. Williams	296 60

Upon motion of Trustee Wickson, the contract for mason work was awarded to the San Luis Contracting Company for \$135; for carpenter

and iron work to J. Maino & Son, for \$2,200; for plumbing and tinning to Vetterline & Butcher, for \$393.50; for painting to F. Tercis & Son, for \$234.

Power House.—The Committee on Site reported having awarded contracts for the construction of the power house to J. Maino for carpenter work; to E. M. Payne for plumbing, and J. P. Lynch for painting, upon the basis of bids presented as follows:

Carpenter Work:

J. Maino	\$893 00
R. S. Aston	No bid
John Darling	No bid

Plumbing:

E. M. Payne	\$230 00
Vetterline & Butcher	240 00

Painting:

J. P. Lynch	\$100 00
E. N. Williams	125 45
F. Tercis & Son	118 00

[Concurred in September 25, 1905.]

Domestic Science Building.—Bids for the construction of the Domestic Science building were received and opened at a special meeting held February 3, 1906, and found as follows:

Mason Work:

San Luis Contracting Co.	\$4,597 58
Jos. Maino, San Luis Obispo	5,000 00
Wilbur E. Greene, Pacific Grove	3,627 00
Chas. M. Kuck, San Luis Obispo	3,315 16
F. C. Mitchell, San Luis Obispo	4,800 00
O. M. Magneson, Oakland	5,275 00

Carpenter and Iron Work:

Wilbur E. Greene, Pacific Grove	\$14,827 00
Jos. Maino, San Luis Obispo	18,340 00
Chas. M. Kuck, San Luis Obispo	14,665 00
O. M. Magneson, Oakland	21,450 00

Plumbing:

E. M. Payne, San Luis Obispo	\$1,900 00
Chas. M. Kuck, San Luis Obispo	2,090 00
Vetterline & Butcher, San Luis Obispo	1,616 00
O. M. Magneson, Oakland	3,050 00

Tinning and Roofing:

Panzer Hamilton Co., Los Angeles	\$1,875 00
E. M. Payne, San Luis Obispo	1,700 00
Chas. M. Kuck, San Luis Obispo	1,775 00
Vetterline & Butcher, San Luis Obispo	2,075 00
O. M. Magneson, Oakland	2,985 00

Painting:

Wilbur F. Greene, Pacific Grove	\$1,725 00
Extra oiling floor, \$185.00	
O. M. Magneson, Oakland	1,885 00
Chas. M. Kuck, San Luis Obispo	2,242 50
Extra oiling floor, \$315.00	
E. N. Williams, San Luis Obispo	1,313 90

Heating and Ventilating:

O. M. Magneson, Oakland—Fan system.	\$2,640 00
Direct steam.....	3,150 00
E. D. Hough, Los Angeles—Fan system.....	2,190 00
Direct steam.....	1,350 00
Machinery and Electrical Co., Los Angeles—Fan system.....	1,590 00

Contracts were awarded to the lowest bidder in each case, viz:

Mason work: Chas. M. Kuck, \$3,315.16.

Carpenter and iron work: Chas. M. Kuck, \$14,665.

Plumbing: Vetterline & Butcher, \$1,616.

Tinning and roofing: E. M. Payne, \$1,700.

Painting: E. N. Williams, \$1,313.90.

Heating and ventilating (fan system): Machinery and Electrical Co., \$1,590.

FINANCIAL STATEMENT.

FOR YEAR ENDING JUNE 30, 1905.

Salaries.

Appropriation for year	\$12,250 00	
Balance July 1, 1904	4,214 00	
		\$16,464 00
Leroy Anderson, Director	\$2,400 00	
S. S. Twombly, Instructor in Agriculture, Chemistry and Veterinary Science	1,800 00	
O. L. Heald, Instructor in Drawing, Forging and Sloyd	1,200 00	
E. W. Yount, Instructor in Drawing and Carpentry	1,020 00	
Harriet Howell, Instructor in Sewing and Matron of Dormitory ..	1,000 00	
J. E. Roadhouse, Instructor in Academic Subjects, Plant Industry and Irrigation	1,000 00	
Naomi M. Lake, Clerk and Librarian	900 00	
S. C. Griffith, Foreman of Farm	720 00	
Gwendolyn Stewart, Matron of Dormitory (1 mo.)	75 00	
Thos. Manton, Gardener (4 mo. 9 days)	218 00	
Dairyman	497 00	
Teamster	609 00	
Janitor Services (students)	637 00	
Assistants (students)	94 00	
I. P. Roberts, Special Lecturer	150 00	
Ernest Braunton, Landscape Gardener	100 00	
Power House Engineers	347 00	
		12,767 00
Balance June 30, 1905		\$3,697 00

Support.

Appropriation	\$2,950 00	
Balance July 1, 1904	246 10	
		\$3,196 10
Advertising	\$26 70	
Agriculture	75	
Animal Industry	68 05	
Botany	196 59	
Carpenter Shop	57 89	
Chemistry	303 36	
Dairy	313 15	
Driving horse, shoeing, etc.	31 30	
Domestic Art	209 37	
Drawing	33 60	
Entertainments	12 85	
Farm	135 40	
Grounds	102 34	
Heat and light	252 00	
Forge shop	61 46	
Office (postage, supplies, etc.) ..	233 07	
Poultry	162 10	
Power house	107 87	
School, general	465 50	
Repairs	12 80	
Surveying	320 17	
Traveling expenses of Director ..	26 85	
Water pumping	62 93	
		3,196 10

Grounds.

Appropriation		\$1,000 00
General, labor, supplies, etc.	\$51 24	
Equipment	18 86	
Road building	596 69	
Water pumping, plant and piping	332 67	
		999 46
Balance June 30, 1905		\$0 54

Library.

Appropriation	\$350 00	
Balance July 1, 1904	137 76	
		\$487 76
Books	\$448 93	
Periodicals and magazines	32 00	
Freight and hauling	6 50	
		487 43
Balance July 30, 1905		\$0 33

Trustees' Expenses.

Appropriation	\$400 00	
Balance July 1, 1904	191 20	
		\$591 20
Expenses (traveling and hotel)	\$566 69	
Livery	24 50	
		591 19
Balance June 30, 1905		\$0 01

Printing.

Appropriation	\$250 00	
Less deficit July 1, 1904	32 25	
		\$217 75
Printing from July 1, 1904, to June 30, 1905		\$217 75

Barns, Shops and Outbuildings. (Special Appropriation, Act of 1903.)

Balance July 1, 1904		\$5,723 48
Dairy barn construction and equipment	\$1,875 84	
Botany equipment	29 21	
Chemical laboratory	11 15	
Dairy	19 17	
Farm buildings	62 80	
Forge shop construction	1,329 44	
Forge shop equipment	1,020 20	
Poultry houses	171 31	
Power house	186 90	
Silo	239 68	
Water (shed over pump)	55 29	
General	60 43	
		5,061 42
Balance June 30, 1905		\$662 06

Power House. (Special Appropriation, Act of 1903.)

Balance July 1, 1904		\$298 50
Steam pipe, extra	\$70 00	
Pump	60 00	
Repairing boiler, etc.	47 85	
		177 85
Balance June 30, 1905 (transferred to Building Fund)		\$120 65

CONTINGENT FUNDS.

Farm.

Balance July 1, 1904.....	\$51 82	
<i>Receipts</i> for year ending June 30, 1905—		
Sale of milk and butter.....	464 19	
Sale of vegetables and fruit.....	45 50	
Sale of hay.....	240 25	
Sale and service of stock.....	100 50	
Rent of horses and land.....	77 00	
		<u>\$979 26</u>
<i>Disbursements</i> —		
Service.....	\$366 89	
Supplies.....	538 36	
		<u>905 25</u>
Balance June 30, 1905.....		<u>\$74 01</u>

Dormitory.

Balance July 1, 1904.....	\$43 08	
<i>Receipts</i> for year ending June 30, 1905.....	3,423 57	
		<u>\$3,466 65</u>
<i>Disbursements</i> —		
Service.....	\$709 70	
Supplies.....	2,504 62	
		<u>3,214 32</u>
Balance June 30, 1905.....		<u>\$252 33</u>

Laboratory.

Balance July 1, 1904.....	\$159 07	
<i>Fees received</i> for year ending June 30, 1905.....	702 60	
		<u>\$861 67</u>
<i>Disbursements</i> for year ending June 30, 1905.....		<u>754 36</u>
Balance June 30, 1905.....		<u>\$107 31</u>

FINANCIAL STATEMENT.

FOR YEAR ENDING JUNE 30, 1906.

<i>Salaries.</i>		
Appropriation for year.....		\$29,500 00
Leroy Anderson, Director.....	\$2,400 00	
S. S. Twombly, Instructor in Agriculture, Chemistry and Veterinary Science.....	1,800 00	
J. E. Roadhouse, Instructor in Plant Industry and Irrigation...	1,450 00	
Harriet Howell, Instructor in Domestic Art.....	1,200 00	
O. L. Heald, Instructor in Drawing and Iron Work.....	1,200 00	
E. W. Yount, Instructor in Carpentry and Drawing.....	1,200 00	
May Secrest, Instructor in Domestic Science and Matron of Dor- mitory.....	1,200 00	
Leroy B. Smith, Instructor in English, History and Economics...	1,375 00	
H. B. Waters, Instructor in Physics and Electricity.....	1,500 00	
C. W. Rubel, Instructor in Animal Husbandry and Dairying (seven months).....	583 31	
Naomi M. Lake, Clerk and Librarian.....	900 00	
I. P. Roberts, Special Lecturer.....	150 00	
Edna Watson, Stenographer (five months).....	150 00	
Marion Jatta, Stenographer (five months).....	175 00	
S. C. Griffith, Foreman of Farm.....	765 00	
A. D. Sinclair, Gardener (five months).....	350 00	
Dairyman.....	684 00	
Teamsters and general labor.....	1,109 55	
Janitors (students).....	618 90	
Assistants (students).....	387 00	
Engineers, power house and pumping plant.....	515 00	
		19,712 76
Balance June 30, 1906.....		<u>\$787 24</u>

Support.

Appropriation for year		\$11,150 00
Agriculture and chemistry	\$16 50	
Animal husbandry	99 30	
Botany and horticulture	368 00	
Carpenter shop	127 00	
Chemistry	410 00	
Creamery	894 00	
Dairy contingent	86 00	
Domestic art	177 00	
Domestic science	340 30	
Drawing	89 00	
Electricity and physics maintenance	12 85	
English, history and economics	37 00	
Farm support	323 00	
Fencing and corrals	330 25	
Forge shop	53 00	
Fuel oil	300 00	
Irrigation and surveying	83 50	
Irrigation system	989 00	
Library furniture	46 00	
Office expenses	900 00	
Physical geography	12 00	
Physics equipment	864 00	
Labor and plantings on grounds	450 60	
Poultry fencing and contingent expenses	200 00	
Poultry stock	75 00	
Power house contingent	67 50	
Repairs and general contingent expenses	407 00	
School furniture	506 00	
Live stock	1,148 00	
Tools and machinery	773 00	
Water pumping	103 00	
		<u>10,287 80</u>
Balance June 30, 1906		<u>\$862 20</u>

Grounds.

Appropriation for year		\$2,500 00
Irrigation system	\$1,385 25	
General supplies	34 55	
Labor	209 56	
Plantings	14 59	
Road building	792 65	
Tools	22 76	
		<u>2,459 30</u>
Balance June 30, 1906		<u>\$40 70</u>

Library.

Appropriation		\$500 00
Books	\$419 75	
Periodicals and magazines	35 00	
Freight and express	25 30	
		<u>480 05</u>
Balance June 30, 1906		<u>\$19 95</u>

REPORT OF BOARD OF TRUSTEES OF THE

Trustees' Expenses.

Appropriation		\$400 00
Expenses (traveling and hotel)	\$186 85	
Livery	27 50	
		214 35
Balance June 30, 1906		<u>\$185 65</u>

Printing.

Appropriation		\$400 00
Printing July 1, 1905, to June 30, 1906		<u>400 00</u>

Improvements. (Special appropriation, Act of 1905.)

Appropriation		\$11,000 00
Bull and calf barn	\$460 86	
Carpenter shop construction	2,984 50	
Carpenter shop equipment	713 60	
Dairy barn furnishing	197 47	
Electrical equipment	1,260 94	
Forge shop equipment	85 09	
Poultry house construction	998 38	
Power house construction	1,300 00	
Pump house construction	200 00	
Swine houses	154 25	
Tool sheds construction	154 72	
Balance plumbing contract on dairy barn	175 52	
		8,685 33
Balance June 30, 1906		<u>\$2,314 67</u>

CONTINGENT FUNDS.

Farm.

Balance July 1, 1905	\$74 01	
Receipts for year ending June 30, 1906—		
Sale of milk and butter	90 26	
Sale of barley	72 85	
Rent of pasture	8 00	
Sale of swine	42 00	
Sale of hay	200 00	
		\$487 12
Disbursements—		
Service	\$207 31	
Supplies	347 94	
		555 25
Deficit June 30, 1906		<u>\$68 13</u>

Dormitory.

Balance July 1, 1905	\$252 33	
Receipts for year ending June 30, 1906	4,350 15	
		\$4,602 48
Disbursements—		
Supplies	\$3,458 92	
Service	939 40	
		4,398 32
Balance June 30, 1906		<u>\$204 16</u>

Laboratory.

Balance July 1, 1905	\$107 31	
<i>Fees</i> for year ending June 30, 1906	920 40	
		\$1,027 71
<i>Disbursements</i> for year ending June 30, 1906		862 58
Balance June 30, 1906		<u>\$165 13</u>

Dairy.

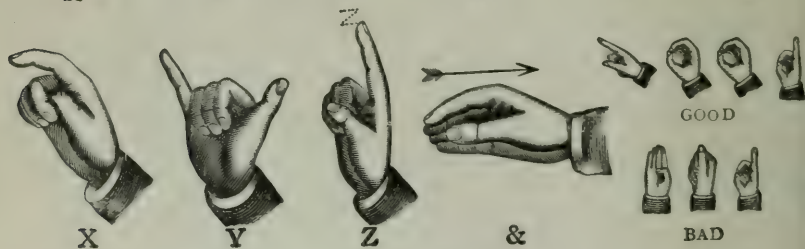
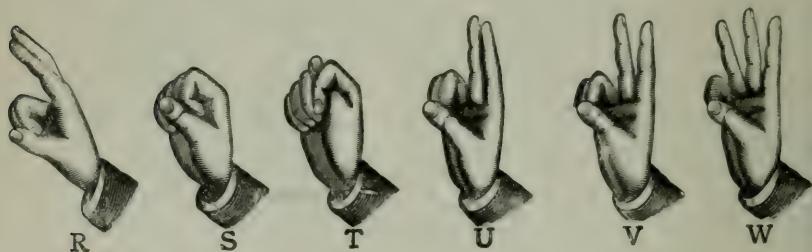
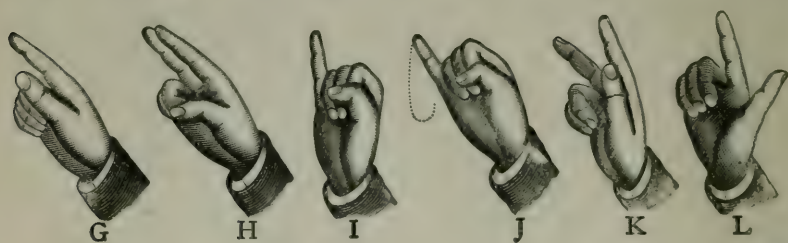
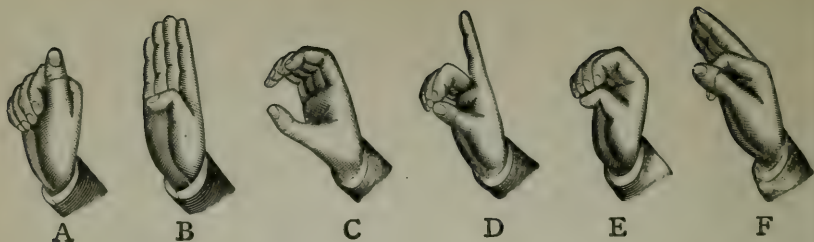
<i>Receipts</i> for year ending June 30, 1906	\$587 34	
<i>Disbursements</i> for year ending June 30, 1906	547 20	
Balance June 30, 1906		<u>\$40 14</u>

Poultry.

<i>Receipts</i> for year ending June 30, 1906	\$146 81	
<i>Disbursements</i> for year ending June 30, 1906	134 87	
Balance June 30, 1906		<u>\$11 94</u>

Power House.

<i>Receipts</i> for year ending June 30, 1906	\$6 50	
<i>Disbursements</i> for year ending June 30, 1906	4 85	
Balance June 30, 1906		<u>\$1 65</u>



TWENTY-SEVENTH REPORT

OF THE

BOARD OF DIRECTORS AND OFFICERS

OF THE

CALIFORNIA INSTITUTION FOR THE DEAF AND THE BLIND

FOR THE

TWENTY-FOUR MONTHS ENDING JUNE 30, 1906



SACRAMENTO:

W. W. SHANNON, : : : : SUPERINTENDENT STATE PRINTING.
1906.

BOARD OF DIRECTORS.

A. J. RALSTON, <i>President</i> ,	- - - - -	Berkeley.
J. W. RICHARDS, <i>Vice-President</i> ,	- - - - -	Berkeley.
WIGGINTON E. CREED,	- - - - -	Oakland.
FRANK M. WILSON,	- - - - -	Berkeley.
W. W. GARTHWAITE,	- - - - -	Oakland.

W. E. GRIFFITH,	- - - - -	<i>Treasurer, and Secretary of Board.</i>
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OFFICERS OF THE INSTITUTION.

PRINCIPAL:

WARRING WILKINSON, M.A., L.H.D.

PRINCIPAL'S ASSISTANT:

WILLIAM A. CALDWELL, M.A.

TEACHERS OF THE DEAF:

WILLIAM A. CALDWELL, M.A.,	FRANK O'DONNELL,
CHARLES S. PERRY, M.A.,	THEO. D'ESTRELLA,
THEODORE GRADY, B.L.,	HENRY FRANK,
MARY A. DUTCH,	LAURA NOURSE,
MARIE P. ORR,	ANITA GOMPERTZ,
JAMES W. HOWSON, M.A.	

TEACHERS OF ARTICULATION:

NATHAN F. WHIPPLE,	LIZZIE MOFFAT.
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TEACHERS OF THE BLIND:

CLARENCE W. PECK, B.L.,	FLORENCE E. MONTGOMERY, B.L.,
MARY W. EASTMAN,	ELMA GOIN.

TEACHERS OF MUSIC:

OTTO FLEISSNER,	BERTHA BUTLER.
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TEACHER OF PHYSICAL CULTURE:

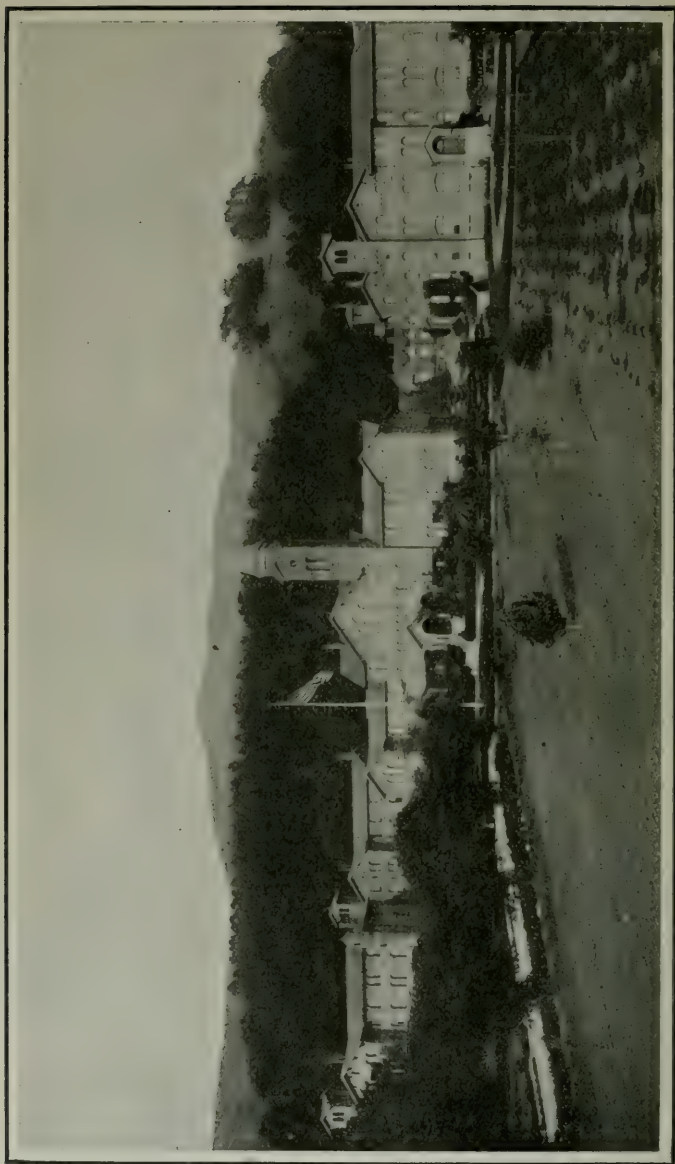
ETHEL A. COPLIN.

T. C. McCLEAVE, M.D.,	- - - - -	Physician.
FRANCIS R. MUSSER, M.D.,	- - - - -	Oculist and Aurist.
DOUGLAS KEITH,	- - - - -	Clerk.
MRS. ETTA BROWN,	- - - - -	Office Assistant.
GUSSIE MAST,	- - - - -	Typewriter.
HARLEY D. DRAKE,	- - - - -	Boys' Supervisor.
RAYMOND HENDERSON,	- - - - -	Assistant Supervisor.

MATRONS:

MARION G. BROWN,	ALICE MUNROE,
CAROLINE C. ALBERS,	SARAH A. KIRK,
HELEN M. CAMMET.	

J. C. JENSEN,	- - - - -	Foreman Carpenter Shop.
ALFRED P. McCARTHY,	- - - - -	Foreman Printing Office.
FRED. HANSEN,	- - - - -	Engineer.
JOHN TREVETHAN,	- - - - -	Electrical Engineer.



INSTITUTION FOR THE DEAF AND THE BLIND, BERKELEY, CALIFORNIA.

REPORT OF THE BOARD OF DIRECTORS.

To His Excellency, GEORGE C. PARDEE,
Governor of the State of California.

SIR: The Directors of the California Institution for the Deaf and the Blind herewith respectfully submit their report for the two years ending June 30, 1906, including the reports of the Principal and the Physician of the Institution, the Treasurer's statement, and the very full and dissected account of all expenditures during the period under review.

The attendance of pupils during the last two years has been the largest in the history of the Institution. The total number under instruction was 285, of whom 189 were deaf and 96 were blind, and 155 were boys and 130 were girls. The full tabulation of the movement of the pupils is contained in the report of the Principal. The present enrollment is 226.

Since the publication of the last report, the changes in the Board have been as follows: J. W. Richards has been appointed, vice John H. Grindley, term expired; Wigginton E. Creed, vice Frank W. Leavitt, term expired; Frank M. Wilson, vice John G. Mattos, Jr., resigned.

The Treasurer's statement herewith annexed gives the total receipts and disbursements for the fiscal period ending June 30, 1906. The receipts from the appropriation made by the last Legislature were \$132,160, and the aggregate of the receipted bills for disbursement now on file in the Controller's office equals the same amount.

The contingent fund, which contained on the 1st of April, 1906, \$6,653.06, was depleted on the 30th of June to \$3,846.99, and this sum, with its additions, has been practically exhausted at present date. The Principal's monthly report to the Board on the 31st of October showed a balance of only \$44.41 to its credit. This wiping out of the contingent fund is due to the repairs made necessary by the earthquake of April 18, 1906. The use of the fund for making good these repairs was approved by your Excellency and the State Board of Examiners, and the Directors of the Institution were thus relieved of the otherwise disagreeable duty of asking for an appropriation at the special session of the Legislature, called chiefly for the purpose of considering the needs of the various State institutions, some of which were very seriously shaken.

Concerning the damage done by the earthquake, and the cost of its repair, we respectfully refer you to the full report of the Principal. When one considers the large number and size of the buildings of the Institution for the Deaf and the Blind, and the price of labor and material, the Directors are satisfied that their action was prudent and economical.

The subject of the segregation of the blind from the deaf, discussed in the report of the Principal, the Directors would respectfully refer to the careful consideration of the Legislature about to convene. That such segregation must ultimately take place there is little doubt, but whether, in view of the great demand for appropriations likely to be asked for at the coming session, it may not be possible to defer such action a reasonable time, is a question for the Legislature to decide. The Directors, however, believe that it would be wise to take preliminary steps toward the proposed segregation, and in this connection it might be well to consider the suggestions of the Principal offered in the twenty-fifth report (1902) as to erecting buildings on the present grounds at Berkeley, and thus, while securing absolute separation, obtaining certain economies of administration and supplies well worth taking into account.

The Directors are pleased with the change of name of the Institution made by the last Legislature, and join the friends of the deaf and the blind in congratulation upon this long desired, but delayed, action.

The Directors approve of the estimates submitted by the Principal for the support of the Institution for the two years ending June 30, 1909, namely:

For Salaries and Wages	\$92,000 00
For Maintenance	43,000 00
Total	<u>\$135,000 00</u>

This is an increase of \$2,800 over the sum asked for two years ago, but the Directors believe that it is necessary, and therefore respectfully ask that this sum be incorporated in the General Appropriation Bill to be passed at the coming session of the Legislature.

The Directors desire to join the Principal in expressing appreciation of the faithful services rendered by the officers, teachers, and employes.

Commending the interests of this important Institution and its beneficent work to the generous consideration of your Excellency, of the Governor-elect, and of the Legislature about to convene, the Directors respectfully submit this report.

A. J. RALSTON,
President of the Board of Directors.

BERKELEY, November 7, 1906.

REPORT OF THE PRINCIPAL.

To the Board of Directors of the California Institution for the Deaf and the Blind.

GENTLEMEN: I have the honor herewith to submit my biennial report, giving in detail the history of the Institution for the Deaf and the Blind for the two years ending June 30, 1906; what the receipts and expenditures have been during the same period, together with estimates of appropriations required for the efficient conduct of the Institution for the two years ending June 30, 1909.

The movement of pupils for the period under review has been as follows:

On the rolls June 30, 1904:		
Deaf—Boys	77	
Girls	62	
	<hr/>	139
Blind—Boys	42	
Girls	30	
	<hr/>	72
Total, both classes		211
The admissions since same date have been:		
Deaf—Boys	26	
Girls	24	
	<hr/>	50
Blind—Boys	10	
Girls	14	
	<hr/>	24
Total admissions, both classes		74
Total under instruction		285
There have been graduated, discharged, and died during the same period:		
Deaf—Boys—Graduated and discharged	30	
Girls—Graduated and discharged, 19; died, 1	20	
	<hr/>	50
Blind—Boys—Graduated and discharged	16	
Girls—Graduated and discharged, 9; died, 1	10	
	<hr/>	26
Total deductions		76
On rolls June 30, 1906		209
Admitted since opening of school	26	
Discharged since opening of school	9	
	<hr/>	17
On rolls at date of report		226

HEALTH.

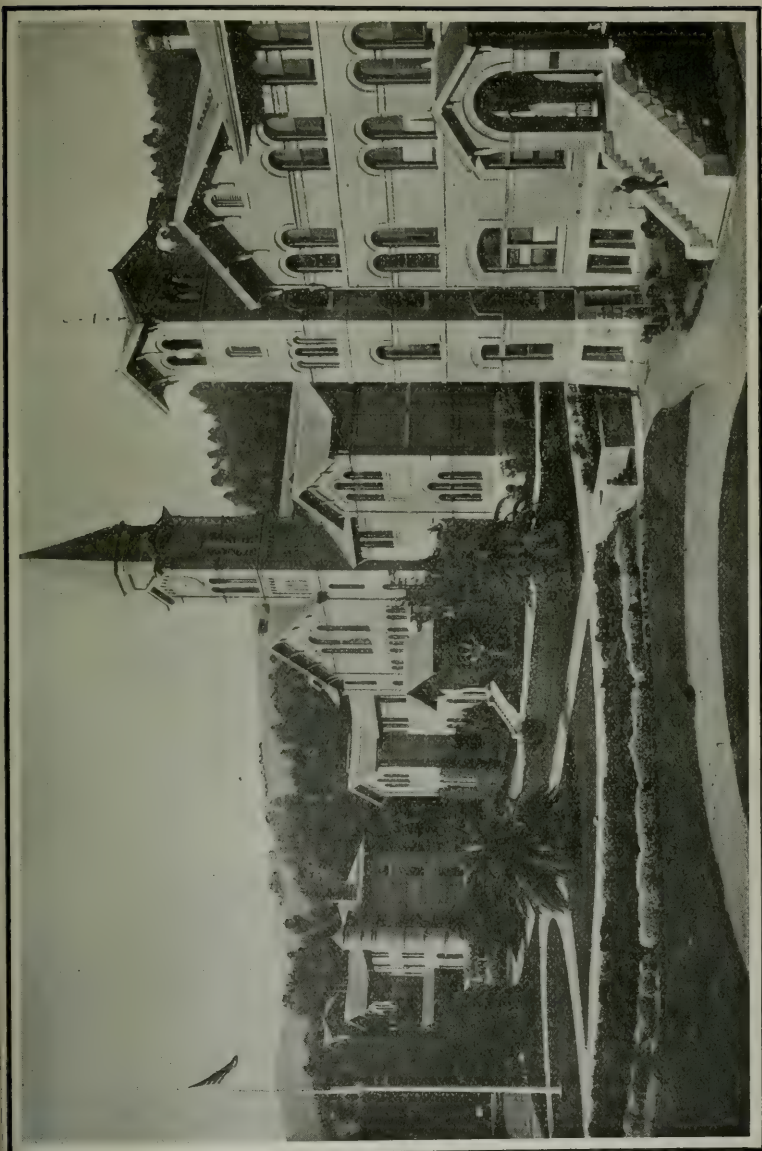
The physician's report, annexed hereto, shows that the general health of the pupils has been excellent. The usual small ailments of children, the contusions of the playground, sore throats, and occasional mild incursions of contagious diseases, like measles and chickenpox, have been in evidence, but these have all yielded to treatment, leaving no aftermath of impaired functions or constitutional disorder. It is, however, my painful duty to report the death of two girls, one blind, the other deaf.

Genevieve Baird, a blind girl, was a member of the household only one day, when she was taken to her rest and restored vision, as we hope and believe. It was some alleviation of sorrow to know from the child's family physician that her sudden death was not unexpected to her friends, for she had long been subject to organic disturbance, for a fatal termination of which the physician had tried to prepare the parents.

Mattie Douglass, a deaf girl, 16 years old, who had been a pupil of the Institution for seven years, died of typhoid fever on the 5th of December, 1905. Undoubtedly she had brought the germs of the disease from home, for the most critical examination of the Institution and all the circumstances of the development of this case went to prove this theory. Dr. N. K. Foster, Secretary of the State Board of Health, was notified, and came from Sacramento to make a special investigation, and approved the diagnosis of the origin of the malady. Everything was done to alleviate the suffering of the child, and to arrest the progress of the disease. Two trained nurses were employed to give her constant attention; the physician came twice and three times a day to watch the symptoms, and in the last days oxygen was freely used to tide over, if possible, the critical moment when life and death tremble in the balance. All was, however, of no avail, and exhausted nature succumbed to the inevitable, and Mattie Douglass passed away in sleep on the night of the 5th of December.

SEPARATION OF DEPARTMENTS.

There have been no changes in the personnel of the Institution since my last report, but a teacher has been added to the corps of instructors in the blind department, made necessary by the overcrowded condition of the classes. Though this addition to the teaching force has helped to relieve the congestion, the classes are still too large, and this leads me to refer again to the subject of permanent and complete separation of the two departments, the blind from the deaf, in buildings erected for their special accommodation and needs. In my report submitted to the Directors four years ago, I called attention to the advisability of taking immediate steps for this segregation, but nothing was done by



INSTITUTION FOR THE DEAF AND THE BLIND—FROM THE SOUTHWEST.

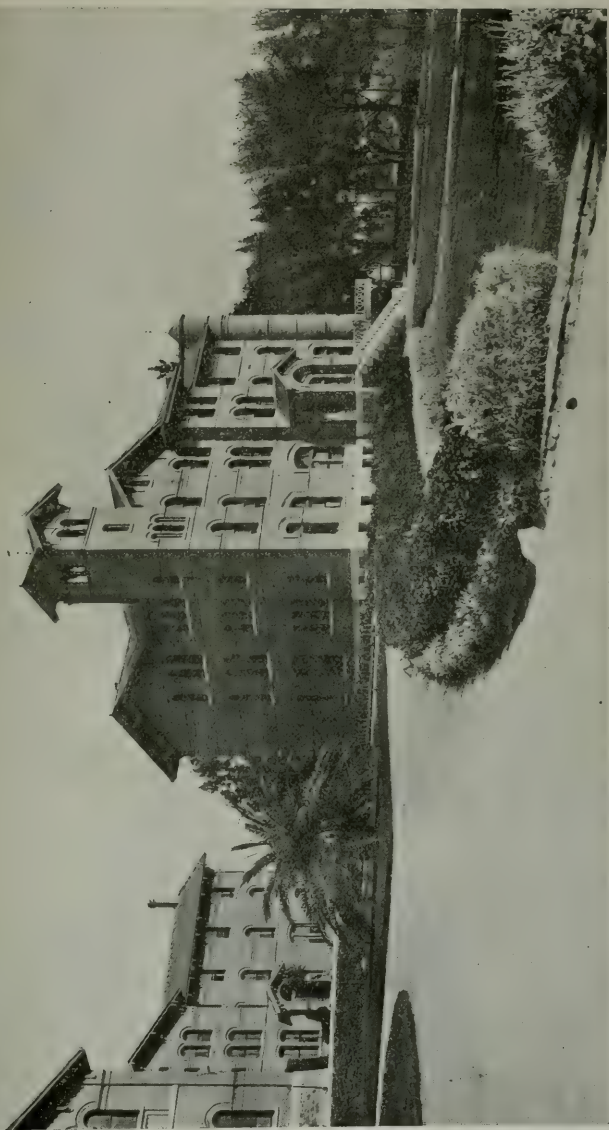
the Legislature, owing, doubtless, to the pressure of other business deemed more important. The time has come, however, when something must be done, or the work of educating the blind, and the deaf as well, in California will come short of supplying what the needs of these handicapped children demand, and which I am sure the people of this great State are willing to pay for.

It has not been an unusual thing for a young State to begin its work in this direction by bringing the deaf and the blind into one institution, and under one management. There are nine such institutions in the United States. This dual arrangement, however, has always been made for reasons of economy and limited numbers, but it is never intended as a permanent combination. I recognized this fact, and stated it in my first report forty-one years ago in these terms:

"The best informed educators of the deaf and the blind are unanimous in disapproval of it (combination of the two classes) as a permanent arrangement, and it will be understood, therefore, that in regard to the advisability of separate institutions for the two classes I agree with my professional brethren."

My opinion has not changed since the above paragraph was written, but, under stress of circumstances, I have tried to minimize the disadvantages of a union of the deaf and the blind as far as possible, and to offset them with certain advantages which are not always recognized, perhaps not sought for, by those who have not had experience with both classes. The saving of expense is an important item, and there can be no question that *this* advantage is gained by bringing the deaf and the blind under one management; but there is a limit of numbers when economy ceases to be the dominant factor in the education of either the deaf or the blind. I think that, for California, the limit has been reached. The roll of blind pupils under instruction in the Institution for the year ending June 30, 1906, was 79. This number is sufficient to form a good school, and offers an opportunity for a fair classification, and while it will cost more per capita for a time, the difference will decrease as the population of the State and the school increases.

In the very interesting pamphlet, "Institutional Life," which Mr. Arthur J. Pillsbury, Secretary of the State Board of Examiners, published after his exhaustive tour of investigation of Eastern institutions, I was glad to see that this matter of segregation of the blind from the deaf did not escape his attention, and that his conclusions support what I have said in this and previous reports. That the antipathy to which Mr. Pillsbury refers, between the deaf and the blind, if there be such feeling, can be overcome, my own experience goes to prove, for their relations in this Institution are friendly and often affectionate;



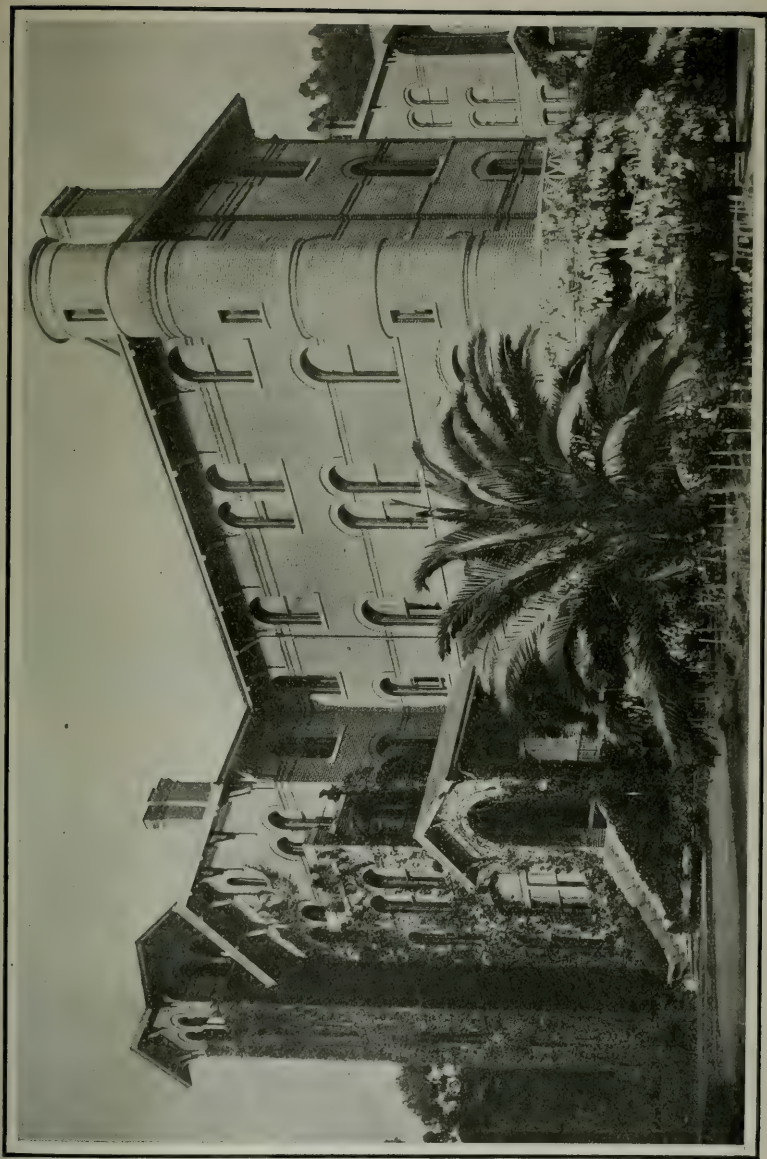
BARTLETT HALL—INSTITUTION FOR THE DEAF AND THE BLIND.

there is no more bickering between the two classes than often arises among the deaf or the blind themselves; thoughtless and sometimes naughty deaf children, who have not outgrown the tendency to tease, do not resist the temptation of nagging which blindness offers, but this passes away with the development of sympathy and gentleness, which is apt to arise in the daily observation of a misfortune greater than one's own. It is a curious fact that among the deaf and the blind, each thinks the other worse off than himself, and out of this, perhaps unconscious, psychological application of an old proverb, the deaf becomes reconciled to his misfortune, and the blind rejoices that, of two evils, he has the lesser. I do not think that the blind and the deaf naturally hate each other, or that it is impossible to reconcile their differences, and to lead them to live happily together. In this school, at least, they exult in each other's successes, and are cast down at defeat. When the debating team of the blind win in a contest with a rival of the High School League, it is a matter of pride and rejoicing among their deaf mates. When the deaf play a match game of foot or base ball on our campus, the blind "root" for them like a Berkeley contingent at the annual struggle for supremacy between Stanford and the University of California. Nor do exercises of the classroom interfere with each other. On the contrary, there is an advantage of having a certain competition between two departments, pursuing an education by different methods, and each adapted to special needs.

But these are only possible ameliorations of conditions found to exist when the deaf and the blind are brought together to save expense, not arguments in favor of continuing the system beyond the limit of wise economy and efficiency. As I said before, that limit has been reached in the California Institution, and I once more earnestly urge the adoption of some measures looking to separation of the two departments.

THE SCHOOLS.

The educational methods of the school have not materially changed since my last report. Indeed, it is doubtful if any *new* method of teaching the deaf or the blind will ever be found. Equipment, environments, combinations, new applications of old truths will vary and improve, but the success we all seek in solving the problem of how best to ameliorate the handicap of deafness and blindness will always depend for its solution upon the skill, the enthusiasm, and the resourcefulness of the teacher, and the patient persistence, energy, and aptitude of the pupil. No method will succeed in the hands of a dull teacher, and any method pursued by a competent and faithful teacher will show good results, which goes to prove how much more important the man is than the method, whether it be the French, the German, or the



DURHAM HALL—INSTITUTION FOR THE DEAF AND THE BLIND.

Combined. The usage in the California Institution has been and is to employ all means of reaching and developing the mind, of preparing the pupil for intelligent citizenship, and of inculcating the principles of moral rectitude.

While the work of the classrooms during the last two years has been good, it goes without saying that we could have done better with smaller classes and more perfect grading. It is idle and unreasonable to expect a teacher to push sixteen pupils as fast and as far as he could *ten* in the same time. The fundamental physical laws of force and motion forbid it. In the Philadelphia School for the Deaf, where I spent a profitable week last February, the class limit is ten pupils to each teacher, and with this limit, and a roll of over five hundred to select from, it is easy to see what a perfect grading can be obtained, and what good results one has a right to expect.

In my last report, a plan of "Institution Extension" was set forth which seemed and seems to me to be of great value. The suggestion grew out of certain experiences in my personal correspondence with ex-pupils. The plan was generally well received with occasional doubt expressed in the institution papers as to the coöperation of teachers in doing the work required; but such doubters misunderstood the scope of the plan, which was to have special teachers employed for the work. The coöperation I expected from the teachers of the Institution was simply in preliminary organization. The first thing to be done was to find out how many would avail themselves of the opportunity offered of continuing their education after leaving school. To this end, the following circular was prepared and sent to many of the graduates and former pupils of the Institution:

BERKELEY, CAL., ———, ———.

DEAR ———.

In my report recently submitted to the Governor, I have set forth a plan which I call "Institution Extension." The purpose of this movement is by means of correspondence, reading courses, lectures, discussions, and home and individual study, to enable those who are deaf to continue the work of the School, only on higher planes. I send herewith an extract from the Biennial Report of the Institution. The first step in this movement is to ascertain how many of our former pupils would care to avail themselves of such an opportunity for self-improvement, and to this end I address you. The cost will be very trifling, indeed nothing at first beyond a membership fee of perhaps 25 or 50 cents to pay for postage. The teachers of the Institution and the Principal will contribute their share for nothing. The initial course will be in English; later, history and mathematics, followed by courses in such natural sciences as are most needed in enabling one to keep abreast with modern research and discovery. Latin and other languages will be taken up if there is sufficient demand for them.

I have spoken to quite a number of the former pupils, who approve of the project. Will you kindly let me know if you desire to join in this extension movement, which has proved so valuable to the hearing population under the name of "University Extension."

An early reply will greatly oblige

Yours truly,

WARRING WILKINSON, Principal.

Many gratifying responses were received to this circular. Nearly all replies expressed the wish to take part in the proposed Extension, and all heartily approved of the plan, though a few regretted that the fierce struggle for existence forbade joining the class. In order to get a starting point, and to form an estimate of the field to be covered, letters were addressed to those who had expressed a wish to take up the work, asking what studies each desired to pursue, and at the same time requesting that the candidate write a history of his life and experiences from the time of leaving school. This history was to be written unaided and uncorrected, otherwise it would be of no use for my purpose, which was to obtain an idea of the intellectual standard of the pupil and his improvement or deterioration in literary expression since his graduation. The "histories" I received were worth all the labor I had expended on the enterprise, but the extent of the field and the work involved in its cultivation began to tax, not my faith and courage, which are unabated, but my physical strength, and so the "Institution Extension" is held in abeyance till the means can be found to pay teachers who will devote their whole time and talents to this plan for extending the beneficent influence of the Institution and of stimulating the deaf to reach higher planes of culture and usefulness.

THE EARTHQUAKE.

The most important event of the two years under review, and indeed in the history of the Institution and of California, was the earthquake of April 18, 1906. At 5:13 o'clock on the morning of that eventful day, just before the rising bell was rung, a sharp shock occurred which brought every member of the household to his feet, and caused a rush for the doors. After a few seconds' duration, the tremor died away, and every one breathed freer in the hope that the earthquake was over, but almost immediately a second and much severer shock followed, which lasted something over twenty seconds, and caused great confusion and consternation among officers and pupils, and no little damage to the buildings. Several chimneys were thrown down, and nearly all the others were cracked, so as to make them unsafe. The towers where water tanks are placed, each holding about five tons of water, were badly hurt. The oscillations of the earth's surface gave a wave motion to the mass of water in the tank that acted as a catapult which no wall could withstand. The observation platform over the tank in Bartlett Hall toppled over on to the roof of the main building. A similar platform on the tower of Durham Hall was so shattered as to require its taking down. An ugly crack in each of the towers of Moss and Strauss Halls showed the force of the water as a battering ram. The peak of a gable in the Educational Building fell in, and some of the brick came through the ceiling of the entrance hall to the gallery of

the chapel, and a slight offset of half an inch in the northeast corner of the tower above the clock has suggested the strengthening of the tower by internal angle irons and tie rods. The plastering in the third stories in all the halls was cracked, and in places it fell. The slates on the roofs were much injured by the falling of the chimneys and the severe shaking of the earthquake, but in all the main walls of the many buildings there was not a crack or evidence that an earthquake had occurred. Fortunately, certain departments which have to do with feeding the household were uninjured in any way. The refectory, containing the kitchen and dining-rooms; the bakery, where all the bread, rolls, pies, etc., are made, and the boiler and engine house, which supplies hot water and steam for laundry, bathing, cooking, and driving engines for electric light and shop purposes, were not harmed in the slightest degree, and meals were served on schedule time, and without any interruption or delay. At eight o'clock on the same morning, the pupils went into school, but in fifteen minutes afterwards a rather lively "shake" emptied the school building in the shortest time on record, and for the rest of the day, and the subsequent two days, the sessions were held under the trees, after the manner of Aristotle and his school peripatetics in the Lyceum at Athens. but on the Monday following the earthquake, regular work was resumed, and continued to the end of the term.

Although no pupil or person connected with the Institution received the slightest injury, the most exaggerated reports went abroad, and caused great alarm and anxiety among parents and friends. As the telegraph wires were overloaded with business, it became necessary, in order to correct unfounded reports, to issue the following circular:

BERKELEY, April 20, 1906.

DEAR —.

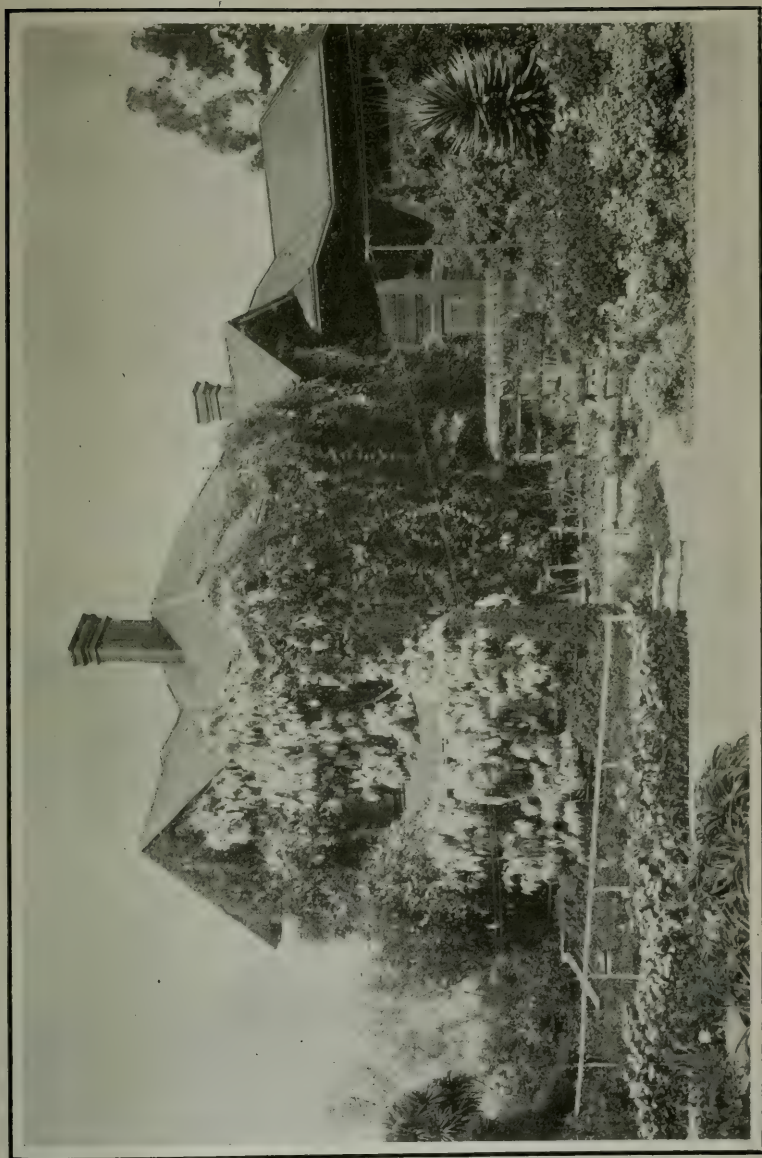
As many exaggerated reports have been current since Wednesday morning concerning the disastrous earthquake, I desire to inform you that no pupil or employé of this Institution received the slightest injury, and that all are well. None of the buildings were radically injured. A number of chimneys were thrown or will have to be taken down; the upper part of the water towers in Durham and Bartlett Halls will have to be taken down from twenty to thirty feet, and be reconstructed. The unsupported peak of a gable in the north end of the school building fell in; also, considerable plastering in the third story of Durham Hall.

This is practically all the damage. In all *essential* structure the buildings are as strong as they were before the earthquake. The pupils are not in the least frightened, but share with others in sympathy for those who have suffered severely. School will continue as usual.

Yours truly,

W. WILKINSON, Principal.

This letter had the desired effect, and satisfied nearly all the parents that their children were safe and well cared for. Half-a-dozen pupils were taken away from school, and removed with their parents to Eastern States, being driven away by fear; but on the whole, the parents expressed themselves as being thoroughly satisfied with the information contained in the circular.



PRINCIPAL'S RESIDENCE—INSTITUTION FOR THE DEAF AND THE BLIND.

The work of repairing the damage done by the earthquake was begun as soon as arrangements could be made for securing men and materials, and the money to pay the expense. The great demand for building material and for skilled artisans caused a sharp advance in price and wages, and the uncertainty of the market and labor conditions made it impossible to find contractors who would take the responsibility of bidding a definite and fixed sum for any work, and especially for repair work, and so it was determined to employ a competent man to undertake the job on a percentage basis, the Directors to pay all bills and allow the Superintendent a profit of ten per cent on all labor employed and all material purchased by him.

To pay the cost of repairs, recourse was had to the contingent fund, which was fortunately in a healthy condition, and both Governor Pardee and the State Board of Examiners approved of its use for the unexpected emergency which the Directors had been called upon to meet, and by this use of the contingent fund the Board escaped the necessity of asking for an appropriation by the Legislature, which was convened in special session to provide for the temporary needs of the various State institutions.

The account with the contingent fund, including all receipts and expenditures from May 1st to September 30th, is as follows:

Balance in fund May 1, 1906	\$6,351 03	
<i>Receipts—</i>		
May	1,157 85	
June	176 82	
July	1,536 65	
August	53 15	
September	168 04	
Total		\$9,443 54
<i>Expenditures—</i>		
May	\$1,181 37	
June	2,657 34	
July	1,728 99	
August	3,388 67	
Total		8,956 37
Balance in treasury		\$487 17
September bills awaiting action		754 50
Deficit		\$267 33

This deficit will probably be made good by the receipts of October, certainly by November. The expenditures include not only earthquake repairs, but all painting, renovation, etc., incident to vacation, when the buildings are put in order for the new year.

Although the plasterers were not out of the buildings till one week before the beginning of the academic session, everything was cleaned up and in order on the 29th of August, when school opened with

a larger number of pupils than in 1905, and the indications lead me to believe that the attendance will fully equal the attendance of last year in spite of the removals of pupils with their families from the State, and the necessities of some parents who have been obliged to avail themselves of the help which their sons and daughters can give in the household and on the farm. This depriving a child of educational advantages at the time when opportunity, if not seized, is lost forever, is saddening, but it is difficult to argue successfully with a man who sees his fruit crop ripening, and nobody but his own family to gather it. It is well known that in every time of financial or labor stringency, the schools are the first to feel the effect, and the Institution for the deaf is no exception to the rule.

CHANGE IN OFFICIAL DESIGNATION OF INSTITUTION.

Ever since the Political Code was enacted in 1872, the Institution has been designated officially as the "Deaf, Dumb, and Blind Asylum," a name which has always been extremely displeasing to the pupils and their friends, but at the last session of the Legislature, the following Act was passed, much to the gratification of all friends of the Institution. Omitting the enacting clause, it reads:

SECTION 1. The Political Code of the State of California is hereby amended by adding thereto a new section to be numbered and known as Section 2236, to read as follows:

2236. The Institution for the Deaf and the Dumb and the Blind, located in Berkeley, Alameda County, and heretofore known as the Deaf, Dumb, and Blind Asylum, shall hereafter be named and known and designated as the "California Institution for the Deaf and the Blind."

SEC. 2. Section 2237 of the Political Code is hereby amended to read as follows:

2237. The Institution for the Deaf and the Blind, located at Berkeley, Alameda County, is a part of the school system of the State, except that it shall derive no revenue from the public school fund, and has for its object the education of the deaf and the blind who, by reason of their infirmity, can not be taught in the public schools. It shall be known and designated as the California Institution for the Deaf and the Blind.

The purpose of the Act above quoted was to give a definite status to the Institution as a part of the educational system of the State, to relieve the school of a misnomer, and to disabuse the public mind, if possible, of the idea that the Institution is an asylum, a name which is misleading and inappropriate to the last degree. Deaf or blind boys and girls come to Berkeley from all parts of the State to obtain an education, and for no other purpose. The parents are not paupers; the pupils are not vicious, nor insane, nor criminal, nor diseased; they spend their summer vacations at home, and to leave the Institution permanently at nineteen years of age, to take their places in the ranks of productive industry with their fellows, and it is nothing but the truth to say that they hold their own in the fierce struggle for existence with the best of them. To call a school of this kind an asylum was an injustice to the pupils and an offense to their parents and relatives, and

for this reason, in behalf of the friends of the Institution, we thank the members of the last Legislature for the change of name, and the clear definition of the purpose and function of the Institution.

VER HUELL BEQUEST.

By the last will and testament of the late Mrs. Caroline C. Ver Huell, a bequest of \$1,000 was made to the Institution for the Deaf and the Blind. The estate is still in process of administration, but there is no reason to think that the benefaction intended by Mrs. Ver Huell will be opposed, and in due time, doubtless, the money will be received. It is to be hoped that the principal will be invested in some safe security, the interest of which will be a perpetual reminder of the generous donor.

FINANCIAL STATEMENT.

Notwithstanding the large expenditure caused by the great catastrophe of April 18, and the increased cost of maintenance, it is gratifying to report that not only has the fiscal period ending June 30, 1906, come to a close without a deficit, but we have reason to hope that the current year covered by the appropriations made by the last session of the Legislature will also maintain the record of over forty years' administration without a deficit. This hope is based upon a saving of \$1,634 out of the appropriation for last year.

There has been drawn from the State Treasury during the two years under review the sum of \$130,525.48, and the same has been expended as per vouchers now on file in the Controller's office, and the items of which are set forth in the "dissections" contained in the present report. But while by the saving of last year it is hoped and believed that the appropriation will suffice for the expenditures of the year ending June 30, 1907, it will be necessary to ask for a small increase for the fifty-ninth and sixtieth fiscal years, in view of the greater cost of certain articles of consumption, especially pork products, coal, hay, and feed. I therefore respectfully recommend that the Legislature be asked for appropriations for the two years ending June 30, 1909, as follows:

For salaries and wages	\$92,000 00
For maintenance	43,000 00
Total	<u>\$135,000 00</u>

ACKNOWLEDGMENTS.

In behalf of the pupils and their parents, I desire to express thanks to the management of the Southern Pacific Company, and the Atchison, Topeka and Santa Fé Company, for their kindness in granting half-fares on their various lines for our pupils, and, in cases of necessity, for

their generosity in granting passes to pupils whose straitened circumstances would have forbidden their going home but for this free transportation.

In closing this report, I desire to bear witness to the general faithfulness of the corps of teachers and officers, and the employés of the Institution, in the discharge of their various duties. I also desire to express my personal thanks to you, the Directors, for your unfailing courtesy and consideration, and for the helpfulness you have extended to me in every emergency. The anxieties of the months following the disaster referred to in previous pages of this report were greatly relieved by your prompt and hearty coöperation and wise counsel, and your thoughtful solicitude for the welfare of the pupils during that trying time will always remain a grateful memory.

Respectfully submitted.

WARRING WILKINSON,
Principal.

BERKELEY, October 31, 1906.

REPORT OF PHYSICIAN.

BERKELEY, June 30, 1906.

To the Board of Directors of the California Institution for the Deaf and the Blind.

GENTLEMEN: I have the honor to submit the following report for the two years ending June 30, 1906:

Total number of cases treated (not including many minor cases of which no record was kept)	287
Discharged well or having reached limit of improvement	277
Discharged for disability or sent home for treatment	6
Died at Institution	2
Causes of death—Typhoid fever	1
Chronic gastritis (child at Institution one day)	1

CAUSES FOR WHICH TREATED.

	No. of Cases.		No. of Cases.
Abscess	15	Lues (congenital)	3
Anemia	3	Malaria	1
Bronchitis	45	Measles	24
Burns	2	Neuralgia (intercostal)	1
Cerebral tumor	1	Ophthalmia (gonorrheal)	1
Cellulitis	2	Otitis media (acute catarrhal)	4
Conjunctivitis (acute)	14	Otitis media (active suppurative)	4
Chorea	1	Periostitis (acute)	1
Chilblains	1	Pertussis (whooping-cough)	4
Coryza (very many cases too mild to note)	4	Pharyngitis (acute)	6
Dermatitis (poison oak)	21	Pneumonia (lobar)	2
Dermatitis (pustular)	1	Rheumatism	4
Eczema	7	Scabies (itch)	14
Epilepsy	1	Scoliosis	2
Eustachian catarrh	1	Sprains	2
Fracture of skull	1	Synovitis (acute), knee	1
Furuncle (boil)	15	Tonsillitis (acute)	20
Gastritis (chronic)	1	Torticollis	1
Glossitis (acute)	1	Tuberculosis (pulmonary)	2
Herpes zoster	1	Tuberculosis (glandular)	1
Indigestion (acute)	12	Typhoid fever	1
Indigestion (chronic)	2	Varicella (chickenpox)	15
Insect bite	1	Vertigo	1
Insanity	1	Wounds (incised)	10
Lymphadenitis (simple acute)	1	Wounds (lacerated)	6
Lymphadenitis (tuberculous)	1	Wounds (contused)	6
		Wounds (punctured)	2

Vaccination was done upon all pupils not showing evidence of successful inoculation—some sixty in all, except for a few in whom it was deemed inadvisable and a few admitted last year.

A card system of medical records was instituted two years ago, and if continued will show from that time the medical history of each pupil coming under treatment in the Institution—a matter of possibly great importance in many cases. A similar system was also instituted showing the status of each pupil with reference to vaccination. It is hoped that by these systems the medical records, previously very incomplete, may be conveniently maintained in the future.

The freedom from contagious diseases during the two years has been gratifying. Small endemics of measles, chickenpox, and scabies occurred, but did not reach serious proportions. A few cases of whooping-cough appeared, but we were fortunately able to limit the disease almost entirely to the original cases.

For constant coöperation in all matters affecting the health of the pupils, and for every necessary facility offered me in the work, my thanks are due the Principal, Dr. Wilkinson, and my indebtedness for numerous courtesies is gratefully acknowledged.

Very respectfully,

T. C. McCLEAVE, M.D.

DISSECTIONS.

SALARIES AND WAGES.

Principal and teachers.....	\$43,543 50
Physician, Clerk and Matrons.....	15,810 49
Servants and services.....	18,589 63
Treasurer.....	2,000 00
Total.....	<u>\$79,943 62</u>

GROCERIES AND PROVISIONS.

Ammonia, carb., 30 lbs.....	\$5 03	Molasses, 113 gals.....	\$46 43
Apple butter.....	59 93	Mustard.....	12 90
Bacon, 1,258 lbs.....	204 93	Oats, rolled.....	6 50
Baking powder, 252 lbs.....	71 91	Olive oil, 28½ doz.....	130 20
Beans, bayo, 1,864 lbs.....	65 30	Peas, split, 1,083 lbs.....	47 03
Beans, lima, 519 lbs.....	24 19	Pepper, 230½ pounds.....	41 65
Beans, white, 1,550 lbs.....	50 13	Pickles, bottled.....	25 00
Butter, fresh, 7,619 lbs.....	1,823 82	Pickles, keg.....	36 20
Canned goods, 275 doz.....	638 48	Polish.....	18 92
Capers.....	3 33	Potatoes, 63,764 lbs.....	961 93
Cheese, 863 lbs.....	119 61	Poultry.....	216 90
Cheese, Edam, 22 lbs.....	16 66	Raisins, 200 lbs.....	18 20
Chicory, 100 lbs.....	4 90	Rice, 3,240 lbs.....	142 05
Chocolate.....	22 86	Rice, puffed.....	6 75
Citron, 40 lbs.....	5 60	Saleratus, 168 lbs.....	10 62
Cocoa, 36 lbs.....	13 20	Sal soda, 4,400 lbs.....	42 25
Cocoanut, 97 lbs.....	22 43	Salt, coarse, 650 lbs.....	2 90
Coffee, 2,215 lbs.....	365 39	Salt, dairy, 900 lbs.....	3 90
Cooking wine.....	11 50	Salt, table, 3,550 lbs.....	16 58
Cornmeal, 2,510 lbs.....	53 15	Salt peter, 80 lbs.....	6 10
Cornstarch, 321 lbs.....	25 71	Salt pork, 788 lbs.....	93 45
Crackers, soda, 2,489 lbs.....	161 45	Sapolio, 36 doz.....	26 79
Crackers, Santa Clara, 395 lbs.....	32 57	Sauce.....	17 50
Crackers, mixed.....	3 92	Silicon, 3 doz.....	2 25
Cream of tartar, 12 lbs.....	1 86	Soap, brown, 4,320 lbs.....	176 05
Currants, 300 lbs.....	22 38	Soap, ivory, 19 boxes.....	130 34
Eggs, 2,322 doz.....	592 38	Soap, toilet.....	3 30
Extracts.....	32 65	Soap, powdered.....	59 90
Farina, etc.....	12 78	Spices.....	12 62
Fish, fresh.....	309 56	Sugar, brown, 850 lbs.....	41 20
Fish, salt.....	70 10	Sugar, cube, 537 lbs.....	31 40
Flour, graham.....	18 60	Sugar, granulated, 31,803 lbs.....	1,697 65
Flour, rye.....	8 14	Sugar, powdered, 326 lbs.....	20 44
Flour, white, 438½ bbls.....	2,138 70	Syrup, 393 gals.....	123 77
Fruit, dried.....	298 03	Tapioca, etc.....	19 66
Fruit, fresh.....	700 89	Tea, 450 lbs.....	133 80
Gelatine.....	6 64	Vegetables.....	70 40
Ham, 2,736 lbs.....	373 74	Vinegar, 150 gals.....	25 55
Honey, 14 gals.....	13 51	Washing ammonia, 25 doz.....	61 85
Lard, 1,541 lbs.....	163 39	Wheat, 22½ bbls.....	77 30
Macaron, 1,042 lbs.....	43 55	Yeast.....	87 65
Meat.....	5,903 33		
Mincemeat.....	35 55	Total.....	<u>\$19,257 66</u>

CLOTHING.

Belt	\$0 68	Rubbers	\$0 65
Buttons	19 80	Scissors	6 50
Clothes brushes	7 70	Shirts	22 80
Collars	47	Shoes, 42 pairs	72 78
Combs and brushes	49 20	Shoe laces	10 60
Corsets	3 55	Shoe blacking, 31 doz.	15 00
Darning cotton	3 49	Shoe brushes	14 40
Dress goods	67 70	Suits, 9	68 61
Elastic	8 53	Stockings	48 05
Hair cutting	25	Suspenders	22 50
Handkerchiefs	9 75	Tape	1 10
Hats	11 76	Thread	36 51
Indelible ink	5 70	Trimmings	3 98
Nail and tooth brushes	15 90	Underwear	1 25
Neckties	8 53	Valise	8 90
Overalls, 12 doz.	68 50		
Pins and needles	21 63	Total	\$636 77

FURNITURE.

Ash barrels, 2	\$6 00	Mop and brush handles	\$4 00
Baskets	73 00	Napkins	6 90
Bedsteads	12 50	Oil cloth	5 80
Blankets, 26 pr.	73 00	Pails	34 85
Brooms	100 00	Pillows	13 50
Carpets	214 65	Preserve jars, etc.	15 74
Carpet cleaning	64 14	Quilts	3 00
Carpet sweeper	2 85	Rubber blankets	2 16
Chairs	70 95	Scrub brushes	25 10
Chamois skins	3 50	Sewing-machine and repairs ..	38 25
Clocks and repairs	37 80	Sponges	5 00
Crockery	373 62	Sheeting	37 10
Cutlery	117 96	String	7 15
Curtains	4 18	Tablecloths	95 48
Dust and floor brushes, 6 doz.	82 58	Thread	6 65
Dust pans	7 24	Ticking	17 31
Enamel ware	39 56	Tinware	33 02
Feather dusters	33 50	Toweling	105 31
Hair, 50 lbs.	20 50	Towel bar	85
Kitchen utensils	51 61	Upholstering	29 84
Mats and matting	110 37	Window shades	38 75
Mattresses and repairs	105 83	Wooden ware	7 90
Mirrors	10 70		
Mop cloths, 18 doz.	65 53	Total	\$2,215 23

BUILDING AND REPAIRS.

Awnings	\$18 00	Lumber	\$1,000 13
Bricks	6 00	Painting and papering	261 50
Cement, 17 bbls.	42 10	Paints and oils	303 04
Cement work	29 25	Plastering	13 30
Engine repairs	95	Plumbing and supplies	447 58
Fire clay	3 00	Range repairs	88 75
Glass, putty, etc.	193 70	Roof repairs	91 15
Glue	8 50	Sewer pipe	24 42
Gravel and sand	20 00	Tank repairs	25 00
Hardware	231 47	Wire guards	65 00
Heating apparatus repairs	15 95		
Lime, 9 bbls.	15 35	Total	\$2,904 14

FUEL AND LIGHT.

Boiler compound	\$110 50	Gas regulator, rent of	\$24 00
Candles	7 85	Gasoline	8 81
Coal, 286 tons, 700 lbs.	2,595 52	Lamps, etc.	4 28
Coal screenings, 498 tons, 660 lbs.	2,469 80	Machine oil, 52½ gals.	32 70
Coal oil	36 21	Matches	9 29
Electric lamps	92 77	Machine repairs	10 48
Electric light	37 90	Wages, engineers	3,720 00
Electric repairs	60 94	Wood, 23 cords	234 75
Gas	549 37	Total	\$10,031 92
Gas fixtures	26 75		

LAUNDRY.

Baskets, 3	\$6 90	Oxalic acid	\$3 00
Bluing, 56 lbs.	8 78	Plans for furnace	9 00
Brushes	1 50	Starch, 1,202 lbs.	81 51
Caustic soda, 820 lbs.	53 40	Tallow, 100 lbs.	5 50
Chloride of lime	31 98	Wages	2,640 00
Crock	9 65	Washboard	70
Irons	18 50	Wax, 20 lbs.	3 40
Indelible ink	3 00	Total	\$2,877 97
Machine repairs	1 15		

STABLE AND DAIRY.

Barley, 2,365 lbs.	\$29 06	Oats, 3,214 lbs.	\$50 31
Bran, 84,154 lbs.	938 20	Oilcake meal, 10,725 lbs.	194 20
Brooms	19 00	Pails	7 18
Buggy and wagon repairs	54 50	Salt	3 50
Corn, 3,810 lbs.	58 91	Veterinary services	25 25
Farm implements	78 99	Wages	1,680 00
Harness and repairs	82 80	Wheat, cracked, 220 lbs.	5 40
Hay, 344,785 lbs.	1,716 25	Wheat, whole, 8,816 lbs.	139 30
Horseshoeing and clipping	146 00	Total	\$5,611 37
Mealfalfa, 3,150 lbs.	31 50		
Middlings, 24,211 lbs.	351 02		

INDUSTRIAL DEPARTMENT.

<i>Printing Office—</i>		<i>Carpenter Shop—</i>	
Ink	\$4 50	Hardwood	\$226 25
Machinery repairs	16 90	Tools	68 25
Paper	204 08	Wages	1,080 00
Type, etc.	202 94	Total	\$2,930 42
Wages	1,127 50		

MISCELLANEOUS.

Blacksmithing	\$1 50	Freight	\$43 53
Books, stationery, etc.	794 94	Garden tools	55 08
Collection charges	110 45	Hose	21 90
Diplomas	11 37	Ice	35 35
Directories	10 00	Lye	6 21
Drugs, etc.	411 47	Music for the blind	30 72
Electric bells	5 34	Piano and organ repairs	253 50
Expense of pupils, parties, etc.	52 00	Rope	3 75
Express charges	220 08	Rubber stamps	8 25
Fertilizer	30 50	Seeds and plants	17 90
Flag	11 90	Spectacles	75

MISCELLANEOUS—Continued.

Stamps	\$118 16	Typewriters and repairs	\$31 35
Subscription to magazines	78 00	Water	1,255 39
Telegrams	16 01	Water sprinkling	4 80
Telephones	275 90	Wrapping paper, etc.	119 65
Traps, poison, etc.	7 00		
Traveling expenses	19 70	Total	\$4,062 45

RECAPITULATION.

Salaries and wages	\$79,943 62
Groceries and provisions	19,257 66
Clothing	636 77
Furniture	2,215 23
Building and repairs	2,904 14
Fuel and light	10,031 92
Laundry	2,877 97
Stable and dairy	5,611 37
Industrial department	2,930 42
Miscellaneous	4,062 45
Total	\$130,471 55

CONTINGENT FUND DISSECTIONS.

Beds	\$270 00	Paints and painting	\$1,452 17
Bricks	12 00	Painting wall	27 00
Carpenter work	1,272 00	Piano and organ repairs	363 00
Cement work	291 57	Plumbing and supplies	401 30
Christmas expenses	131 12	Roof repairs	586 87
Clock repairs	20 00	Repairs to colored glass	14 00
Clothing	654 44	Road repairs	222 00
Desks	175 25	Sewer pipe	42 47
Dentist	49 50	Sewing-machines	33 50
Earthquake repairs	3,317 14	Shoes and repairs	1,137 65
Expressage	32 70	Shop supplies	70 45
Fire-extinguishers	144 00	Stock for dairy	148 10
Flower pots	15 40	Stocking poultry yard	42 00
Gas	43 00	Sundries	348 60
Half-tones	30 00	Traveling expenses	144 30
Hot water heating	441 00	Typewriters	214 00
Hospital expenses	464 75	Typewriting	15 00
Kettles retinned	15 50	Water	49 10
Labor	67 00	Wire cloth	23 40
Linoleum	458 80		
Lumber for shop	689 24	Total	\$13,929 32

TREASURER'S STATEMENT.

FOR THE TWENTY-FOUR MONTHS ENDING JUNE 30, 1906.

STATE APPROPRIATION.

Received from State Treasurer	\$130,471 55	
<i>Disbursements.</i>		
Payrolls		\$90,883 76
Supplies, as per vouchers		39,587 79
	\$130,471 55	\$130,471 55

CONTINGENT FUND.

To cash from State Treasurer	\$13,929 32	
To miscellaneous receipts	13,497 19	
<i>Disbursements.</i>		
By sundry accounts as per vouchers		\$13,929 32
By cash sent State Treasurer		13,497 19
	\$27,426 51	\$27,426 51

DURHAM FUND.

July 1, 1904—Cash on hand	\$16,298 15	
June 30, 1906—Interest and dividends	5,875 20	
Received from loans	26,500 00	
<i>Disbursements.</i>		\$48,673 35
June 30, 1906—As per vouchers, including loans		37,838 18
Cash on hand		\$10,835 17

STRAUSS FUND.

July 1, 1904—Cash on hand	\$5,357 27	
June 30, 1906—Interest and dividends	1,031 82	
Loans	5,000 00	
<i>Disbursements.</i>		\$11,389 09
Paid as per vouchers, including loans		5,379 54
Cash on hand		\$6,009 55

REVOLVING FUND.

Transferred from Durham Fund and part of said fund	\$1,500 00
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LIBRARY FUND.

To cash on hand	\$855 26	
Receipts from interest	56 69	
		\$911 95
Disbursements, as per vouchers		74 35
		\$837 60

CASH BALANCES JUNE 30, 1906.

Durham Fund deposit with Farmers and Merchants' Savings Bank	\$10,835 17
Durham Fund (Revolving Fund) deposit with First National Bank, Berkeley	1,500 00
	\$12,335 17
Strauss Fund deposit with Union Savings Bank, Oakland	6 009 55
Library Fund deposit with Union Savings Bank, Oakland	837 60
Total	\$19,182 32

ASSETS.

Cash on hand	\$19,182 32
Bills receivable	52,414 53
	\$71,596 85

DETAILED STATEMENT OF BILLS RECEIVABLE.

Charles Jurgens	\$40,000 00
Elletta M. Brown	5,000 00
Douglas Tilden	2,221 80
Newell Perry	1,990 60
G. T. Redmond	2,056 23
Theo. Grady	450 00
James W. Howson	687 50
	\$52,414 53

Respectfully submitted.

W. E. GRIFFITH, Treasurer.

Subscribed and sworn to before me, this 16th day of November, 1906.

R. S. McHENRY,

[SEAL]

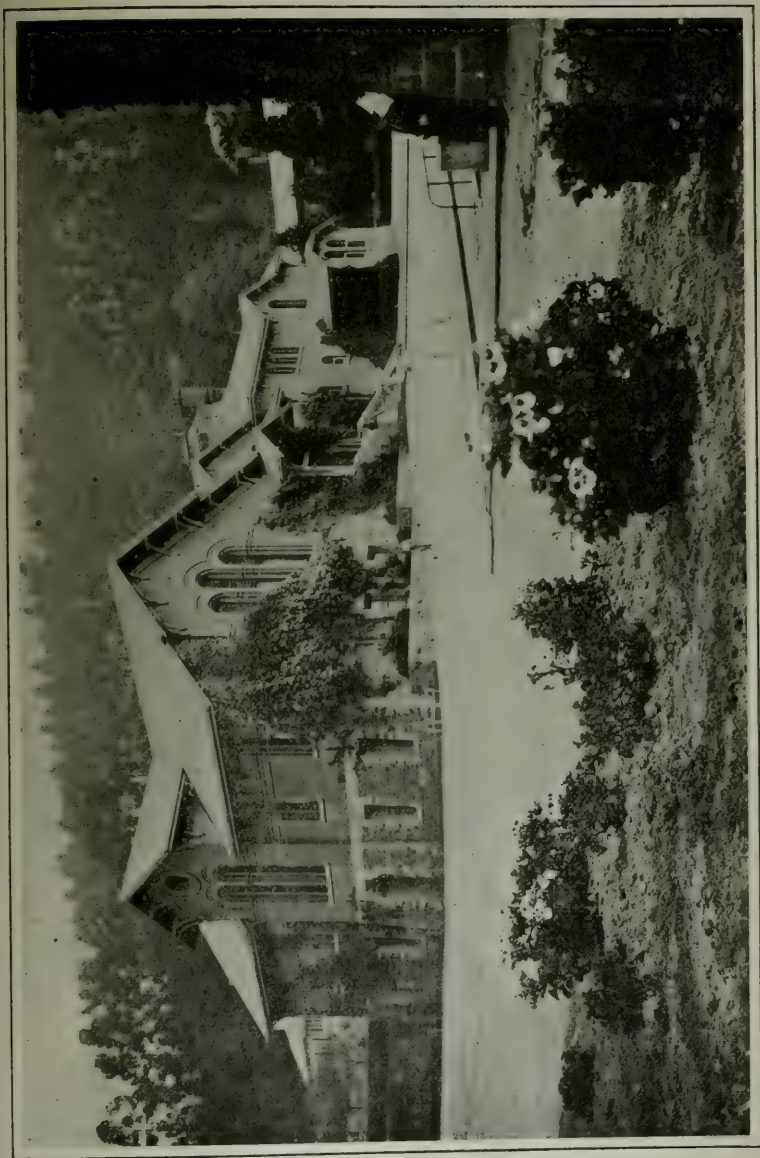
Notary Public in and for the County of Alameda,
State of California.

LIST OF PUPILS IN THE INSTITUTION

FOR THE TWO YEARS ENDING JUNE 30, 1906.

DEAF BOYS.

Name.	Town.	County.	Name.	Town.	County.
Abbott, Ashbel	Piney	Monterey	Kett, Robert	Tehachapi	Kern
Akers, Lester	San Francisco	San Francisco	Kibby, Norman	Cupertino	Santa Clara
Baker, James	Marysville	Yuba	Kohrumel, Wm	Red Bluff	Tehama
Barthe, John	Livermore	Alameda	Knarston, I. J.	Nanajmo	B. C.
Barwise, William	Pomona	Los Angeles	Kramback, H.	Santa Cruz	Santa Cruz
Beck, Mark	Vallejo	Solano	Land, Bruce	Napa	Napa
Beck, Hiram	Oakland	Alameda	Lawton, William	San Francisco	San Francisco
Beebe, Arthur	Safford	Arizona	Lopez, Clemons	Berkeley	Alameda
Bonar, James	Sacramento	Sacramento	Matson, George	San Francisco	San Francisco
Bonzani, Charles	San Gregorio	San Mateo	Matthews, Chas.	Arcata	Humboldt
Buker, Ray	Aromas	Merced	McNeilly, Harold	Reno	Nevada
Burton, Roy	Fresno	Fresno	McLaughlin, C.	Fresno	Fresno
Burrell, Fred	Dos Palos	Merced	McNeil, Charles	Loyalton	Sierra
Broderick, Edwd.	Cloverdale	Sonoma	Moore, John	Anderson	Shasta
Campbell, Fred	Rumsey	Yolo	Morris, Manuel	Ignacio	Marin
Cambri, Manuel	Oakland	Alameda	Moynahan, John	Vallejo	Solano
Cartwright, L.	San Diego	San Diego	Neil, Henry	Pope Valley	Napa
Christiansen, Geo.	Berkeley	Alameda	Nelson, Carl	Visalia	Tulare
Cordero, Aug.	Santa Barbara	Santa Barbara	Norton, Ernest	Oakland	Alameda
Crawford, John	Santa Barbara	Santa Barbara	Nutting, George	San Francisco	San Francisco
Croll, Martin	Alameda	Alameda	Pale, Charles	San Francisco	San Francisco
Curtiss, Almon	Paradise	Butte	Patheal, Monroe	Campbell	Santa Clara
Curtiss, Oscar	Paradise	Butte	Peixotto, Antone	Centerville	Alameda
Curran, William	Gold Hill	Nevada	Phillips, Charles	Oakland	Alameda
Davis, George	Lawrence	Santa Clara	Phillips, George	Oakland	Alameda
Dwyer, Jolly	Sacramento	Sacramento	Phelps, George	Oroville	Butte
Degrossellier, Albt.	Carson City	Nevada	Poole, Earl	Yreka	Siskiyou
Depew, Roscoe	Los Angeles	Los Angeles	Rose, Alexander	Sacramento	Sacramento
Dick, Arthur	Virginia City	Nevada	Ross, Leslie	Napa	Napa
Doane, Clarence	Rialto	San Bernardino	Rossi, Herbert	Stockton	San Joaquin
Dutra, José	Mission San José	Alameda	Ryden, Edward	Los Angeles	Los Angeles
Dutton, Clive	Berkeley	Alameda	Schroyer, Laurel	San Francisco	San Francisco
Elmer, Leslie	San José	Santa Clara	Sherman, Wm	Lemoncove	Tulare
Frank, Henry	San Francisco	San Francisco	Sherman, Daniel	Lemoncove	Tulare
Gabrielli, Joseph	Sacramento	Sacramento	Sherman, John	Lemoncove	Tulare
Gardner, Charles	San Francisco	San Francisco	Sherman, Laf.	Lemoncove	Tulare
Genignani, V.	Sacramento	Sacramento	Smith, Alexander	Crockett	Contra Costa
Gianbruno, Jos.	San Francisco	San Francisco	Songey, Ernest	Berkeley	Alameda
Gleason, Thomas	San Francisco	San Francisco	Stevens, William	Virginia City	Nevada
Glidden, Don	Berkeley	Alameda	Taylor, Fred	Reno	Nevada
Guire, Oscar	Colton	San Bernardino	Thomas, Rhea	Prunedale	Monterey
Hart, William	Princeton	Colusa	Thurman, Merle	Redding	Shasta
Hawks, Alex.	San Francisco	San Francisco	Tyhurst, William	San José	Santa Clara
Hawvichorst, R.	Los Angeles	Los Angeles	Walker, William	Pollasky	Fresno
Hill, Vivian	Berkeley	Alameda	Weber, Carl	Chico	Butte
Hoitschusen, J.	Anaheim	Orange	Wharton, Valley	San Francisco	San Francisco
Hytti, Hjalmer	Sawyer's Bar	Siskiyou	Whitworth, Geo.	Newman	Stanislaus
Issoglio, Arthur	Jerome	Arizona	White, Albert	Richmond	Contra Costa
Johnson, Harold	Los Angeles	Los Angeles	Wilder, Herman	Visalia	Tulare
Kaiser, Dedrich	Fruitvale	Alameda	Wilsey, Silas	Highland	San Bernardino



REFECTORY—INSTITUTION FOR THE DEAF AND THE BLIND.

DEAF BOYS—Continued.

Name.	Town.	County.	Name.	Town.	County.
Winters, Ebbie	Oakland	Alameda	Wood, Golden	Taylor	Shasta
Wimber, John	Hanford	Tulare	Wood George	San Francisco	San Francisco
Woodruff, Albert	San Francisco	San Francisco	Zilk, Harry	Berkeley	Alameda

DEAF GIRLS.

Arnold, Lilly	Allendale	Alameda	Knarston, Helen	Nanaimo	B. C.
Baertschiger, A.	Los Angeles	Los Angeles	Larimer, Mildred	Tucson	Arizona
Baars, Charlotte	Alameda	Alameda	Lee, Lillie	Reno	Nevada
Beale, Elsie	San Francisco	San Francisco	Luddy, Mabel	San Andreas	Calaveras
Billings, Caro	Yountville	Napa	Lytle, Ruth	Modesto	Stanislaus
Bilby, Stella	Fresno	Fresno	Marketta, Pearl	Weed	Siskiyou
Bonzani, Pauline	San Gregorio	San Mateo	Marshall, Ruth	Santa Rosa	Sonoma
Brodrick, Amy	Cloverdale	Sonoma	Matsuda, Mary	San Francisco	San Francisco
Bryan, Hattie	San Francisco	San Francisco	McCarthy, Sadie	Los Angeles	Los Angeles
Case, Viola	Paradise	Nevada	McLean, Maggie	Fresno	Fresno
Cloer, Grace	Santa Rosa	Sonoma	Mitchell, Wildey	Selma	Fresno
Cohn, Mellie	Hanford	Tulare	Millar, Irene	San Rafael	Marin
Cohn, Ida	Hanford	Tulare	Montgomery, G.	Oakland	Alameda
Cohn, Annie	Hanford	Tulare	Montgomery, J.	Oakland	Alameda
Comacho, Annie	San Leandro	Alameda	Nagiller, Ida	Williams	Arizona
Conrad, Goldy	Farmersville	Tulare	Nelson, Edith	Turlock	Stanislaus
Cota, Carmen	Montecito	Santa Barbara	Noll, Martha	Irvington	Alameda
Cowles, Inez	Sacramento	Sacramento	Overton, Georgie	Chico	Butte
Cook, Mae Belle	Yreka	Siskiyou	Parks, Lulu	Hollister	San Benito
Cox, Agnes	Fresno	Fresno	Peters, Maggie	San Francisco	San Francisco
Cruz, Hortense	Compton	Los Angeles	Phelps, Minnie	Zachray	Colusa
DeLarge, Irene	Prescott	Arizona	Phillips, May	Winters	Yolo
Delmas, Caroline	Sanger	Fresno	Pickering, Gladys	San Francisco	San Francisco
Douglass, Mattie	O'Neils	Madera	Reese, May	Jackson	Amador
Dunsmore, Dora	Palo Alto	Santa Clara	Risher, Mary	S. Bernardino	S. Bernardino
Egan, Edna	San Francisco	San Francisco	Robles, Luiz	S. Barbara	S. Barbara
Fitzgerald, Golda	San Diego	San Diego	Roy, Ella	Los Angeles	Los Angeles
Freal, Ida	Collegewille	San Joaquin	Schiff, Lena	San Francisco	San Francisco
Freitas, Annie	Haywards	Alameda	Schneck, Georgie	San Francisco	San Francisco
Forbes, Ramona	San Francisco	San Francisco	Shattuck, Phebe	San Francisco	San Francisco
Garcia, Josefa	Pomona	Los Angeles	Shea, Lillian	Los Angeles	Los Angeles
Ghioris, Marie	Stockton	San Joaquin	Shimonowsky, D.	Willits	Mendocino
Golden, Algie	San Francisco	San Francisco	Simpson, Mollie	Coronado	San Diego
Gregory, Elva	Fresno	Fresno	Simpson, Nora	Coronado	San Diego
Guerrero, Rebec'a	Azusa	Los Angeles	Sink, Genevieve	Cloverdale	Sonoma
Hare, Irene	Berkeley	Alameda	Skaine, Alice	San Francisco	San Francisco
Hall, Grace	Phoenix	Arizona	Smith, Alice	Bitterwater	San Benito
Hadson, Meta	Cupertino	Santa Clara	Stacks, Bessie	Elliot	San Joaquin
Harde, Freda	Oakland	Alameda	Stubbs, Gertrude	Duarte	Los Angeles
Hoffman, Martha	St. Helena	Napa	Sturm, Hattie	Berkeley	Alameda
Hogan, Myrtle	Santa Clara	Santa Clara	Taylor, Helen	Napa	Napa
Hopkins, Amy	Potter Valley	Mendocino	Terrell, Stella	Oroville	Butte
Ikin, May	Sacramento	Sacramento	thom-Whorden,		
Johnson, Amelia	Ocean View	San Francisco	Edna	San Francisco	San Francisco
Johnson, Myrtle	Black Diamond	Contra Costa	Waters, Ava	Oakland	Alameda
Kaiser, Augusta	Fruitvale	Alameda	Walker, Carrie E.	Los Angeles	Los Angeles
Kenney, Annie	Madera	Madera	Walker, Myrtle	Santa Rosa	Sonoma
Keesing, Grace	San Francisco	San Francisco			

BLIND BOYS.

Allen, Walter	Grass Valley	Nevada	Cook, Jesse	Los Angeles	Los Angeles
Baker, Henry	Sacramento	Sacramento	David, Willard	Bakersfield	Kern
Bailey, George	San José	Santa Clara	Dean, Franklin	Los Angeles	Los Angeles
Bohlander, E.	Berkeley	Alameda	Deckard, Everett	Black Diamond	Contra Costa
Brueyer, Fred	Los Angeles	Los Angeles	Dondero, John	San Francisco	San Francisco
Britton, Ray	Lawrence	Santa Clara	Ernst, Roy	Sacramento	Sacramento
Craig, Walter	Martinez	Contra Costa	Evans, Charles	Los Angeles	Los Angeles

BLIND BOYS—Continued.

Name.	Town.	County.	Name.	Town.	County.
Forester, Frank	Pomona	Los Angeles	Miller, Polk	Ukiah	Mendocino
Gedge, Jonathan	Vallejo	Solano	Miller, Valentine	Ukiah	Mendocino
Gonzales, Frank	Haywards	Alameda	Miller, Robert	Los Angeles	Los Angeles
Grant, Duncan	Sacramento	Sacramento	Morgan, Edward	Berkeley	Alameda
Groshell, Wm.	Delmar	San Diego	Olcese, Frank	Hornitos	Mariposa
Hammers, Geo.	San Francisco	San Francisco	Pettis, Charles	Fresno	Fresno
Harlan, Deland	Williams	Colusa	Phillips, Owen	Niles	Alameda
Henderson, S.	Oakdale	Stanislaus	Paulson, Charles	Lompoc	Santa Barbara
Hines, Charles	Haywards	Alameda	Rinaldi, Bertolo	Visalia	Tulare
Ingalls, Chester	San Francisco	San Francisco	Robinson, Arthur	Compton	Los Angeles
Ingalls, William	San Francisco	San Francisco	Schoeller, Carl	Capay	Yolo
Kenyon, Floyd	Chico	Butte	Scurlock, Walter	San Francisco	San Francisco
Kenyon, Roy	Chico	Butte	Shepherd, James	Arcata	Humboldt
Kloess, Alfred	Los Angeles	Los Angeles	Sheeley, Ira	Oakland	Alameda
Kloess, Walter	Los Angeles	Los Angeles	Schlingheyde, L.	Oakland	Alameda
Kaunitz, Hilbert	San Francisco	San Francisco	Stover, Elmer	San Francisco	San Francisco
Leslie, Ernest	Berkeley	Alameda	Svenson, Andrew	Berkeley	Alameda
Leonard, John	San Francisco	San Francisco	Watson, John	Lathrop	San Joaquin
Lyon, Earl	Reno	Nevada	Weile, Charles	S. Barbara	S. Barbara
Macdonald, Carl	Sites	Colusa	Wheaton, Donald	Alameda	Alameda
McDonald, Geo.	San Francisco	San Francisco	Yong Shu Wah	San Francisco	San Francisco
McHale, Law'nce	Los Angeles	Los Angeles			

BLIND GIRLS.

Alison, Tilly	Lincoln	Placer	High, Minnie	Berkeley	Alameda
Barbee, Laura	San Francisco	San Francisco	Hilton, Maud	Santa Cruz	Santa Cruz
Banchero Cath.	Benicia	Solano	Hickcox, Winif'd	Etiwanda	San Bernardino
Bowles, Jessa	Livermore	Alameda	Jameson, Mildred	Los Banos	Merced
Cabrillas, C.	Valley Center	San Diego	Jeffrey, Minnie	Oakland	Alameda
Carter, Mabel	Los Angeles	Los Angeles	Keough, Marg't.	San Francisco	San Francisco
Chambers, Helen	San Francisco	San Francisco	Monterichard C.	Alameda	Alameda
Dawson, Kath'l'n	San Francisco	San Francisco	Muir, Margaret	Berkeley	Alameda
Dean, Martha	Long Beach	Los Angeles	Murphy, Maud	Montello	Nevada
Dibitonda, R.	San Francisco	San Francisco	Phillips, Frances	Winnemucca	Nevada
Dixon, Edna	Los Angeles	Los Angeles	Piper, Hazel	Virginia	Nevad
Dixon, Louise	Bakersfield	Kern	Pierson, Edith	Oracle	Nevada
Drummond, E.	Berkeley	Alameda	Reynolds, Ruth	Santa Cruz	Santa Cruz
Finnerty, Ruby	San Francisco	San Francisco	Robertson, Bessie	Berkeley	Alameda
French, Marg'ite	Redding	Shasta	Ruiz, Marie	Tustin	Orange
Graham, Marg'ite	San Francisco	San Francisco	Schumacher, A.	San Francisco	San Francisco
Haight, Berna	Little Shasta	Siskiyou	Tilton, Grace	San Francisco	San Francisco
Hall, Birdie	San Francisco	San Francisco	Ward, Marie	Calistoga	Napa
Harris, Charlton	San Francisco	San Francisco	Wilber, Leona	Los Angeles	Los Angeles
Hamann, Eva	San Francisco	San Francisco	Young, Louise	San Francisco	San Francisco

TERMS OF ADMISSION.

The California Institution for the Deaf and the Blind is located at Berkeley, about four miles north of the city of Oakland.

Between San Francisco and Berkeley, railroads and ferries offer communication every ten minutes of the day, and from Oakland there are two lines of electric cars which land passengers within five minutes' walking distance of the Institution.

The Institution offers its benefits to all deaf or blind persons who are of age suitable for instruction who are of sound intellect, and free from vicious habits and contagious or offensive diseases.

No charge is made for pupils from this State, except for clothing and traveling expenses.

Pupils from other states or territories are charged \$300 per annum, payable quarterly in advance. No reduction is made from annual charge, except in case of prolonged absence by reason of sickness.

The session begins on the fourth Wednesday in August, and ends on the second Wednesday in June. Parents are earnestly requested to enter or return their children promptly at the beginning of the term. Only in extreme cases will pupils be permitted to leave before school closes.

Pupils should be provided with comfortable clothing when they enter the Institution, and their wardrobe renewed twice a year.

All moneys designed for pupils should be placed in the hands of the Principal, to whom, also, all letters of inquiry should be addressed. Money orders should be drawn on the Berkeley postoffice, and all letters, packages, trunks, etc., should be addressed "Institution for the Deaf and the Blind, Berkeley, Cal."

Parents or guardians of applicants for admission are requested to furnish answers to the following questions:

1. What is the name of the applicant?
2. When and where was he born?
3. Is his deafness or blindness from birth, or is it from accident or disease? If from accident or disease, at what age and from what cause did he become deaf or blind?
4. Is his deafness or blindness total or partial? If the latter, what is his degree of hearing or sight?

5. Have any attempts been made to remove his deafness or blindness? If so, what were the results?

6. Are there any other cases of deafness, blindness, idiocy, or insanity in the family, or among the collateral branches of kindred? If so, state the relationship?

7. Was there any blood relationship between parents or grandparents?

8. Has the child had smallpox, scarlet fever, mumps, whooping-cough, or measles? Has it been vaccinated?

9. What are the names, nationality, and postoffice address of parents?

10. What is the number of other children?

11. How long have parents lived in California?



TWENTIETH AND TWENTY-FIRST ANNUAL REPORTS

OF THE

INDUSTRIAL HOME OF
MECHANICAL TRADES
FOR THE ADULT BLIND

OF THE

STATE OF CALIFORNIA

1904-05—1905-06



SACRAMENTO:

W. W. SHANNON, : : : : SUPERINTENDENT STATE PRINTING.

1907.

BOARD OF DIRECTORS.

JOHN P. IRISH, <i>President</i> ,	-	-	-	-	-	-	Oakland.
GEORGE E. RANDOLPH, <i>Vice-President</i> ,	-	-	-	-	-	-	Oakland.
SOL. KAHN,	-	-	-	-	-	-	Oakland.
H. C. CAPWELL,	-	-	-	-	-	-	Oakland.
J. W. SCOTT,	-	-	-	-	-	-	Oakland.

OFFICERS OF THE HOME.

JOSEPH SANDERS,	-	-	-	-	-	-	Superintendent.
H. N. ROWELL,	-	-	-	-	-	-	Physician.
GEORGE S. MEREDITH,	-	-	-	-	-	-	Secretary.

TWENTIETH ANNUAL REPORT

OF THE

Superintendent of the Home for Adult Blind.

For the Year Ending June 30, 1905.



REPORT OF THE SUPERINTENDENT

FOR THE YEAR ENDING JUNE 30, 1905.

OAKLAND, CAL., June 30, 1905.

To the Honorable the Board of Directors of the Industrial Home for the Adult Blind.

GENTLEMEN: In accordance with the provisions of Section 4, subdivision eleventh, of the Act governing the Home, I herewith submit to you my report of the affairs and conditions of the Home for the year ending June 30, 1905.

The year just ending is the twentieth of the Home's existence and the sixth in which it has been under the control and management of your present Superintendent since his reinstatement by your body in 1899.

Annexed hereto are presented the several statistical tables of the affairs of the Home required to be set forth in this report.

Officers of the Home.

		Salary.
Superintendent.....	Joseph Sanders.....	\$2,100 00
Physician.....	H. N. Rowell, M.D.....	1,200 00
Secretary.....	Geo. S. Meredith.....	600 00

Employees of the Home, and their Rate of Compensation per Month.

Clerk of the Home.....	T. A. Williston.....	\$65 00
Matron and Teacher.....	Mrs. A. Sanders.....	35 00
Assistant Matron.....	Miss O. B. Smith.....	30 00
Attendant in Charge of Women.....	Mrs. C. B. Goodrich.....	30 00
Watchman and Carpenter.....	P. Mervin.....	40 00
First Cook.....	E. Weider.....	50 00
Second Cook.....	S. A. Pinchard.....	30 00
Janitor and Nurse.....	J. H. Wulzen.....	33 00
Janitor.....	H. Colley.....	22 50
Waitress.....	Miss W. Andrews.....	22 50
Waitress.....	Miss E. Houseman.....	22 50
Waitress.....	Miss K. Dyer.....	22 50
Waitress.....	Miss M. Lusk.....	17 50
Laborer.....	J. Collins.....	20 00
Driver of Wagon.....	W. Cooper.....	22 50
Reader.....	Wm. McKee.....	7 50
Total.....		\$470 50
Gardener.....	W. Gustafson, when employed, per day...	\$2 50

Inmates Employed by the Month.

Shop Assistant.....	D. Weider.....	\$35 00
Shop Assistant.....	W. Plowman.....	27 50

Employees of the Shop, and their Rate of Compensation per Month.

Shop Assistant.....	W. W. Wederin.....	\$25 00
Shop Assistant.....	M. Lucey.....	20 00
Teacher in Girls' Shop.....	Miss M. Marquette.....	16 00
Total.....		\$61 00

Names of Inmates Present during the Year ending June 30, 1905.

Name.	Date of Admission.	Age when Admitted.	Native of.
1. Elisha Andrews †.....	Jan. 14, 1904	29	California
2. D. D. Aherns.....	June 15, 1890	68	Germany
3. Maggie Aitkens.....	Oct. 1, 1887	28	Michigan
4. Luke Andrews.....	May 25, 1895	37	California
5. G. Allman.....	Aug. 25, 1902	52	Massachusetts
6. S. Brown.....	Aug. 17, 1901	42	Connecticut
7. Fred Bowman *.....	May 23, 1902	23	California
8. P. M. Belan.....	Mar. 23, 1896	34	Ireland
9. Chas. Bauhofer.....	Jan. 23, 1905	21	Switzerland
10. J. E. Buskirk.....	May 26, 1905	44	Indiana
11. J. Barrett.....	Jan. 20, 1905	25	Ireland
12. Thos. Carr.....	June 9, 1905	50	Ireland
13. A. Bellisle.....	Jan. 2, 1888	42	Canada
14. A. Berdrow *.....	Nov. 29, 1899	39	New York
15. L. Brewester *.....	Nov. 30, 1887	29	California
16. Anna Brissell.....	Mar. 30, 1888	38	New York
17. W. Brookst.....	June 5, 1899	21	California
18. T. Bulger *.....	June 17, 1897	21	California
19. E. N. Beckwith.....	Sept. 24, 1903	49	Pennsylvania
20. W. Crossfield.....	Aug. 9, 1901	22	California
21. J. L. Chamblin.....	Nov. 25, 1899	73	Kentucky
22. Isabel Cinega.....	Feb. 9, 1890	29	California
23. Margaret Clifford.....	Oct. 25, 1898	25	California
24. J. Coffey.....	Dec. 1, 1890	20	California
25. Kate Carroll.....	Jan. 4, 1901	47	Ireland
26. J. H. Craig *.....	July 31, 1902	41	Massachusetts
27. L. M. Denlis.....	Dec. 10, 1904	20	California
28. B. Daniels.....	June 24, 1890	60	Pennsylvania
29. G. Davist.....	Dec. 11, 1899	23	England
30. John Didier.....	April 17, 1896	38	Illinois
31. E. Donohue *.....	Nov. 22, 1899	34	Nevada
32. G. Dudley †.....	Nov. 30, 1885	33	California
33. Oscar Darnell.....	Dec. 17, 1902	20	Oregon
34. Alex. Derrick.....	Mar. 14, 1903	20	Arizona
35. Viola Doudell.....	Mar. 16, 1903	37	Virginia
36. Jas. Eaton.....	Aug. 31, 1903	26	Scotland
37. B. Fales.....	Sept. 20, 1893	50	Michigan
38. Sarah Fryberg.....	Jan. 25, 1904	27	Germany
39. Lillie Fulton.....	Dec. 19, 1904	35	New York
40. W. Flannigan.....	Dec. 19, 1896	35	New York
41. Alice E. Fields.....	Jan. 12, 1895	25	Maine
42. Fred Folsom †.....	Oct. 30, 1894	25	Indiana
43. W. E. Gill †.....	April 13, 1901	28	Missouri
44. T. G. Graney.....	Nov. 14, 1904	20	California
45. J. A. Gafferney.....	Jan. 9, 1886	32	California
46. Clara E. Haight.....	Oct. 12, 1903	44	California
47. Lizzie Hannah.....	Sept. 7, 1887	41	England
48. P. Hoban.....	Sept. 25, 1893	44	Ireland
49. Henry Hodges.....	May 23, 1896	49	England
50. B. Holmest.....	April 25, 1894	32	Illinois
51. Pauline Howe.....	Feb. 2, 1889	29	California
52. T. Jones.....	Oct. 29, 1903	32	Kansas
53. T. M. Jensen.....	Mar. 23, 1902	35	Denmark
54. C. E. Juckett.....	Dec. 14, 1904	25	Iowa
55. W. Johnston.....	Feb. 16, 1899	49	North Carolina
56. J. W. Judson.....	Nov. 10, 1902	22	Tennessee
57. Frank King.....	June 13, 1890	17	Massachusetts
58. D. Kraskey.....	June 16, 1890	18	Minnesota
59. M. Kouper.....	Sept. 28, 1900	38	Germany

Names of Inmates Present during the Year ending June 30, 1905—Continued.

Name.	Date of Admsision.	Age when Admitted.	Native of.
60. H. Lutz	Jan. 24, 1902	46	Germany
61. A. LaMott	Dec. 25, 1899	53	New York
62. J. Lannigan*	April 29, 1891	53	Massachusetts
63. J. LaFever*	Sept. 11, 1895	53	Belgium
64. J. Lippt	Jan. 7, 1895	20	California
65. Eliza O. Logan	Oct. 7, 1891	22	California
66. E. Lundbeck	Feb. 18, 1898	37	Sweden
67. C. Martin	Sept. 3, 1903	44	Norway
68. Rose McComb†	April 24, 1902	37	Utah
69. W. H. Massey†	Oct. 24, 1901	35	Texas
70. C. S. Morgan	Dec. 5, 1904	41	California
71. A. McGregor*	Mar. 22, 1901	45	New York
72. A. McGuinness	Aug. 9, 1895	51	England
73. R. Miller†	Mar. 22, 1901	45	New York
74. H. Mahnke*	Mar. 15, 1894	41	Germany
75. J. Marks	Nov. 29, 1895	41	New Brunswick
76. M. Marmalejo	Mar. 9, 1899	24	California
77. Emma Mast	Sept. 22, 1887	24	California
78. W. E. Mast†	June 16, 1891	21	California
79. P. Miller	Feb. 1, 1886	44	Iowa
80. Eliza J. Matlock	Dec. 16, 1899	35	Virginia
81. Louis Moulzen	Dec. 3, 1894	49	Germany
82. John Moore	Aug. 27, 1885	29	California
83. Dorinda Mullaney	Nov. 14, 1889	27	New York
84. Bryan Nelson	May 12, 1888	48	New York
85. John Nolan	May 18, 1902	48	Ireland
86. N. P. Nelson	July 28, 1905	31	Sweden
87. J. I. Nall	Nov. 3, 1903	21	Illinois
88. J. Paulsen	Aug. 22, 1904	25	Sweden
89. E. Pinzon*	Dec. 7, 1904	28	Mexico
90. W. T. Rose	July 9, 1904	20	California
91. F. C. Ross*	Aug. 12, 1903	56	Massachusetts
92. Cathern O'Rourke*	Feb. 12, 1889	51	Ireland
93. L. Orth	Sept. 2, 1895	37	California
94. W. R. Organ*	July 8, 1902	38	England
95. B. Oakland	April 15, 1903	55	Sweden
96. Eliza Parker	April 30, 1893	46	California
97. W. Peterson	Jan. 14, 1895	21	Missouri
98. W. Plowman	Oct. 19, 1899	46	Kansas
99. E. Porter†	Sept. 22, 1885	28	California
100. T. Powers	Oct. 19, 1885	40	Ireland
101. E. P. Rosenthal	Feb. 7, 1902	42	California
102. G. Richville	April 27, 1896	19	Mississippi
103. Joseph Riley	June 10, 1890	47	Ireland
104. F. R. Smith	June 3, 1905	55	Illinois
105. John Silva*	Sept. 24, 1894	21	California
106. W. H. Smith	Sept. 5, 1901	59	New York
107. Bessie M. Sherman	April 29, 1904	31	California
108. H. Salmon	April 21, 1890	21	California
109. J. Sexton	Aug. 27, 1885	42	Ireland
110. W. Shakeley	Aug. 19, 1893	44	Pennsylvania
111. Mary Slattery	Aug. 27, 1892	28	Ireland
112. Wm. Staggs	Nov. 1, 1889	23	California
113. R. Sublett	May 12, 1887	35	California
114. V. Swortellis	Dec. 27, 1887	51	Russia
115. J. Thompson	May 13, 1895	66	Scotland
116. J. M. Thompson	May 23, 1900	48	Tennessee
117. E. B. Taylor	June 9, 1892	48	Maine
118. P. Tipps	Oct. 11, 1894	48	Holland
119. J. Wickes	Feb. 9, 1901	54	Germany
120. H. Ward†	June 29, 1895	54	Illinois
121. Viola Whipple†	Sept. 11, 1895	22	Minnesota
122. D. Weider	Nov. 1, 1901	36	Iowa
123. W. W. Wight*	Oct. 25, 1902	40	Pennsylvania
124. H. H. Wisner	Aug. 22, 1904	21	Kansas
125. Kate Zimmer*	Mar. 4, 1901	21	California

† Inmates on leave of absence, 16. * Left the Home during the year, 17. Inmates on the roll July 1, 1904, 111. Inmates on the roll June 30, 1905, 108.

Inventory of Raw Material on Hand June 30, 1905.

Broomcorn, 75 tons, at \$90 per ton	\$6,750 00
Broom handles, Parlor No. 1, 8,300, at \$18.80	156 04
Broom handles, Straight Taper, No. 1, 3,200, at \$17.95	57 44
Broom handles, Parlor No. 2, 1,000, at \$16	16 00
Broom handles, Parlor No. 3, 2,625, at \$15	39 37
Broom handles, Straight Taper No. 2, 2,600, \$15	39 00
Broom handles, No. 1, Maple (painted), 600, at \$34.50	20 70
Broom handles, No. 1, Maple (misses), 150, at \$29.50	4 42
Broom handles, No. 1, Maple (parlor), 1,750, at \$29.50	51 62
Broom handles, No. 1, Maple (warehouse), 1,400, at \$31	43 40
Broom wire, 1,622 pounds, at 5½ cents per pound	89 21
Broom bands, 4,330, at \$11	47 85
Sulphur, 25 pounds, at 3½ cents per pound	88
Nails, 2 in., No. 13, 90 pounds, at \$3.65 per pound	3 28
Nails, ¾ in., No. 14, 50 pounds, at \$4.65	2 32
Velvet, 226 yards, at 24½ cents per yard	55 37
Broom locks, 720 gross, at 35 cents per gross	25 20
Canton flannel, 8 yards, at 12½ cents per yard	1 00
Broom twine, 1,495 pounds, at 30 cents per pound	448 50
Brush rods, 240, at \$15	3 60
Toy handles, 4,000, at \$14.90 per 1,000	59 60
Plush whisk caps, 6 gross, at 30 cents per gross	1 80
Rattan, 100 pounds, at 11 cents per pound	11 00
Broom labels, 77,000, at \$1.50 per 1,000	115 00
Mattress covers, 100, at 50 cents each	50 00
Broom sacks, 450, at 4 cents each	18 40
Burlap, 550 yards, at 5 cents per yard	27 50
Coir, 1 bale	17 40
Chair cane, 154,000 feet, at 50 cents per 1,000	77 00
Chair cane (binding), 25 pounds, at 36 cents per pound	9 00
Hammock stretchers, 100, at 20 cents each	20 00
Hammock rings, 1 gross, at \$4.50	4 50
Total	\$8,268 40

Inventory of Manufactured Stock on Hand June 30, 1905.

Brooms, 262 dozen, at \$2 per dozen	\$524 00
Whisks and toys, 30 dozen, at 80 cents per dozen	24 00
Hammocks, 13, at \$4 each	52 00
Hammocks, 9, at \$3 each	27 00
Hammocks, 3, at \$2 each	6 00
Hammocks (doll), 70, at 35 cents each	24 00
Total	\$657 50

Brooms Manufactured, Sold and Delivered.

Brooms on hand July 1, 1904	534
Brooms manufactured from July 1, 1904, to June 30, 1905	93,143
Total	93,677
Brooms sold and delivered during the year ending June 30, 1905	90,525
Brooms on hand June 30, 1905	3,152
Whisks on hand July 1, 1904	194
Whisks manufactured during the year ending June 30, 1905	20,799
Total	20,993
Whisks sold and delivered during the year ending June 30, 1905	20,636
Whisks on hand June 30, 1905	357

Manufacturing Statement for the Year ending June 30, 1905.

Brooms manufactured	93,143
Whisks manufactured	20,799
Mattresses manufactured	56
Hammocks manufactured	44
Broom bags manufactured	5,510
Chairs reseated	1,406
Toy hammocks manufactured	136
Mattress covers manufactured	200

Summary of Expenditures for the Year ending June 30, 1905.

Month.	Provi- sions.	Furni- ture.	Wages.	Wages of Inmates.	Drugs.	Buildi'g and Im- prove- ments.	Washing.	Raw Material.	Miscel- laneous.
1904.									
July	\$687 04	\$13 67	\$919 55	\$466 51	\$27 10	\$51 21	\$125 00	\$717 88	\$90 26
Aug.	787 36	6 60	914 65	529 45	26 45	67 83	125 00	619 22	60 21
Sept.	831 30	5 85	913 66	426 25	29 55	83 95	125 00	229 36	66 69
Oct.	765 70	38 14	919 00	472 10	25 35	52 20	125 00	628 61	114 04
Nov.	765 53	196 79	915 00	390 70	24 70	21 55	125 00	6,531 61	140 67
Dec.	828 61	17 14	916 00	349 40	33 65	132 90	135 00	483 45	57 13
1905.									
Jan.	708 20	31 33	917 50	415 60	26 40	53 67	135 00	143 66	56 33
Feb.	772 90	16 48	913 50	388 65	29 15	28 36	135 00	514 26	52 63
March	732 89	97 34	913 70	462 70	26 45	147 31	135 00	774 82	62 83
April	718 36	10 85	920 00	418 40	20 50	19 40	135 00	1,291 70	88 17
May	769 38	28 27	924 75	434 50	26 30	82 35	135 00	873 56	51 21
June	775 70	62 31	913 30	438 10	20 65	77 57	135 00	685 12	95 31
Totals.	9,142 97	524 77	11,000 61	5,192 36	316 25	818 30	1,570 00	13,493 25	935 48

Receipts and Collections for the Year ending June 30, 1905.

1904—July	\$1,801 66
August	1,730 31
September	1,918 88
October	2,181 98
November	1,753 73
December	1,524 71
1905—January	1,567 10
February	1,481 57
March	1,780 31
April	1,558 89
May	1,562 23
June	1,583 02
Total	\$20,444 39

Expenditures for Year ending June 30, 1905.

1904—July	\$3,098 52
August	3,136 77
September	2,711 31
October	3,140 14
November	9,111 55
December	2,953 28
1905—January	2,487 69
February	2,850 93
March	3,353 04
April	3,622 38
May	3,325 32
June	3,203 06
Total	\$42,993 99

Expenditures for the Year, Segregated.

Provisions.....	\$9,142 97
Furniture.....	524 77
Wages and salaries.....	11,000 61
Wages of inmates.....	5,192 36
Medicine.....	316 25
Building and improvements.....	818 30
Washing.....	1,570 00
Raw material.....	13,493 25
Miscellaneous.....	935 48
Total.....	\$42,993 99

The current expense for the year, after deducting the following items:

Furniture.....	\$524 77
Building and improvements.....	818 30
Raw material.....	13,493 25
Wages of inmates.....	5,192 36

amounts to \$20,028.68. The average number of persons residing at the Home during the year was 120. The yearly cost was, therefore, \$166.90; the weekly cost was \$3.21. The cost for provisions alone for the year was \$9,142.97. The cost per capita for provisions was, therefore, \$76.15 per year; cost per week, \$1.48; cost per day, 21 cents.

Value of Stock, Raw Material, etc., on Hand June 30, 1905.

Value of stock on hand.....	\$657 50
Value of raw material.....	8,268 40
Bills receivable.....	2,671 11
Amount in the Adult Blind Fund.....	4,536 37
Total.....	\$16,133 38

The above sum of \$16,133.38 represents the assets of the broom shop on June 30, 1905, which is an increase of \$2,388.85 since July 1, 1904. This shows that the broom shop is in a most healthy condition; and as the outlook for the future is all that I desire, I see no reason why we should be discouraged; on the contrary, I have every reason to believe that we will continue to increase our output and add to the usefulness of the institution.

It affords me pleasure to report to the Board that our output and collections are greater than those of last year (1903-04). New avenues of trade are opening and there is a greater demand than ever for our brooms. We are shipping hundreds of dozens of brooms to Central America, Hawaii, and the Philippine Islands. This assures a market for brooms manufactured from rough short corn, which of necessity accumulates in all broom shops, and it also enables us to give constant employment to our unskilled workmen who are unable to make a first-class article.

It is also gratifying to inform the Board that we still continue to receive letters from institutions for the blind which have been estab-

lished throughout the United States, Canada, and Europe, as well as from many which are being organized, asking us for guidance and advice as to the best methods of procedure in order that their institutions may be the success which they all concede ours to be. I make mention of this fact as it proves that our institution is considered, by those qualified to judge, the model one of its kind in the world, or rather that it is the one which has solved the problem of employing the blind mechanic and making him a self-respecting and useful citizen.

Thanks to the efforts of the Board of Directors and the generosity of his Honor, Governor Pardee, we have received an appropriation of \$25,000 for a new shop. The old workshop has long since served its purpose. It is true that we are able to manufacture many hundreds of dozens of brooms each month, yet we suffer many disadvantages which the condition of the old shop entailed upon the blind workmen. During the winter months it is cold and damp, so much so that the aged blind are frequently forced to remain idle, thus adding to the sadness of their affliction. With the advent of the new shop all this will be changed. A warm, comfortable workshop, heated with steam, will add to their happiness and comfort and assure them steady employment throughout the year. It is planned to make the capacity of the new shop equal to the requirements which the natural growth of the institution will demand from it. As the institution grows and as the number of inmates increase, the new shop, we are satisfied, will be found large enough, and will fill every requirement for many years to come. I trust that the new shop will be but the beginning; and as each Legislature convenes, new and substantial buildings will be added, until we have a model institution, which will stand as a monument to the Board of Directors, and will be one of which the State will be justly proud.

We have on the roll between twenty-five and thirty aged and infirm blind who are practically non-producers. It is true that a number of these are employed, at their own request, in the shop; but their capacity for labor is such that it does not add to our output. From a humanitarian standpoint, however, I deem it best to keep them busy, as it adds to their happiness and fulfills the purpose of the Organic Act.

Two or three of our inmates have learned trades and have left the Home, and are now self-supporting on the outside. If nothing else were accomplished, this in itself would be sufficient encouragement for further efforts.

During the year we paid the blind mechanics over \$5,000 in wages. To this should be added about \$1,000 which those blind men who work on the outside are able to earn, by reason of the fact that they enjoy the privileges of the Home.

It will be seen by referring to this report that we have accumulated quite a large amount in the Adult Blind Fund. This has been done

largely by reason of the fact that I was permitted by your honorable body to buy broomcorn in the open market. Had I been compelled to purchase from the dealers who presented bids last October (and whom it appears had entered into a combine), the profits of the broom shop would have gone into the pockets of the contractors instead of into the Adult Blind Fund, where it properly belonged.

We have had a good deal of sickness among the aged inmates, and ten died during the year. The general health of the institution, however, is good, thanks to the faithfulness of our physician, Dr. H. N. Rowell. Through his suggestion a small infirmary has been fitted up, and we are now able to isolate cases when infection is to be feared. He has also suggested changes in the sanitary conditions, which I have carried out, and I take this opportunity of thanking him for his willingness to answer all calls, day or night, and for his assistance and unselfish devotion to the interests of the institution.

The officers and employés of the institution have been attentive and faithful to their duties during the year that has just passed. I am satisfied that I have as good a corps of employés as are to be found in any institution in the State, and I take this opportunity of thanking them for their efficient service.

In conclusion, I desire to thank deeply your honorable body for the honor conferred upon me and for the good will and assistance you have rendered in the execution of my charge and its duties. It has been, and shall be, my continual endeavor to carry out faithfully the responsibilities devolving upon me and to execute the worthy aims of yourselves.

Respectfully submitted.

JOSEPH SANDERS,
Superintendent.

TWENTY-FIRST ANNUAL REPORT

OF THE

Board of Directors of the Home for Adult Blind.

ALSO

ANNUAL REPORT OF THE SUPERINTENDENT

For the Year Ending June 30, 1906.

REPORT OF BOARD OF DIRECTORS.

To HON. GEORGE C. PARDEE,

Governor of the State of California.

SIR: The Board of Directors of the Home for the Adult Blind presents this, its twenty-first annual report of the condition of that institution.

The statistical statement required by law will be found in the annual report of the Superintendent, appended hereto.

Since the close of the last fiscal year the receipts of the Home for manufactured articles sold, up to the close of November, were \$10,216.54, making the total receipts for the seventeen months preceding December, 1906, \$31,999.83, or an average of \$1,882.34 per month, paid into the Adult Blind Fund. The earthquake damaged the buildings to the amount of \$1,899.33, and that amount was paid out of the Adult Blind Fund for the necessary repairs.

The last Legislature appropriated money to build a new broom shop, which has long been needed. As the inexpediency of a brick shop was made apparent, a substantial, comfortable, and properly equipped frame shop was planned and is now approaching completion.

Applications for admission to the institution are constantly increasing, but all available space is occupied by inmates, and those on the waiting list must wait for vacancies to occur by mortality or withdrawal. The Board of Directors strongly recommends an appropriation for an additional dormitory, in order that the State may be able to do its duty by its blind citizens who apply for and are entitled to the benefits of this useful institution.

The great advance in the cost of maintenance makes necessary a larger appropriation for that purpose; the wages of employés, cooks, waiters, drivers, etc., have largely advanced, as have the prices of supplies. The Board therefore urges an increase of \$2,000 in the appropriation for the next biennium.

The law authorizes the Directors to receive bequests and donations, but requires that such gifts of money be put into the Adult Blind Fund, where they are used in paying the running expenses of the institution. This feature deters the charitable friends of the blind from making donations and bequests to the Home, as they naturally prefer that the gift fund should be used to add to the permanent buildings, or to enlarge hospital facilities. It is the opinion of the Directors that such change in the law will result in donations and bequests that will soon

enable needed and permanent additions to the facilities of the institution. Already two bequests have been made, and the legal administrators of the estates are delaying distribution in the hope that the Legislature will so change the law that the gifts will not be used in maintenance.

The Directors are glad to testify to the ability and devotion of the Superintendent, Mr. Sanders, and of all the administrative officers of the institution.

As noted in the Superintendent's report, the Home has become a model for the world, and it is the pride of Californians that this State institution is studied and copied by many states and by foreign countries. Its needs are confidently commended to the Legislature.

JOHN P. IRISH,
President of Board of Directors.

Subscribed and sworn to before me, this 5th day of December, 1906.

[SEAL.]

GEO. H. PROBASCO,
Notary Public in and for the City and County
of San Francisco, State of California.

REPORT OF SUPERINTENDENT.

FOR THE YEAR ENDING JUNE 30, 1906.

OAKLAND, CAL., June 30, 1906.

To the Honorable the Board of Directors of the Industrial Home for the Adult Blind.

GENTLEMEN: In accordance with the provisions of Section 4, subdivision eleventh, of the Act governing the Home, I herewith submit to you my report of the affairs and conditions of the Home for the year ending June 30, 1906.

The year just ending is the twenty-first of the Home's existence and the seventh in which it has been under the control and management of your present Superintendent since his reinstatement by your body in 1899.

Annexed hereto are presented the several statistical tables of the affairs of the Home required to be set forth in this report.

Officers of the Home.

		Salary.
Superintendent	Joseph Sanders	\$2,100 00
Physician	H. N. Rowell, M.D.	1,200 00
Secretary	Geo. S. Meredith	600 00

Employees of the Home, and their Rate of Compensation per Month.

Clerk of the Home	T. A. Williston	\$65 00
Matron	Mrs. A. Sanders	35 00
Assistant Matron	Miss O. B. Smith	30 00
Attendant in charge of women	Mrs. C. B. Goodrich	30 00
Watchman	M. Jarrett	40 00
First Cook	D. Bennett	50 00
Second Cook	T. Attillie	30 00
Janitor and Nurse	J. H. Wulzen	33 00
Janitor	J. Hughes	23 50
Waitress	Miss Dyer	22 50
Waitress	Miss Hughes	22 50
Waitress	Miss Rassmussen	22 50
Waitress	Miss Schriener	17 50
Laborer	R. Douse	25 00
Driver of Wagon	W. Cooper	22 50
Reader	W. Pillsbury	7 50
Total		\$476 50
Gardener	W. Gustafson, when employed, per day	2 50

Inmates Employed by the Month.

Shop Assistant.....	D. Weider.....	\$35 00
Shop Assistant.....	W. Plowman.....	27 50

Employees of the Home, and their Rate of Compensation per Month.

Shop Assistant.....	George Zimmer.....	\$25 00
Shop Assistant.....	Ed Timmell.....	20 00
Teacher in Girls' Shop.....	Miss Marquett.....	17 50
Total.....		\$62 50

Names of Inmates Present during the Year ending June 30, 1906.

Name.	Date of Admission.	Age when Admitted.	Native of.
1. Elisha Andrews*	Jan. 14, 1904	29	California
2. D. D. Abers	June 15, 1890	68	Germany
3. Maggie Aitkens	Oct. 1, 1887	28	Michigan
4. Luke Andrewst	May 25, 1895	37	California
5. G. Allman	Aug. 25, 1902	52	Massachusetts
6. S. Brown	Aug. 17, 1901	42	Connecticut
7. P. M. Behan	Mar. 23, 1898	34	Ireland
8. Chas. Bauhofert	Jan. 23, 1905	21	Switzerland
9. J. E. Buskirk	May 6, 1905	44	Indiana
10. J. Barrett	Jan. 20, 1905	25	Ireland
11. Thos. Carr	June 9, 1905	50	Ireland
12. A. Bellisle	Jan. 2, 1888	42	Canada
13. Miss Brissell	Mar. 30, 1888	38	New York
14. Wm. Brooks†	June 5, 1899	21	California
15. E. N. Beckwith	Sept. 2, 1903	49	Pennsylvania
16. Wm. Crossfield†	Aug. 9, 1901	22	California
17. J. L. Chamblin	Nov. 25, 1899	73	Kentucky
18. Isabel Cinega	Feb. 9, 1890	29	California
19. Margaret Clifford	Oct. 25, 1898	25	California
20. John Coffey	Dec. 1, 1890	20	California
21. Kate Carroll	Jan. 4, 1901	47	Ireland
22. Lewis Denlis*	Dec. 30, 1904	20	California
23. Ben. Daniels*	June 24, 1890	60	Pennsylvania
24. Geo. Davist	Dec. 11, 1899	23	England
25. John Didier	April 17, 1898	38	Illinois
26. G. Dudley†	Nov. 30, 1885	33	California
27. Oscar Darnell	Dec. 17, 1902	20	Oregon
28. Alex. Derrick*	Mar. 14, 1903	20	Arizona
29. Viola Doudell	Mar. 16, 1903	37	Virginia
30. James Eaton	Aug. 31, 1903	26	Scotland
31. B. Fales	Sept. 20, 1893	50	Michigan
32. Sarah L. Fryberg	Jan. 25, 1904	27	Germany
33. Lillie E. Fulton*	Dec. 19, 1904	35	New York
34. Wm. Flannigan	Dec. 9, 1896	35	New York
35. Alice E. Fields	Jan. 12, 1895	25	Maine
36. Fred Folsom†	Oct. 30, 1894	25	Indiana
37. Samuel D. Grant	April 4, 1906	19	California
38. W. E. Gill†	April 13, 1901	28	Missouri
39. T. C. Graney	Nov. 14, 1904	20	California
40. J. H. Gafferney	Jan. 9, 1886	32	California
41. Clara E. Haight*	Oct. 12, 1903	44	California
42. Lizzie Hannah	Sept. 7, 1887	41	England
43. P. Hoban	Sept. 25, 1893	44	Ireland
44. Henry Hodges	May 23, 1896	49	England
45. Benj. Holmest	April 25, 1894	32	Illinois
46. Pauline Howe	Feb. 2, 1889	29	California
47. T. Jonest	Oct. 29, 1903	32	Kansas
48. T. M. Jensen	Mar. 23, 1902	35	Denmark
49. C. E. Juckett	Dec. 14, 1904	25	Iowa
50. Wm. Johnston	Feb. 16, 1899	49	North Carolina
51. J. W. Judson	Nov. 10, 1902		Tennessee
52. Frank King	June 13, 1890	17	Massachusetts
53. D. Kraskey	June 16, 1890	18	Minnesota
54. M. Kouper	Sept. 28, 1900	38	Germany

Names of Inmates Present during the Year ending June 30, 1906—Continued.

Name.	Date of Admission.	Age when Admitted.	Native of.
55. H. Lutz	Jan. 24, 1902	46	Germany
56. A. LaMott	Dec. 23, 1899	53	New York
57. James Lippt	Jan. 7, 1895	20	California
58. Eliza O. Logan	Oct. 7, 1891	22	California
59. E. Lundbeck	Feb. 18, 1898	37	Sweden
60. J. McDonald	July 12, 1905	37	Ireland
61. A. McNeil*	Feb. 24, 1906	56	Prince Edward Island
62. Ellen P. Morgan	May 1, 1906	29	Utah
63. Clara Long	May 1, 1906	41	Illinois
64. C. Martin	Sept. 3, 1903	44	Norway
65. Rose McComb†	April 24, 1902	37	Utah
66. W. H. Massey†	Oct. 24, 1901	33	Texas
67. C. S. Morgan	Dec. 5, 1904	41	California
68. A. McGuinness	Aug. 9, 1895	51	England
69. J. Marks*	Nov. 29, 1895	41	New Brunswick
70. M. Marmelejo	Mar. 9, 1899	24	California
71. Emma Mast	Sept. 22, 1887	24	California
72. W. E. Mast†	June 16, 1891	21	California
73. P. Miller	Feb. 1, 1886	44	Iowa
74. Eliza J. Matlock	Dec. 16, 1899	35	Virginia
75. L. Moulzen	Dec. 3, 1884	49	Germany
76. J. Moore	Aug. 27, 1885	29	California
77. Dorinda Mullaney	Nov. 14, 1889	27	New York
78. Bryan Nelson	May 12, 1888	48	New York
79. John Nolan	May 18, 1902	48	Ireland
80. N. P. Nelson	July 28, 1903	31	Sweden
81. J. I. Nall	Nov. 5, 1903	21	Illinois
82. J. Pasco	Dec. 29, 1905	48	England
83. J. Paulsen	Aug. 22, 1904	45	Sweden
84. W. T. Roset	July 9, 1904	40	California
85. L. Orth	Sept. 2, 1895	37	California
86. B. Oakland	April 15, 1903	55	Sweden
87. Eliza Parker	April 30, 1893	46	California
88. W. Peterson	Jan. 14, 1895	21	Missouri
89. W. Plowman	June 1, 1899	46	Kansas
90. E. Portert†	Sept. 22, 1885	28	California
91. T. Powers	Oct. 19, 1885	40	Ireland
92. E. P. Rosenthal*	Feb. 7, 1902	42	California
93. C. L. Reynolds	Aug. 31, 1905	49	Maryland
94. G. Richville	April 27, 1896	19	Mississippi
95. J. Riley	June 19, 1890	47	Ireland
96. F. R. Smith	June 3, 1905	55	Illinois
97. J. H. Sheenan	Mar. 6, 1906	50	Ireland
98. W. H. Smith	Sept. 5, 1901	59	New York
99. B. M. Sherman	April 29, 1904	31	California
100. H. Salmon	April 21, 1890	21	California
101. J. Sexton	Aug. 27, 1885	42	Ireland
102. W. Shakeley	Aug. 29, 1893	44	Pennsylvania
103. Mary Slattery	Aug. 27, 1892	48	Ireland
104. W. Staggs	Nov. 1, 1888	23	California
105. R. Sublett	May 12, 1887	35	California
106. V. Swortellis	Dec. 27, 1887	51	Russia
107. J. Thompson	May 13, 1895	66	Scotland
108. J. M. Thompson	May 25, 1900	48	Tennessee
109. E. B. Taylor	June 9, 1892	45	Maine
110. P. Tipps	Oct. 11, 1894	48	Holland
111. F. Weiland	Oct. 19, 1905	63	Germany
112. J. Wickers	Feb. 9, 1901	54	Germany
113. H. Ward†	June 29, 1895	54	Illinois
114. Viola Whipple	Sept. 11, 1895	22	Minnesota
115. D. Weider	Nov. 1, 1901	36	Iowa
116. H. H. Wisner	Aug. 22, 1904	45	Kansas

† Inmates on leave of absence, 17. * Left the Home during the year, 9. Inmates admitted during the year, 9. Inmates died during the year, 1. Inmates on the roll June 30, 1905, 111. Inmates on the roll June 30, 1906, 111.

Inventory of Raw Material on Hand June 30, 1906.

Broomcorn, 50 tons, at \$90 per ton	\$4,500 00
Broom handles, cedar, 34,000, at \$20 per 1,000	680 00
Broom handles, maple, 50,000, at \$24 per 1,000	1,200 00
Broom handles, maple, warehouse, 1,400, at \$33 per 1,000	46 20
Broom handles, No. 3 Alder, 3,800, at \$15 per 1,000	57 00
Broom twine, orange, 185 pounds, at 31½ cents per pound	58 27
Broom twine, green and red, 567 pounds, at 29½ cents per pound	167 26
Broom twine, gray, No. 48, 60 pounds, at 18 cents per pound	10 80
Broom twine, gray, No. 18, 60 pounds, at 19 cents per pound	11 40
Broom twine, gray, No. 12, 100 pounds, at 17 cents per pound	17 00
Whisk twine, 9 pounds, at 42 cents per pound	3 78
Hammock twine, 37 pounds, at 28 cents per pound	10 36
Rope, 65 pounds, at 15 cents per pound	9 75
Wire, tinned, 1,450 pounds, at \$5.35 per 100 pounds	77 57
Wire, galvanized, 500 pounds, at \$6.40 per 100 pounds	32 00
Broom bands, 1,200, at \$10 per 100	12 00
Broom locks, 675 gross, at 30 cents per gross	202 50
Sulphur, 50 pounds, at 3 cents per pound	1 50
Broom dye, 8 pounds, at \$1 per pound	8 00
Rattan, 290 pounds, at 11 cents per pound	31 90
Nails, 30 pounds, at 4 cents per pound	1 20
Broom staples, 15 pounds, at 25 cents per pound	3 75
Bluestone, 12 pounds, at 5 cents per pound	60
Velvet, 340 yards, at 24 cents per yard	81 60
Brush rods, 500, at \$14 per 1,000	7 00
Toy handles, 3,700, at \$14 per 1,000	46 20
Plush caps, 50 gross, at 20 cents per gross	10 00
Chair cane, 200,000 feet, at 50 cents per 1,000 feet	100 00
Burlap, 500 yards, at 5½ cents per yard	27 50
Hammock stretchers, 50, at 15 cents each	7 50
Hammock rings	2 25
Ticking, 100 yards, at 12 cents per yard	12 00
Coir, 1 bale, at \$17.40	17 40
Total	\$7,454 29

Inventory of Manufactured Stock on Hand June 30, 1906.

Brooms, 110 dozen, at \$2.15	\$236 50
Whisks, 13 dozen, at \$1	13 00
Hammocks, toy, 19 dozen, at \$4	76 00
Hammocks, 8, at \$3.50	28 00
Hammocks, 2, at \$3	6 00
Hammocks, 3, at \$2	6 00
Mattresses, 9, at \$1	9 00
Broom bags, 500, at 4 cents	20 00
Total	\$394 50

Brooms Manufactured, Sold, and Delivered.

Brooms on hand July 1, 1905	3,152
Manufactured, July 1, 1905, to June 30, 1906	99,853
Total	103,005
Brooms sold and delivered	101,687
Brooms on hand June 30, 1906	1,318
Whisks on hand July 1, 1905	357
Manufactured July 1, 1905, to June 30, 1906	19,850
Total	20,207
Whisks sold and delivered July 1, 1905, to June 30, 1906	20,047
Whisks on hand June 30, 1906	160

Manufacturing Statement for the Year ending June 30, 1906.

Brooms manufactured	99,853
Whisks manufactured	19,850
Chairs reseatd	1,352
Mattresses manufactured	114
Pillows manufactured	8
Broom bags manufactured	5,698
Frames recaned	2
Hammocks manufactured	13
Toy hammocks manufactured	341

Summary of Expenditures for the Year ending June 30, 1906.

Month.	Provi- sions.	Furni- ture.	Wages.	Wages of Inmates.	Drugs.	Building and Im- prove- ments.	Washing.	Raw Material.	Miscel- laneous
1905.									
July	\$711 82	\$8 99	\$914 50	\$360 90	\$31 75	\$20 60	\$135 00	\$416 27	\$46 70
Aug.	784 24	38 04	917 72	475 67	32 00	23 60	135 00	706 34	53 77
Sept.	786 58	31 25	914 50	336 40	23 90	210 03	135 00	997 23	70 27
Oct.	704 17	114 13	909 86	333 54	31 80	138 97	135 00	3,233 74	103 70
Nov.	803 94	3 40	918 55	507 65	31 65	27 38	135 00	2,171 84	53 72
Dec.	782 49	20 31	913 50	407 00	30 10	76 90	135 00	664 80	339 65
1906.									
Jan.	774 23	71 84	928 75	407 95	22 80	172 41	135 00	2,483 22	68 77
Feb.	722 90	14 63	916 70	426 35	24 60	60 84	135 00	444 58	61 17
Mar.	781 94	18 65	917 98	494 40	27 90	53 00	135 00	1,899 77	82 91
Apr.	753 35	12 25	917 00	419 15	29 60	233 18	136 00	277 77	29 05
May	756 18	30 41	908 25	531 45	32 95	79 35	135 00	1,005 00	98 08
June	782 17	45 30	922 65	402 25	18 00	166 25	135 00	663 90	91 45
Total.	9,144 01	409 20	10,999 96	5,192 71	337 05	1,262 51	1,621 00	14,964 46	1,099 04

Receipts and Collections for the Year ending June 30, 1906.

1905—July	\$1,562 34
August	1,989 35
September	1,603 74
October	1,665 65
November	1,515 74
December	2,017 95
1906—January	1,587 26
February	1,536 09
March	2,279 28
April	935 60
May	2,842 03
June	2,242 26
Total	\$21,777 29

Expenditures for the Year ending June 30, 1906.

1905—July	\$2,646 53
August	3,166 18
September	3,505 16
October	5,704 91
November	4,653 13
December	3,369 75
1906—January	5,064 97
February	2,806 77
March	4,411 55
April	2,807 35
May	3,576 67
June	3,316 97
Total	\$45,029 94

The current expense for the year, after deducting the following items:

Furniture	\$409 20
Building and improvements	1,262 51
Raw material	14,964 46
Wages of inmates	5,192 71

amounts to \$23,201.06. The average number of persons residing at the Home during the year was 125. The yearly cost was, therefore, \$185.61; the weekly cost was \$3.32. The cost of provisions alone was, for the year, \$9,144.01. The cost per capita for provisions was, therefore, \$73.15 per year; cost per week, \$1.40; cost per day, 20 cents.

Value of Stock, Raw Material, etc., on Hand June 30, 1906.

Raw material.....	\$7,454 29
Value of manufactured stock.....	394 50
Bills receivable.....	2,898 51
Amount in Adult Blind Fund	6,281 68
Total.....	<u>\$17,028 98</u>

The above sum of \$17,028.98 represents the assets of the broom shop on June 30, 1906, which is an increase of \$895.60 since July 1, 1905. This proves that our manufacturing interests are in a most healthy condition; our trade continues good, and our output is on the increase. This is shown by the fact that we manufactured over 6,000 brooms more during the year 1905-06 than we did during the year 1904-05. This condition of affairs must be very gratifying to your honorable body, also to the Governor of the State, as well as to the friends and patrons of the institution. It is particularly gratifying to myself, as the last administration positively declared, after closing the shops, "They never would be opened and run successfully, because they had tried and failed."

It gives me pleasure to know that our institution is one of the leading institutions of its kind in the world. We are continually receiving letters, asking for advice and guidance, from institutions all over the civilized world.

The inmates, with few exceptions, have tried their best to make the shop a success, and their conduct has done much to maintain the high standard of the institution. The result of their efforts is shown in this report.

The officers, and also the employes, have given good satisfaction, and I am well pleased with each individual effort, and I take this opportunity of thanking them for service well performed.

I can not find words too strong to express my appreciation for the faithful and efficient services of our physician, Dr. H. N. Rowell, and I also wish to thank him for the very able manner in which he performs his duties, and for his affable and courteous bearing toward all, and also for his willingness to answer all demands made upon his time either day or night.

In conclusion, I desire to thank deeply your honorable body for the honor conferred upon me and for the good will and assistance you have rendered in the execution of my charge and its duties. It has been, and shall be, my continual endeavor to carry out faithfully the responsibilities devolving upon me and to execute the worthy aims of yourselves.

Respectfully submitted.

JOSEPH SANDERS,
Superintendent.

SIXTH BIENNIAL REPORT

OF THE

STATE DAIRY BUREAU

TO THE

GOVERNOR OF THE STATE OF CALIFORNIA.

1904-1906.



SACRAMENTO:

W. W. SHANNON, : : : : SUPERINTENDENT STATE PRINTING.

1907.

THE STATE DAIRY BUREAU.

JOHN A. BLISS, *Chairman*, - - - - - OAKLAND.

W. FRANK PIERCE, - - - - - SAN FRANCISCO.

GEORGE R. SNEATH, - - - - - SAN BRUNO.

WM. H. SAYLOR, *Secretary and Chemist*, San Francisco.

Office: San Francisco.

SAN FRANCISCO, October 1, 1906.

To His Excellency, GEORGE C. PARDEE,

Governor of the State of California.

SIR: In compliance with the requirements of an Act of the Legislature, approved March 4, 1897, and an Act approved March 20, 1905, we have the honor to submit herewith the sixth report of the State Dairy Bureau for the two years ending October 1, 1906.

Respectfully,

JOHN A. BLISS,

Chairman.

WM. H. SAYLOR,

Secretary and Chemist.

SIXTH BIENNIAL REPORT.

PART I.

In presenting its sixth biennial report, it is most gratifying for the State Dairy Bureau to state that the two years covered by it have witnessed a continuation of the advance of the dairy industry in the State and a remarkable degree of prosperity among those identified with it, whether as the dairyman who keeps the cows, the manufacturer who converts their milk into the various products, or the dealer who finds a market for them. The past eight years, during which reliable statistics relative to dairying have been available, have shown an increase in the butter output of the State from 23,691,028 pounds in 1898 to 44,044,578 pounds for the year ending on the date of this report. No other industry of the State has witnessed such remarkable growth, and it indicates that the people are awakening to the adaptability of California to dairying. Throughout the districts of the State where dairying is most common, we find farmers with substantial cash incomes, debt free and with deposits in banks. In one important dairy county in California, the deposits of money in the local banks by dairymen have been so excessive that no interest whatever is allowed depositors. Much of this surplus money that has come out of the cow-keeping business has sought investment in stocks, bonds, and other securities. In fact, it has become somewhat common for financial operators to seek investors in the country for securities, instead of sending money to the country to loan upon mortgages, as was the financial trend not many years ago.

There are a number of agencies that have contributed to the success of the dairy interests in California, the principal one, of course, being the adaptability of our soil and climate to the production of cheap forage. The general prosperity of the country has permitted a large consumption of dairy products, which has been encouraged by the excellent quality that our producers are learning to put into dairy products.

During the two years covered by this report prices for all kinds of dairy products have ruled higher than they have for the past fifteen years, notwithstanding our increased production—in case of butter.

Only one obstacle has impeded a still more noticeable advancement

of the dairy industry in the State, and that is the difficulty dairymen find in securing the necessary help to do the milking of their herds. The stringency in this particular kind of labor has become so serious that it has prevented many citizens of the State from continuing in the dairy business. Were it not for this drawback, California would in a very short time leap to the front as one of the most important dairy sections of the world. The milking of cows is an occupation that does not appeal to the American workman, which has created two classes of dairymen in California. One of these consists of those who keep only such a number of cows as can be milked by the owner and his family. This represents our most successful class of dairymen. Such a dairyman has his cows under his immediate supervision. He knows their individual peculiarities, the care they individually need, and their individual productiveness and value to him.

The other is that large class of dairymen who have large herds cared for by hired employés. The only source for such labor seems to be among foreigners, and even this class, which in the past has taken to dairy work so willingly, seems to have been so much attracted to other lines of labor, as a result of present general industrial conditions, that despite the good wages offered by dairymen, the supply is discouragingly short, and to a degree that is preventing the more rapid expansion of a great industry and cheaper dairy products for the consumer.

Out of the labor scarcity there seems to be one source of comfort for the dairyman which is so important that it deserves mention. It is the fact that inventive genius has arrived at a mechanical device that milk cows with sufficient success to warrant its use. The last year or two have seen several forms of milking machines placed upon the market. Should their introduction prove the success their manufacturers claim for them, the most vexatious problem confronting the dairyman, and those who would be dairymen were it not for the scarcity of the kind of labor they require, would be solved and great areas of land adapted to growing dairy feed would come into use, with the result that we would send immense quantities of dairy products out of the State.

We dwell at some length upon the conditions of dairying in the State, for the reason that the object in creating the State Dairy Bureau by the people of the State was to assist in the development of this industry for which it is so admirably adapted and to save its progress from the abuse that may have a degrading or obstructive tendency. Along this line the last session of the Legislature enacted several new laws of great importance, and the Bureau has been enforcing them to the best of its ability during the past two years.

DUTIES OF THE BUREAU.

A resumé of some of the duties of the State Dairy Bureau during the two years covered by this report is given below:

1. To prevent the sale of substitutes for butter (oleomargarine) and cheese in the State, unless the purchaser is advised by proper labeling of the article as to its real character.
2. To enforce the law preventing the manufacture of cheese in the State, unless the same is branded so as to advise the purchaser whether it is "full cream" (that is, made from unskimmed milk) or "skimmed cheese" (that is, made from milk partly skimmed of its cream).
3. To register and issue State "brands" to producers of cheese.
4. To enforce the law preventing the sale of renovated butter unless the same is labeled as such.
5. To issue licenses to manufacturers and dealers in renovated butter and collect fees for the same and pay them to the State Treasurer.
6. To enforce the law preventing the use of inaccurate testing apparatus in connection with the Babcock or other means determining the butter-fat in milk and cream.
7. To test apparatus used with the Babcock test for accuracy upon application of citizens.
8. To enforce the law preventing the sale of milk, or milk products, from diseased cows or from an unsanitary dairy or factory of dairy products.
9. To enforce the law preventing the indiscriminate use of chemical preservatives, thickening material, and coloring matter in milk and cream.
10. To enforce the law preventing the misbranding of butter as to the name of the producer or place of production.
11. To enforce the law compelling dealers in and manufacturers of butter to place the correct weight on retail packages. (Law declared unconstitutional.)
12. To gather statistics and other information relative to the dairy industry and disseminate the same.

OLEOMARGARINE.

Although the Bureau has exercised the most thorough vigilance to prevent any one in the State from selling oleomargarine as a substitute for butter in violation of the law, not a single instance of its sale, either by complying with the law in regard to labeling, or in violation of it, has been discovered. Neither has the Bureau received, during the period covered by this report, a single report or complaint from any source that it has been offered for sale within the State.

This freedom of our dairy interests from interference with the "oleo

fraud" seems to indicate that oleomargarine makers have abandoned California as a field in which to find a market for their product. It has frequently been suggested that, as a result of this freedom, there is no longer need for watchfulness on the part of the State and that the energy expended in this way could be directed into other channels. The fact, however, must be considered that if this State has been abandoned by the oleomargarine interests, the same interests are by no means inactive in other states, where they are putting every energy into their efforts to maintain and increase the trade in oleomargarine. Pennsylvania may be taken as an example of a State where the makers and dealers in oleomargarine are extremely unwilling to recede, regardless of the energy displayed by her officials who enforce the law to regulate traffic in oleomargarine. In his recent report, the Dairy and Food Commissioner of that State reports that notwithstanding the vigorous activity maintained for a number of years by the State to prevent the unlawful sale of oleomargarine, it found it necessary to prosecute cases during the last year that resulted in the imposition of fines amounting to \$10,890.98. From this fact it is seen that makers of oleomargarine, although they may have withdrawn from the field in California, are determined to maintain, if possible, their trade for oleomargarine in the disguise of butter, and there can be little doubt that if California were to relax her vigilance, oleomargarine makers would take advantage of the opportunity and resume business here. The experience of Pennsylvania also would indicate that the Federal law enacted in 1902 has not proven itself an absolute barrier to the imposition of oleomargarine upon the public in the disguise of butter. In speaking of this defect in the operation of the Federal law, the Dairy Commissioner of Pennsylvania says:

An inquiry into the provisions of the laws enacted by the Congress of the United States, regulating the manufacture and sale of oleomargarine and other substitutes for butter, reveals the fact that in some instances such laws are not so framed as to give to the dairy interests of the country the protection they were intended to secure. For example, at the time prosecutions were brought by the Dairy and Food Commissioner of this State against certain contractors who had engaged to supply butter to the United States Government at League Island Navy Yard, Philadelphia, the United States district attorney at Philadelphia was notified that the Federal oleomargarine law had been violated and the United States Government had been defrauded by the substitution of colored oleomargarine for butter, and when asked to prosecute the guilty parties, that official declared that it would be useless to begin prosecutions for the reason that conviction could not be secured without proving that the offenders had "knowingly" violated the law. The word "knowingly" should be stricken from the statutes.

It has also developed that to secure convictions under the section of the law referred to, it must be proven that the color which gives to oleomargarine the appearance of butter is the result of some foreign substance introduced for that purpose. While it may be plainly apparent that such coloring matter had been introduced, it would, in most cases, be difficult to prove, and this difficulty should be relieved by the amendment of the statute.

A further feature in which the Federal law has proven somewhat disappointing as a protection for butter against oleomargarine is the attitude of the Internal Revenue Department of the United States on the question. Although plainly enacted with a view of suppressing the sale of oleomargarine in imitation of butter, the revenue officials seem to view it as a "revenue" measure primarily, and only incidentally as a protection against fraud. Hence, it seems that they do not wish to interfere in a manner that will prevent the traffic in oleomargarine, lest this source of revenue for the Government be restricted.

In view of these facts, which have received much attention at the hands of the dairy commissioners of the different states, it would be dangerous to the dairy interests of a State that has imitation butter (oleomargarine) under control to relax its hold on the situation.

The production of oleomargarine in the United States is shown in the following table secured from the Commissioner of Internal Revenue:

Oleomargarine Production in the United States.

Year.	Pounds.
1888	34,325,527
1889	35,664,026
1890	32,324,932
1891	44,392,409
1892	48,364,155
1893	67,224,298
1894	69,622,246
1895	56,958,105
1896	50,853,234
1897	45,531,207
1898	57,516,136
1899	83,130,474
1900	107,045,028
1901	104,943,856
1902	126,316,436
1903	71,804,192
1904	48,071,480
1905	49,880,982
1906	53,146,659
Total	1,208,627,919

RENOVATED BUTTER.

In its last report this Bureau pointed out several defects in the law in force at that time relative to renovated or "process" butter that prevented it from accomplishing the purpose for which it was enacted, and suggested the advisability of amending it. At its last session the Legislature acted upon the recommendation made, with the result that an entirely new law (published in the Appendix) was enacted, which, among other features, repeals the one formerly in force.

The Act now in force eliminates the term "process butter," which has been objected to as misleading and not defining the true nature of the article and not the proper form by which to designate it when labeling it so as to inform the intending purchaser of its true nature. Instead, it adopts the term "renovated" butter, by which this particular kind of butter is to be recognized, and requires that all such butter offered for sale in the State shall be labeled as renovated butter.

In view of the enactment of this new law, it is proper to explain here what is meant by "renovated" butter. It is a product made from butter that has become so stale or rancid that it is inedible. By melting this rancid butter the liquid oil may be treated in various methods by means of which the compounds that give rise to the objectionable odors and flavor are at least temporarily removed. This clarified or "processed" oil is solidified and churned with milk or cream, resulting in what is properly termed renovated butter. Although a low grade of butter, on account of its temporary freshness, this article, unless prevented by law, is generally sold as fresh butter, the deception becoming apparent if not consumed shortly after making, or if not kept under refrigeration. This form of deception has annoyed the producers and dealers in normal butter to such an extent that the leading dairy states in the Union have statutes compelling it to be sold under a label that will advise the purchaser of its true character.

The law also requires manufacturers and dealers to secure a license from the State Dairy Bureau and to pay to the State annual fees for the same in order to engage in the renovated butter business, the fees to be paid by the Bureau into the State Treasury.

This Act has been in effect a year and a half. Up to the present time the Bureau has been unable to find that any renovated butter has been offered for sale in the State, and no applications for licenses have been received. Up to the present time this class of butter has not been manufactured in the State, owing to the fact that the supply of low-grade butter is not large enough to warrant it, a feature of our dairy business that speaks well for the high average quality of California butter. In fact, each year considerable quantities of low-grade butter are brought into the State to supply the demand for cooking butter, of which we do not produce enough.

A few months prior to the time when the new law went into effect, the officers of the Bureau discovered that a San Francisco firm was violating the law formerly in force. The case, which is given under the head of "Prosecutions" in this report, resulted in a conviction and the imposition of a fine upon the defendant.

THE BUTTER-PACKAGE WEIGHT LAW.

Among the several laws enacted by the last session of the Legislature, a very important one was the law seeking to compel manufacturers of and dealers in butter to place the exact weight contained on retail packages of butter; that is, packages containing less than six pounds. California butter producers have for many years practiced packing their butter in small parcels acceptable to the consumer. This does not necessitate removing it from the bulk in the wholesale package. These small parcels were formerly known as "rolls," from their cylindrical shape. In later years, with the advent of the public creamery system of butter-making, these parcels, in order to fit them more compactly into shipping cases, were changed into a shape resembling bricks, their right-angle corners and flat faces giving rise to the term "squares." The original "roll" of the older days in California dairying is reputed to have been scrupulously exact in weighing two pounds. As butter production advanced and more competition and business keenness were injected into the trade, the tendency to shade the weight crept in until, during the past few years, a "square" of butter might mean any quantity of butter from two pounds down. In some market centers, notably Los Angeles, "standard" sized "squares" were kept in use by regulation carried out by mutual understanding among the producers and wholesale dealers. The same was the case with the markets of the State of Washington, while the Oregon law has for a number of years required the weight to be marked on the packages offered for sale in that State. At certain seasons these states make a good market for a large amount of California butter. The San Francisco market, however, was unable to secure any uniformity in this matter of packing butter.

It can easily be seen that this indiscriminate method of packing, aside from the fact that it gave no definite quantity of butter to the consuming buyer for his money, was a great disadvantage to the butter trade, which for convenience in a large market demanded a uniform system of packing. A wholesale butter dealer was ever at a loss to know how to order his shipper to pack the butter to meet the demands of his trade. If the shipper forwarded his butter in, say, two-pound "squares," he found that he could find plenty of buyers for lighter weight "squares," but not for his "full-weight" two-pound squares. He would then instruct his shipper to change the weight, only to find that by the time the butter, packed as ordered, arrived the market had changed so as to make still another weight of "square" the more attractive to the retailer and he found that his "packed to order" butter was left on his hands. The way in which this system best

shows its disadvantages is during the surplus butter season when the San Francisco market ships large quantities of butter to outside points—Los Angeles, Seattle, Portland, and other markets that draw heavily upon San Francisco, where the practice, acquired through an agreement among dealers and by law, in the case of Oregon, is to use only the one- and two-pound “squares.” A dealer in San Francisco may have any amount of butter on his hands and almost regardless of the price he may offer it at, he can not fill an order for one of these points unless it is packed to comply with their custom. Usually when he fails to secure the order, he telegraphs his shipper to put up “full-weight” butter, in anticipation of a future order, but by the time it arrives it too commonly happens that the outside demand has suddenly stopped, and he is left with the “full-weight” butter to offer to the San Francisco trade, which refuses it. His only way out of the predicament is to take this butter, free each “square” of its paper, or other wrapper, and cut it down to a desired quantity and rewrap it. If he was overstocked with “light-weight” squares he would often go through the process of adding to each “square,” or remold it into the larger size wanted. All of this involved expense and waste, for which in the end the shipper had to pay.

As a result of the confusion and loss that were involved in this manner of indiscriminate packing, and after vainly attempting to eliminate it by mutual agreement among producers and dealers, it was but natural that the leading producers, especially the creameries and the dealers, should work for the enactment of a law seeking to correct this abuse. The result was the enactment, at the last session of the Legislature, of an Act requiring that all retail packages, in other words, “squares,” should have the weight marked upon them. It was the general belief that this would remove the incentive for packing in “short-weight” sizes and result in a more uniform style of packing.

The enforcing of this law, by its provision, was placed in the hands of the State Dairy Bureau. Immediately after it went into effect, the Bureau took hold and caused several prosecutions in San Francisco and other cities against parties for violating the law. This had a most satisfactory effect, and in a few months the law proved to be a most effective remedy for the abuse it was aimed at. It eliminated at once from the market “squares” that contained twenty-two ounces, which the consumer was often led to buy for one and a half pounds, and the 30-ounce for the 32-ounce square, as well as all other irregular sizes. In their stead the system resolved itself into uniform one and one-half and two-pound “squares,” with these respective weights marked upon them, but with the tendency in the direction of eliminating everything but a standard two-pound “square.”

Unfortunately for the satisfactory results of the law, a case brought against a San Francisco retail dealer, who was convicted in the police court in which the case was brought, was appealed to the Supreme Court, which declared the law unconstitutional in habeas corpus proceedings, and liberated the defendant.

We give considerable space to the discussion of this law, and its final outcome, on account of its importance to the butter industry of the State, and because this Bureau took a deep interest in the matter while it was pending as a bill before the Legislature, believing it to be of such great value that it earnestly recommended its enactment. The opinion of the Supreme Court is published in the Appendix. The question as to whether a law with the same object in view could be enacted that would meet the objection raised in the opinion of the court is a topic commonly discussed among butter producers and dealers, indicating the favor with which the law was received. From the sweeping grounds assumed by the court in its opinion, it is difficult to see how it could be circumvented. The only remedy for the abuse the law tried to remedy seems to be in the producers and the trade controlling it by concerted action.

THE LAW RELATING TO TESTING APPARATUS.

The introduction of means for determining the value of milk and cream as based on their content of butter fat was brought about through the invention of what is known as the Babcock test. Although there are other methods based on chemical principles by which this is accomplished, in this country the Babcock method is almost universally employed.

In using this, or in fact any other chemical test, glassware is employed that is graduated to the standard necessary to give accurate results. A small variation from the standard that may not be noticeable to the user of the test may easily result in an inaccurate test. It can be seen that a buyer of milk or cream on a basis of its content of butter fat could, either intentionally or unintentionally, secure an advantage over the seller. While this Bureau has no proof that inaccurate apparatus has been used intentionally in the past, and has suggested in explanation of the large amount of inaccurate apparatus found to be so commonly in use in former years, that it was the result of the cheapness that it was sold for as a result of competition, it is remarkable that in the past, in nearly every case examined by the chemist of the Bureau, the inaccuracy resulted to the benefit of the buyer and loss to the dairyman. In other words, the inaccuracy invariably favored the buyer. In former reports this Bureau has called

attention to this injustice to the dairymen of the State. When the chemist of the Bureau first investigated the accuracy in apparatus used by the creameries of the State, it developed that an accurate bottle, which is the most important part of the Babcock test, was the exception. The disclosures in the matter resulted in a law being enacted in the form of an amendment to the Penal Code (published in the Appendix), which makes the use of inaccurate testing apparatus a misdemeanor.

As a result of this law the Bureau has had many applications from creameries to examine their apparatus and certify to their accuracy. In this way the examination of testing apparatus has required considerable of the time of the chemist.

In our last report it was suggested that in view of the freeness with which such inaccurate apparatus may creep into use, so as to make legal regulation necessary, the law might as well go farther and prescribe a system of inspections and enforcement; also in view of the fact that the Bureau has been so frequently requested to certify to the accuracy of apparatus, that the law should authorize and make such certifying official.

The outcome of the suggestion was the enactment, by the last session of the Legislature, of another amendment to the Penal Code, which is published in the Appendix. It authorizes the Bureau to enforce the section relating to inaccurate apparatus and to examine bottles for accuracy upon application of citizens and to collect a fee for the work, which is paid into the State Treasury. It also directs the Bureau to officially stamp, or mark, all apparatus that it finds correct when submitted for examination.

The law has apparently been very effective in eliminating inaccurate apparatus from the market. During the eighteen months that it has been in force the chemist of the Bureau has examined and certified to the accuracy of 1,908 pieces of apparatus, out of which less than one per cent was not approved.

THE SANITARY DAIRY LAW.

This term has been applied to a law enacted at the last session of the Legislature, which, while it has the improvement of the sanitary conditions prevailing on and about the dairies and factories of dairy products of the State as its primary object, embodies other important features relating to dairy affairs. It is in carrying out the provisions of this law that the Bureau finds the most of its work. Those who are

familiar with its provisions and requirements, and who have observed its operations, have realized that notwithstanding much more has been accomplished under it than was anticipated, it has several unfortunate features that operate against its success. Chief among these is the limited appropriation that it carries, which amounts to \$5,000 for each fiscal year. This Bureau has ascertained from the assessment rolls that there are in the State over five thousand persons who make a business of keeping cows in herds of over twelve head, to say nothing of the factories of dairy products, which come under the provisions of the law. This fund enables the Bureau to pay the salary and traveling expenses of only two inspectors, if it wishes to keep them constantly employed. The difficulty of one man keeping track of over two thousand five hundred dairies and factories is obvious. However, by concentrating the work of inspection at seasons when it could accomplish the best results and by concentrating it in districts where sanitary improvement seems to be most needed, the Bureau has brought about a marked improvement in the conditions prevailing in the average dairy and in the average factory to which it has been able to give attention. The Bureau also made use of the time of its inspectors drawing salaries under its regular appropriation, when not engaged, to act as inspectors under the sanitary dairy law. The Secretary and Chemist was also able to give considerable of his time to the work of inspection. By practicing rigid economy in using its funds and by keeping the inspectors constantly active, the Bureau was enabled during the past eighteen months to make over three thousand inspections of dairies and factories throughout the State. The loss of all records in the office in the fire of April 18th makes it impossible to give the exact number, or discuss in detail the work in connection with the sanitary dairy law, and all that we can report is on the general nature of the work.

Since the law went into effect the Bureau has had three inspectors of dairies and factories in service until the appropriation was exhausted, which was in the month of May. The inspection work was then suspended until the first of September, when the appropriation for the fifty-eighth fiscal year became available. The inspectors that served during the fifty-seventh fiscal year were L. P. Branstetter, P. C. Krog, and Howard J. Faulkner. In addition to this force, Mr. J. L. Starr was appointed as assistant agent of the Bureau, with Los Angeles as headquarters. While he was compensated out of the original Dairy Bureau fund, his entire time has not been occupied with duties coming under that head, and in order to make full use of his time he was also designated as an inspector of dairies and factories and served in a double capacity. This is the force of inspectors the Bureau had at its disposal, but even these were not constantly employed, Mr. Branstetter only devoting about half of his time to the service, on account of the limited

funds that were available. The State was divided into five inspection districts, arranged by counties as follows:

First District.

Del Norte	Humboldt	Mendocino	Siskiyou
Lake	Trinity		

Second District.

Alameda	Contra Costa	Solano	Napa
Sacramento	Yolo	Amador	Alpine
Placer	Nevada	Sutter	Colusa
Glenn	Tehama	Shasta	Butte
Yuba	Sierra	Plumas	Lassen
El Dorado	Modoc		

Third District.

San Francisco	San Mateo	Santa Clara	Marin
Sonoma			

Fourth District.

San Joaquin	Calaveras	Inyo	Tuolumne
Mariposa	Merced	Stanislaus	Madera
Kern	Fresno	Tulare	Kings
San Luis Obispo	San Benito	Santa Cruz	Monterey
Santa Barbara	Mono		

Fifth District.

Los Angeles	Ventura	Orange	San Bernardino
Riverside	San Diego		

Mr. Branstetter was assigned to the first district and Mr. Starr to the fifth district. Messrs. Krog and Faulkner jointly carried out the work in the second, third, and fourth districts.

In making their investigations the inspectors are required to make reports to the Bureau upon every detail that may have any relation to the sanitary conditions of a dairy or a factory. In order that the inspectors might not overlook any of these details, and that the Bureau might establish a system of rating or scoring dairies and factories that would show a kind of comparative standing of a dairy or factory with regard to its sanitary excellence, the Bureau devised a system of rating based upon numerical values. Thus, by crediting a dairy or factory satisfactory in every sanitary detail with a total of 100 points or credits, others would be rated relatively as these sanitary details approached perfection. By this means the reports give the Bureau information upon every detail and the sanitary standing of a dairy or factory at a glance. The system is also devised with a view of arousing a kind of rivalry among dairymen and factorymen to secure for themselves as high a rating as possible.

In order to show the detail of this system of rating, and that the reader may have the benefit of what the Dairy Bureau considers essential in a sanitary dairy or factory, we reproduce below a copy of schedule or ratings that are used:

STATE DAIRY BUREAU.

DAIRY SANITARY RATING.

District No.

Date,, 190..

NAME:	ADDRESS:	Per- fect.	Rat- ing.
I. <i>The Herd:</i>			
1. Health of cows as indicated by general appearance, and showing no outward signs of tuberculosis		8	-----
2. Cleanliness of cows—free from adhering manure and other dirt; clear udders especially		10	-----
Total		18	-----
II. <i>Surroundings and General Sanitary Conditions:</i>			
1. Water—pumped from the well outside of cowyard and otherwise removed from any source of contamination; or from flowing stream, free from contamination		6	-----
2. Cowyard—well drained; solid earth, so as to prevent excessive mud in wet weather and dust in dry weather; free from manure and dead animal and decaying vegetable matter; ample room for herd; hog and calf yards separate, and at sufficient distance		10	-----
3. Stable—well constructed, permitting good drainage; good floor, permitting perfect cleaning; no holes or cracks; no decaying manure and urine beneath floor; free from excessive odors; well ventilated and dry		10	-----
4. Manure—conveyed daily to a sufficient distance, and outside of cowyard		5	-----
5. No decaying food in feed boxes and mangers		5	-----
6. Stable free from cobwebs and flies		3	-----
7. Stable whitewashed within one year from date of inspection		5	-----
Total		44	-----
III. <i>Dairy Room:</i>			
1. Clean, dry, well ventilated and free from odors		5	-----
2. Good drainage, carrying liquids to sufficient distance		2	-----
3. Cement floor, or otherwise impervious to liquids		3	-----
4. Well provided with cleaning facilities—brushes, soap, boiling water, etc.		2	-----
5. Pig and calf quarters at sufficient distance		1	-----
6. Absence of stale milk, cream, refuse matter and flies		2	-----
Total		15	-----
IV. <i>Utensils:</i>			
1. Well made, well tinned and free from cracks		2	-----
2. Cleaned thoroughly, including sterilizing with boiling water		5	-----
3. Separator clean		2	-----
4. Churn and butter apparatus clean		1	-----
Total		10	-----
V. <i>Attendants:</i>			
1. Clean clothing		2	-----
2. Clean hands		2	-----
3. Careful to have udder of cows clean		1	-----
Total		5	-----
VI. <i>Product:</i>			
1. Milk immediately removed from stable after drawing		3	-----
2. Fore-milk discarded		1	-----
3. Aërated and cooled at once below 68°		2	-----
4. Free from odors and solid matter, as shown by strainers and settlings in tanks, vats, etc.		2	-----
Total		8	-----
Total		100	-----

Inspector.

Approved:

File No.

Secretary.

STATE DAIRY BUREAU.

CREAMERY SANITARY RATING.

District No.

Date,, 190..

NAME:	ADDRESS:	Per- fect.	Rat- ing.
I. Building:			
1. Large and roomy		5	-----
2. Good drainage system in working order, carrying sewage sufficient distance		10	-----
3. Ample light and ventilation so as to keep interior dry		5	-----
4. Walls well constructed to permit thorough cleaning		5	-----
5. Floor and walls perfectly clean; rooms free from objectionable odors; no decaying milk or cream in crevices about factory		5	-----
6. Windows clean		1	-----
7. Free from flies		5	-----
8. Hog yard, privy vault, slaughter house, manure or other dirt not in close proximity to factory		5	-----
9. Well provided with material for cleaning, such as brushes, soap, etc.		4	-----
10. Absence of refuse matter, old rags, paper, packing material, soiled clothes, etc.		5	-----
Total		50	-----
II. Milk and Cream Received:			
1. Sweet, cooled below 70°		8	-----
2. Free from objectionable odors and gas		9	-----
3. Free from solid matter as shown in strainer and tank settlings		8	-----
Total		25	-----
III. Utensils:			
1. Thoroughly washed and sterilized		3	-----
2. Churn clean and sweet		2	-----
3. Testing glassware clean		2	-----
4. Plant well provided with full line of necessary creamery utensils		4	-----
5. Skim-milk and butter-milk vats clean, and area surrounding same free from decaying milk		2	-----
6. All milk pipes, pumps, and other conveyances clean and free from objectionable odors		2	-----
Total		15	-----
IV. Employees:			
1. Clean in appearance, wearing laundried clothes, etc.		10	-----
Total		100	-----

Approved:

Inspector.

File No.

Secretary.

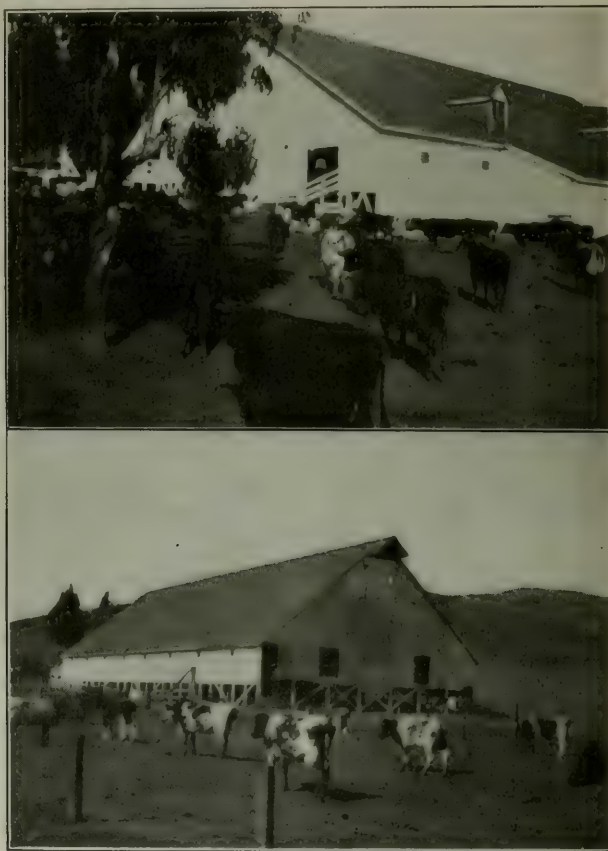
Immediately upon taking up the work when the law went into effect, the fact became apparent to the Bureau that if an effort was made to cover the entire State in the way of inspections, it could not hope to accomplish much in bringing about an improvement in sanitary conditions. It was deemed far better, in order to secure results, that the work be concentrated along certain lines and localities and that it be largely confined there until results were accomplished. The Bureau therefore decided first to give attention to the condition of dairies, and

city milk stores or depots from which milk is sold for consumption in the leading cities, realizing that here is where the greatest need is for sanitary improvement. It was also considered that if the public creameries and cheese factories are placed in good sanitary condition, their example will make an impression upon the dairymen who patronize them that would stimulate them to maintain better sanitary conditions about their dairies. The inspection work along this line has been most thorough, many dairies having been visited and revisited as many as five times by the inspectors, who persisted in their attention to the owner of an unsanitary dairy or factory until a satisfactory improvement is brought about, and in the event this could not be brought about the negligent dairyman is finally prosecuted for violating the law. Fortunately there has been little need for resorting to this means, as will be noted in the record of prosecutions elsewhere. The few prosecutions brought for violating the sanitary dairy law served very thoroughly their purpose, which was to show to stubborn and insolent dairymen that the law must be complied with.

In order that the law might not be made to work a hardship upon any dairyman or factory owner in involving him, without ample warning as to the requirements of the law, it provides that in the event his premises are not in a satisfactory sanitary condition, before he can be prosecuted he must be notified in writing as to what is required to comply with the law and be given thirty days in which to comply with these requirements. The Bureau has found this provision very serviceable in its efforts. Any dairyman whom an inspector can not induce or persuade to make improvements is upon his second visit usually served with one of these notifications, which instructs him what must be performed by him and warning him that unless it is done he will be prosecuted at the expiration of the thirty days allowed by the notification. In all about two hundred such notifications have been served to date. The inspectors send duplicate copies of all notifications served to the office of the Bureau, where they are filed until a final report is made in each case. In all but a very few cases these notifications were complied with and the cases were thus disposed of. The serving of these notifications, backed up with prosecutions in the few cases where they were ignored, has enabled the inspectors to do excellent work, and the Bureau is pleased to report a substantial advance along the line of sanitary dairying where it has applied its efforts. In the future the Bureau will be able to expand its efforts and cover the dairies over a larger area of the State. Not only has nearly every dairy inspected made some progress in the way of better sanitary conditions, but in a number of cases new barns have been built in order to comply with the law. In some cases lessees of dairy farms have abandoned them, because the owners failed to make the required improvements. In one

case a large creamery that was notified to comply with the law did so by the stockholders of the company deciding to tear down the entire building and rebuild along sanitary lines.

In this work of sanitary control several features of the Bureau's work deserve special mention. From the reports sent in by the inspectors,



WELL-CONSTRUCTED SANITARY DAIRY BARNs THAT REPLACED
OTHERS CONDEMNED THROUGH DAIRY INSPECTION.

as well as a matter of general observation, we may say that California dairymen are extremely lax in maintaining sanitary conditions about their cow stables. Drainage and the removal of the large amount of manure that is produced by a herd of cows seem to receive little attention. In fact, many dairymen seem to rely upon California's abundance of sunshine as the only agency necessary for this purpose. It is a gen-

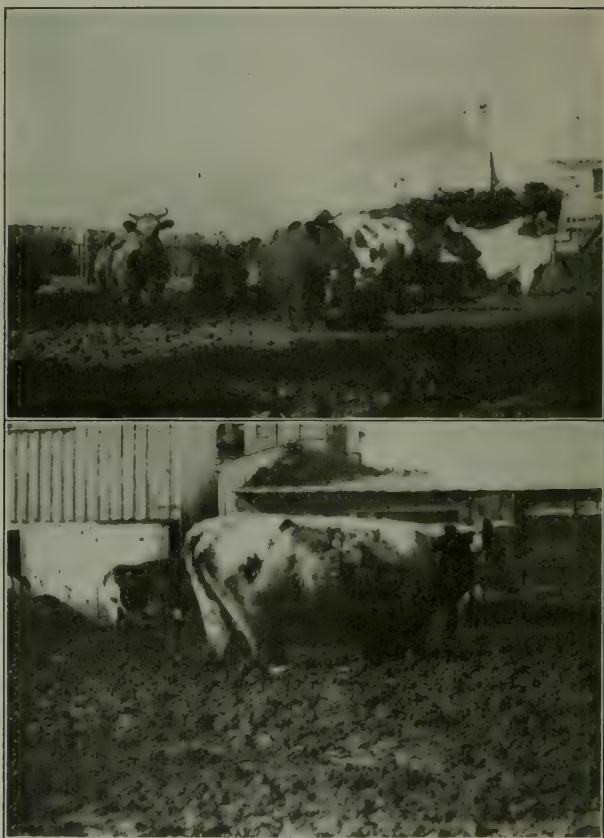
eral practice to throw the manure out of the stable through rows of holes in the sides, each hole giving rise to a heap that grows until it often reaches the eaves of the roof. At the bases of these heaps the manure spreads over larger and larger areas; finally, with the assistance of the tramping of the herd it spreads over the yards surrounding the stables. In dry weather it is in this way ground into the fine and filthy dust that adheres to cows lying in it, or, by being blown by wind, finds its way into the milk, which is one of the worst sources of dirt and bacterial contamination of milk. In wet weather this same manure makes an impassable mire in the yards through which cows must pass to reach the barn, if in fact they are not compelled to lie down in it, thereby splashing and otherwise getting rotten, filthy manure upon their udders and bodies, which gets into the milk. It is no wonder that



AN UNSIGHTLY AND UNSANITARY SCENE TOO COMMON ON CALIFORNIA DAIRY FARMS.

much solid sediment is found in milk, even when the most of it is removed by straining. In one case of a large dairy that came to the notice of the Bureau the dirt adhering to the cows resulted in so much sediment in the milk that it had to be set aside for settling before it could be drawn off into the cans in which it was shipped to market. While this may seem as an extreme case of filthiness, it is a matter of very common occurrence that actual manure in this manner finds its way into milk offered to the public. In this connection two photographic views of dairy conditions, taken by an inspector of the Bureau, are shown that portray conditions that were almost typical of dairies in wet weather before any legal control over their sanitary conditions was assumed. One of them shows a stable with its row of accumulated manure heaps. The other one shows how a dairy from which the

manure is not regularly removed becomes a filthy mire in wet weather. The cows are seen to be wading belly-deep in filth, dragging their udders in it. The owner of the dairy on which the last-mentioned scenes were taken was prosecuted by the Bureau and convicted in court, as a result of which he abandoned the premises for dairy purposes. The Bureau has made this matter of allowing manure to accumulate about



THE EXTREME OF UNSANITARY CONDITIONS AMONG DAIRIES.

the stables a special object of attack, and if its progress in eliminating it continues the time is not far distant when this unsightly and unsanitary feature will no longer be found as a characteristic of California dairies.

A second striking feature as related to sanitary conditions about California dairy methods is the fact that dairymen take full advantage

of our climate in this respect and seem to think that any kind of a "shack" will serve for keeping cows. All that they think is needed is protection for the milkers from the rains and sun while the milking is in progress. While it is the case that a cow in California may require little or no protection from the weather, the dairymen fail to appreciate that a cow stable should be constructed so as to be clean, whether it needs also to provide shelter or not. The Bureau finds that few barns are provided with well-laid floors that do not permit liquids to get beneath them and form filthy pools and that are smooth so that every particle of manure may be readily removed. Drainage gutters that carry off the large volume of urine that is produced by a considerable number of cows are found in very few cow stables. Feeding mangers are in most cases constructed in such a manner that they are not easily cleaned, and in fact seldom are, and owing to the practice of many dairymen to feed concentrated foodstuffs mixed with a large amount of water, that is "slop," such mangers are frequently filthy and foul smelling, an ideal medium in which the germ of tuberculosis may be transmitted from a tuberculous to a sound animal.

The Bureau, through its inspectors, is doing all it can to induce dairymen to construct more substantial stables, and new ones that are built these days have in most cases concrete floors and drainage gutters, and we believe this practice will become very general when dairymen realize the durability and cleanliness of such construction, and the fact that through the law the public demands it. All that is often needed to bring such an advantageous innovation about is a little pressure in the form of authority of law. It is the aim of the Dairy Bureau, through the supervision conferred upon it by the law, to inaugurate, if possible, in the State an era of more substantial and sanitary dairy stable building.

FARM SEPARATOR CREAM.

The sanitary dairy law also aims to prohibit the selling of stale, rancid milk and cream. Under the definition of what may constitute an unsanitary factory of dairy products, the law states that it shall be considered so "if milk or cream is received that has reached an advanced stage of fermentation, or that shows a state of putrefactive fermentation." The Bureau takes it that this clause is aimed particularly at public creameries that are not sufficiently exacting as to the quality of the cream they accept from their patrons as regards its age. Up to within the past few years it was the practice among all the creameries in making butter to receive only the whole milk from the dairymen and separate the cream from it after receiving the milk. Under this plan, commonly referred to as the "whole milk system," the milk had to be delivered at least once a day in order to be able to separate it with the centrifugal separators. During the past few years this sys-

tem has almost entirely changed among the creameries of the State. Now it is the common practice to separate the milk at the farms and only deliver the cream to the creamery. In this way, by installing a small separator on his farm, the patron needs to haul only one fifth to one tenth the load of material he does when delivering whole milk. Not only does he save in this way, but he takes advantage of the fact that he can keep the cream longer, and as a result, instead of making daily deliveries, he generally cuts the trip to the creamery or shipping point down to every other day, and often much less frequent. The use of the separator on the farms has also brought about another change in dairying, and that is, by reducing the volume of the product to be delivered to the creamery it enables the patron to ship this comparatively small volume of cream by rail. As a result of this, cream is shipped to creameries several hundred miles distant, usually to some city or large market center. In the cities of San Francisco, Los Angeles, Oakland, Stockton, Sacramento, Fresno, and several other centers are located creameries in which one half the butter made in the State is churned. By this process has come about what is referred to as the centralized creamery, as distinguished from the local creameries throughout the State, which are supported by the milk and cream produced in the immediate vicinity of such a creamery.

While it is true that the systems of separating the cream on the farms and the centralized creamery are not in themselves responsible, the fact is that in their wake has followed an abuse that has worked against the average quality of butter produced in the State. Butter dealers and expert creamerymen declare the quality of our butter has declined. The reports on butter entered at competitive exhibits at fairs and conventions of the creamerymen lend confirmation to this statement. This retrogression in the butter business is due to the fact that cream is sent to and received by the creameries that is in such an advanced stage of fermentation, or really putrefaction, that the skill of the most expert butter-maker can not overcome. In the preparation of the cream for churning lies the skill of the butter-maker. If the cream he must work with, or even a small part of it, is contaminated with putrefactive fermenting germs, or too advanced in fermentation, his efforts are in vain. What is required is the more frequent delivering of the cream, or keeping it in a way that will enable delivering it as sweet and fresh as possible. The question naturally arises, Why do the creameries accept it? Unfortunately the keen competition among creameries, aggravated especially by the aggression of the large central concerns or the local creameries, and the fight for business supremacy, has placed the dairyman with cream to sell in so independent a position that he cares little for the quality of the cream he delivers, so long as he gets full credit for the quantity.

How to overcome this abuse is the most important problem in the butter business. It is due largely to the creamery interests in the State that the sanitary dairy law was enacted, as it has been the hope of the creamery owners and managers of the State that the abuse could only be remedied by making the selling of what is known to them as "bad cream" unlawful and by having a system of inspection and enforcement of the law. The sanitary dairy law provides that a creamery is in violation of the law "if milk or cream is received that has reached an advanced stage of fermentation, or that shows a state of putrefactive fermentation."

The State Dairy Bureau looks upon this feature as one of its most important duties, and one in which it can be of great service to the butter industry of the State. The purpose is to elevate the quality of California butter. Unfortunately, the lack of funds prevented the arranging of the work of the inspectors in a way that enabled them to be on duty during the months of warmest weather when the trouble from "bad cream" is the greatest. In outlining its work for the coming year it is the purpose of the Bureau to give attention to this feature as one of its principal duties.

CHEMICAL PRESERVATIVES.

The sanitary dairy law prohibits the use of chemical preservatives in dairy products, with the exception of boron compounds, provided that if boron compounds are used the fact must be stated on the container in which the product is sold. Under this provision the Bureau during the time covered by this report brought eight prosecutions in San Francisco, securing convictions in all but one case. Even with this record, the Bureau believes the law is still being violated to some extent, and probably will be while it is in its present form. Under its provisions a dealer need, as the courts in which cases have been brought seem to hold, only place the word "boron" on the container of the product offered, regardless of the fact that in that form it really means nothing to the buyer. Neither does it prescribe the manner in which, or place on the container where, it shall be marked. The result is that the wholesale dealers will mark the word "boron" in some inconspicuous way, often on the corner of the shipping tag (in case of milk and cream), or some equally inconspicuous place. For this reason it is not easy to secure a case against the wholesaler, who is the one responsible for the violation of the law. It is the small retailer to whom he sells and who is ignorant of the law that is caught. It is owing to this reason that it is difficult to prohibit the practice. An amendment of the law in this respect will be referred to further on in this report.

The law also prevents the use of coloring matter in milk and cream

for the purpose of making it appear superior in quality. It also prevents the use of material, such as gelatin, that has in the past been used in milk and cream to increase their consistency, thereby making the article in which it is used appear better than it is, unless the container bears a statement to the effect that such material has been used, the statement to be arranged and applied in a manner to be prescribed by the State Dairy Bureau. Although many samples have been examined with a view of finding that coloring and thickening matter have been used, not a single instance has been found where the law has been violated.

LABORATORY WORK.

Through the fire on April 18, 1906, the Bureau sustained the loss of its office and laboratory equipment and all of its records with the exception of a few books that were saved. Included in the destruction were the records of the work performed in the laboratory. Hence a detailed report on this part of the work of the Bureau can not be made. Since the last report the Bureau has had arranged and equipped a new laboratory, which for the first time enabled it to do its work with thoroughness and satisfaction. Prior to this it had a small amount of laboratory apparatus occupying one corner in the office of the Bureau, which then occupied a single room. The inadequacy of its accommodations have been felt for a number of years, and a little less than a year before the fire other rooms were secured that enabled the Bureau to set one aside and equip it as a laboratory. It was here that the Secretary and Chemist devoted most of his time. Up to the time of the fire, nearly two hundred samples of dairy products were examined to ascertain whether those from whom they were secured were violating the law. During the same period 1,908 pieces of Babcock testing glassware were examined for accuracy. Determination of fat in milk and cream, made upon application of dairymen and factorymen to settle disputes between buyers and sellers, was a matter of almost daily occurrence.

In view of the great amount of interest and controversy over the question of water in butter and the rumors to the effect that many producers in the State aim to incorporate as much water as possible in butter, the question seems to demand the attention of the law. It is not only a form of adulterating butter and tampering with the quality of the butter of the State, but it has had a most demoralizing effect on the butter industry. To what extent these rumors are true, and whether legislation on the matter is necessary to curtail the abuse, was a subject the chemist was about to inquire into and report upon, but the loss of the laboratory by the fire just as this year's butter season was opening, when it was desired to make the investigation, made it out of the

question. It is the desire of the chemist to take it up as soon as a new laboratory is provided.

The great interest that is being manifested in the subject of bacteria, and their relation to dairy problems and affairs, induced the Bureau to add to its laboratory equipment apparatus and means for studying and work along this line with a view of aiding dairymen. Health boards and others interested in the protection of the public health are placing great importance upon the condition of milk in regard to its contents of bacteria and their control. It is comparatively a new feature in the dairy business, and the chemist of the Bureau is often consulted on the question and asked to make bacterial determinations in milk. It was in order to be of service to the dairymen of the State in this respect that apparatus for work in bacteria analysis was installed in the laboratory. When it provides its new laboratory the Bureau hopes to have facilities that will enable the chemist to continue to be of service to the dairymen on problems that arise in the way of the chemistry and bacteriology of milk.

SUGGESTIONS AND RECOMMENDATIONS.

In its work in carrying out the laws the Dairy Bureau has found a number of features in which their provisions failed to bring about the results hoped for by those who are responsible for their enactment, and others that hindered the Bureau from accomplishing the successful enforcement of their good features. In the contact the Bureau enjoys with the dairy interests of the State, and those citizens who are identified with it, it has learned of abuses that tend to obstruct the development of the dairy industry and of the wishes of those identified with it for legislation that will encourage the further improvement, expansion, prosperity, and integrity of the industry. In view of the fact that some features of what may be termed dairy agitation in the State will no doubt be presented for legislation, it is in place to discuss some of them and make suggestions with regard to them as far as the observation and experience of the Bureau enable it to do so.

With reference to the State laws relating to dairy affairs now in force, no suggestions or criticism can be offered in case of the law prohibiting the fraudulent selling of oleomargarine and filled cheese. The same is true of the law prohibiting the promiscuous skimming of milk for cheese-making, and the law prohibiting the use of inaccurate testing apparatus in factories. These laws are accomplishing their purpose with every satisfaction. Through the fact that renovated butter has not been offered in the State during the eighteen months that the new law relating to it has been in effect, there have been no opportunities of testing its efficiency.

In case of the law seeking to remedy improper sanitary conditions under which dairies and factories of dairy products are conducted, its enforcement has developed several features in which it is materially weak. That the funds that it provides for carrying it into effect, which amount to \$5,000 for each fiscal year, are inadequate, is apparent to any one who will consider the magnitude of the task of an institution attempting to keep track of over five thousand dairies and factories scattered over a large State like California. The popular and just demand of the present day for food products produced under proper sanitary conditions, warrants the recommendation on the part of the Bureau that the State should deal more liberally with an effort to bring about more sanitary methods in dairying, a line of industry in which sanitary conditions are universally recognized as playing a most important part.

In order to make the appropriation it provides go as far as possible, the law limits the compensation of the inspectors to a maximum of \$4 per day or \$100 a month. The Bureau has found that this compensation is too small, and has had much difficulty in securing and retaining competent persons to act as inspectors. The position demands men who are well posted in every phase of the dairy business, men possessed of good judgment, and who are reliable, energetic, and willing to put up with the inconveniences incident to traveling about the State, divorced from home ties and home comforts. With the good salaries that men of the competency that the Bureau requires command in other lines at the present time, it is no surprise that it has had difficulty in securing the talent that it needs. It is recommended that the law be amended to increase the salaries so that the office of an inspector may be attractive to a person possessing the qualifications necessary to successful service, and that the appropriation be increased so as to provide at least seven inspectors.

In carrying out the work of inspecting dairies and factories, the Bureau has often been requested by owners whose premises were found unsatisfactory to be lenient and to give them extra time before instituting proceedings against them. In some instances the excuse for the unsatisfactory conditions is given that it would not be economy to make repairs on an existing building, but that if given time the owner would construct an entirely new building. In other instances the party explains that his lease on the premises he occupies expires in a few months, and that he contemplates moving to another and more sanitary location and wishes to be excused from the expense involved in making alterations. In the majority of cases these requests for time are made in good faith, but in quite a few it is merely an excuse to secure delay and trifle with the authority of the Bureau. It occurs to us that if there are no judicial objections, the law might be amended to advantage by

providing that the Bureau be authorized to accept a bond in a proper amount in case of a party requesting a delay for reasons such as we have referred to, as a guarantee that the request is made in good faith and to forfeit the bond if this faith is broken. In fact, in a number of instances, those who have made requests for delay have offered to give bonds, but they have been refused for the reason that the Bureau has no legal authority to accept and act upon such a bond. The Bureau finds in its work that dairymen and factory owners and managers are frequently profuse in promises, but derelict in fulfilling them. A system that would enable the Bureau to place under bond such persons as it learns by experience to have little confidence in, would enable it to compel a more thorough compliance with the sanitary dairy law, and without the uncertainty that often follows if the Bureau resorts to prosecutions.

The sanitary dairy law prohibits the use of all forms of chemical preservatives in dairy products, with the exception of boron, which may be used provided the containers of the product to which it has been added has "plainly marked thereon the fact that it contains such preparation of boron." It fails to state explicitly the manner in which the marking shall be done. The result has been that the provisions of the Act have been much abused. So long as the word "boron" is on or about the container of the product, the courts have refused to convict. In some instances the Bureau finds the word "boron" placed upon the shipping tag which is placed on the vessel. Generally it is applied by means of a rubber stamp or simply written with a lead pencil. It may be expressed in large type or inconspicuous type. It all seems to look the same to the courts. Were it not for the fact that, in the cases brought, the defendants take advantage in this way, the Bureau could with little difficulty eliminate the use of all preservatives, and in fact it can say that, with the exception of the use of boron compounds, their elimination is already complete. The Bureau therefore suggests an amendment to the law that will make the marking required more specific. It is needless here to recite the reasons for prohibiting the use of chemical preservatives in food products, as objection to them on the ground of unhealthfulness and the fact that they are employed to counteract the results of unsanitary methods is almost universally accepted.

The above are the only suggestions the Bureau has to make with reference to laws now in force in relation to dairy affairs. There are, however, several other features not legislated upon that are attracting much attention among those identified with the dairy interests of the State. The Dairy Bureau has given much consideration to them.

To the Bureau it seems that the time is at hand when much dissatisfaction about our dairy products could be settled by the adoption of a

general law defining what dairy products should be in order to entitle them to the use of the familiar commercial names. In recent years business methods are largely in the direction of giving to a buyer "something just as good" for less money. The minds of business men are largely occupied in figuring out something cheap. If a person can, by means of gelatin and coloring matter, convert an entire bulk of milk into an article that he can sell as "cream" and at cream prices, he is doing business with an article that costs him one fourth to one eighth what the real article does. No one should be permitted to use the term "cream" on an article that is really only milk.

In case of butter we have a similar state of affairs. Butter is made by churning cream so as to collect the fat it contains. Incidentally it contains a small amount of water and curd. That is the way butter has always been made. It is becoming different in recent years. The average large producer now, instead of getting water into it incidentally, uses every effort to make the amount of water he can get into his butter the primary consideration, and the butter fat it may contain as small as possible. To what extent this is practiced in California the Bureau had hopes of throwing some light upon, but just as its chemist was about to undertake an inquiry into the matter, in order to report more specifically on the subject, the laboratory was destroyed by the fire. That the subject is a serious one is manifest from the great amount of dissatisfaction and accusation that is heard among the butter producers and dealers.

And so we might go through the entire list of dairy products and find that there is need for definitions and standards in order to legally designate when a product is entitled to assume the established trade names of dairy, or any other food products. A few years ago Congress enacted a law to provide for the creation of a commission of chemists to formulate definitions and standards for food products. To this Bureau it seems that it would be wise on the part of a State to make these, or similar definitions and standards, a part of their laws. The existence of such legal definitions and standards would serve as a damper to the scheming that is constantly going on, having for its object the making of illegitimate gain. Such methods have in them no advantage to the consumer, who is invariably deceived and does not get the value of the money he pays. Neither do they benefit in the least the real producer, the farmer. The schemes are invariably worked out in hands between the farmer and the consumer.

PROSECUTIONS.

The following cases were brought for violating the dairy laws upon complaints filed by the State Dairy Bureau. In each case the records of the date of prosecutions were lost in the fire of April 18, 1906:

People vs. Israel Morris. Before Police Judge Cabaniss, San Francisco. Complaint: Selling renovated butter without labeling according to law. Plead guilty: fined \$25.

People vs. Robert Deitrich. Before Police Judge Fritz, San Francisco. Complaint: Selling butter without marking the correct weight on the package. Found guilty and sentenced to pay a fine of \$100, or thirty days in jail. Writ of habeas corpus applied for in Supreme Court, pending action upon which defendant was released on bonds of \$100. Supreme Court declares law under which conviction was secured unconstitutional and orders release of defendant.

People vs. H. C. Smith. Before Police Judge Mogan, San Francisco. Complaint: Selling butter without marking correct weight on package. Case continued and dismissed after the Supreme Court declared the law unconstitutional in the case of *People vs. Deitrich*.

People vs. Herman Faber. Before Police Judge Fritz, San Francisco. Complaint: Selling butter without marking correct weight on package. Found guilty and fined \$20. Fine paid.

People vs. J. R. Newberry. Before Police Judge Rose, Los Angeles. Complaint: Selling butter without marking correct weight on package. Acquitted by jury.

People vs. Julius Steifrater. Before Justice of the Peace Hull, Point Richmond. Complaint: Selling butter without marking correct weight on package. Plead guilty. Fined \$20. Fine paid.

People vs. Moses Martignoli. Before Police Judge Cabaniss, San Francisco. Complaint: Selling cream containing boron compound without labeling. Found guilty and fined \$10. Fine paid.

People vs. Thos. Marron. Before Police Judge Cabaniss, San Francisco. Complaint: Selling cream containing boron compound without labeling. Found guilty and fined \$10. Fine paid.

People vs. Chas. Haufe. Before Police Judge Cabaniss, San Francisco. Complaint: Selling cream containing boron compound without labeling. Plead guilty. Fined \$10. Fine paid.

People vs. A. Johnson. Before Police Judge Fritz, San Francisco. Complaint: Selling cream containing boron compound without labeling. Plead guilty. Fine \$10. Fine paid.

People vs. S. De Carli. Before Police Judge Fritz, San Francisco. Complaint: Selling cream containing boron compound without labeling. Plead guilty. Fined \$10. Fine paid.

People vs. Henry Beacom. Before Police Judge Cabaniss, San Francisco. Complaint: Selling milk from a dairy maintained in an unsanitary condition. Found guilty. Fined \$10.

People vs. John Crouch. Before Police Judge Cabaniss, San Francisco. Complaint: Selling cream containing boron compound without labeling. Found guilty. Fined \$10. Fine remitted.

People vs. M. Martignoli. Before Police Judge Cabaniss, San Francisco. Complaint: Selling cream containing boron compound without labeling. Found guilty. Fined \$10. Fine paid.

People vs. A. Maffly. Before Police Judge Cabaniss, San Francisco. Complaint: Selling cream containing boron compound without labeling. Found guilty. Fined \$10. Fine paid.

People vs. Manuel Furtado. Before Police Judge Smith, Oakland. Complaint: Selling milk from a dairy maintained in an unsanitary condition. Plead guilty. Fined \$200. Fine paid.

People vs. Manuel Smith. Before Police Judge Cabaniss, San Francisco. Complaint: Selling milk from a dairy maintained in an unsanitary condition. Case dismissed on the ground that complaint was improperly drawn. The defendant was a resident of Marin County, from which he shipped milk to San Francisco.

People vs. J. F. Silveira. Before Police Judge Cabaniss, San Francisco. Complaint: Selling milk produced on a dairy maintained in an unsanitary condition. Case dismissed on the ground that the complaint was improperly drawn. The defendant was a resident of Marin County, from which he shipped milk to San Francisco.

PART II.

DAIRY STATISTICS.

Since it was first established, the State Dairy Bureau has in each report it has submitted endeavored to present an idea of the growth and magnitude of the dairy interests of California and to touch upon other matters of public interest relative to the industry. The law enacted by the last Legislature, to which we have referred in this report as the "sanitary dairy law," contains a section that seeks to extend this line of usefulness on the part of the Bureau. It authorizes the Bureau to gather and compile statistics and other information relative to the dairy industry, and to disseminate the same. Acting under this authorization the Bureau had planned an elaborate system of data that it hoped to gather, not only in the way of figures showing the output of dairy products in the State, but it also planned to present facts that would show the profitableness of dairying, the distribution of the dairy industry throughout the State, the nature of forage crops growing naturally, and those best adapted for cultivation, in various localities; in other words, to devise a forage survey of the State. It was also the plan of the Bureau to ascertain and report to what extent our dairymen and manufacturers of dairy products are employing advanced methods in their business, the profitableness of their cows, and what efforts they are putting forth to increase this profitableness through selection and breeding. The inspectors of the Bureau had really a double rôle to perform in visiting dairies and factories—they were performing duty as sanitary inspectors and at the same time they have been census-takers for the Bureau. In this way the Bureau had accumulated a large amount of data regarding California dairying and dairy conditions, which it expected to arrange for presentation in this report; but all of this was lost in the conflagration last April, and all that the Bureau has at hand at the present time are those reports that the inspectors had not turned in before the fire and that has been secured during the short time the inspectors have been at work since the fire.

In this connection the suggestion seems in place to the effect that the law should go further than merely to authorize the Dairy Bureau to collect this data, by making it compulsory for dairymen and manufacturers to furnish such data to the Bureau as it may desire. The experience the inspectors of the Bureau have had with a few dairymen in their work along this line has been both unpleasant and unsatisfactory. Accurate statistics and information regarding the industries of

a State or county are of inestimable value, and the public is learning to appreciate them more and more, which makes it incumbent upon those who compile and publish them to use every effort and means to make them reliable. They should have the aid of the law, and not be compelled to rely upon the information that they can obtain from those who only give it voluntarily, and in some cases only after a lot of disagreeable persuasion.

BUTTER PRODUCTION.

The chief interest in the statistics issued by the Bureau has been in the production of butter each year, in view of the marked growth that has taken place in this branch of the dairy output of the State. The production of butter for the statistical years ending September 30, 1905, and September 30, 1906, is presented by counties in the following table:

County.	Year Ending Sept. 30, 1905. Pounds.	Year Ending Sept. 30, 1906. Pounds.
Alameda	886,315	848,953
Alpine	26,060	24,455
Amador	266,656	230,420
Butte	166,652	176,633
Calaveras	153,241	137,316
Colusa	234,819	278,872
Contra Costa	557,114	526,311
Del Norte	644,112	636,431
El Dorado	251,584	223,769
Fresno	2,166,048	2,644,897
Glenn	178,456	177,954
Humboldt	4,289,739	4,235,927
Inyo	137,442	123,106
Kern	323,363	334,070
Kings	1,444,218	1,677,272
Lake	124,942	109,506
Lassen	359,821	361,068
Los Angeles	1,431,045	933,896
Madera	75,424	94,642
Marin	3,959,641	3,603,274
Mariposa	14,628	18,262
Mendocino	793,122	782,387
Merced	1,786,082	2,361,528
Modoc	136,444	138,945
Mono	22,648	22,456
Monterey	534,241	551,122
Napa	738,983	741,074
Nevada	139,623	135,444
Orange	585,268	517,697
Placer	253,544	260,275
Plumas	380,941	350,145
Riverside	411,148	578,957
Sacramento	1,578,751	1,617,633
San Benito	144,155	121,567
San Bernardino	181,216	183,558
San Diego	759,111	1,041,207
San Francisco	-----	-----

County.	Year Ending Sept. 30, 1905. Pounds.	Year Ending Sept. 30, 1906. Pounds.
San Joaquin	1,468,991	1,641,374
San Mateo	206,261	272,551
San Luis Obispo	1,309,831	1,388,551
Santa Barbara	687,204	767,823
Santa Clara	242,648	326,218
Santa Cruz	455,778	399,976
Shasta	11,312	12,368
Sierra	113,123	216,386
Siskiyou	486,692	495,771
Solano	675,714	856,154
Sonoma	4,156,759	3,794,846
Stanislaus	2,006,171	2,759,582
Sutter	683,684	274,016
Tehama	133,053	148,176
Trinity	15,686	16,786
Tulare	1,735,888	2,075,929
Tuolumne	29,468	31,676
Ventura	199,632	145,640
Yolo	1,124,907	1,387,210
Yuba	83,648	182,516
Totals	41,961,047	44,044,578

To appreciate the full meaning of the figures given in the table above they must be considered in relation with the production of former years. These are given in the following table :

	Pounds.
1897	28,678,439
1898	23,691,028
1899	24,868,084
1900	28,783,859
1901	29,701,202
1902	31,528,762
1903	34,786,289
1904	35,636,969
1905	41,961,047
1906	44,044,578

California is rapidly developing her many industrial resources, but in no line can she show more substantial progress than in case of her production of butter. An increase from 23,691,028 pounds in 1898 to 44,044,578 in 1906, or almost double the former amount, is proof of the fact that the State has great possibilities in the dairy line that are becoming more and more appreciated.

A study of the table showing the production by counties, especially if the comparison is carried back for eight or ten years, will show that the increase in production is not general throughout the State, but is confined to those counties in which irrigation, which permits the production of alfalfa for feed, has made dairying possible.

The counties along the coast, where butter has been produced almost constantly since the pioneer days, have contributed little or

nothing to the increased butter output of the State. Their production from year to year seems to be governed only by feed conditions as affected by an absence or abundance of rainfall. But in case of those counties located in the San Joaquin and Sacramento valleys there has been a development of dairying that is attracting attention throughout the entire country, and the possibilities in the dairy business in these valleys are bringing to California many new citizens. To show more clearly the rate at which butter production has increased in the irrigated districts, we have taken a few counties and by going back over the former reports of the Dairy Bureau compiled the interesting table below, which gives the butter production of these counties for every other year for the past eight years:

Counties.	1898.	1900.	1902.	1904.	1906.
Fresno	291,754	604,861	1,025,374	1,619,746	2,644,897
Kern		129,848	156,878	200,936	334,070
Kings		258,750	727,282	1,099,400	1,677,272
Merced		623,608	712,202	1,563,771	2,361,528
Sacramento	285,984	742,443	1,186,135	1,508,293	1,617,633
San Joaquin		506,047	907,694	1,015,568	1,641,374
Stanislaus	190,655	423,185	677,058	1,564,749	2,759,582
Yolo	321,218	533,525	743,268	831,185	1,387,210
Totals		3,827,267	5,135,891	9,403,728	14,235,516

It will be noted that in case of Fresno County the annual production of butter multiplied almost ten times in the last eight years. Prior to 1899 the production of butter in Kern, Kings, Merced, and San Joaquin counties was not reported, as the Bureau then practiced the custom of not reporting those counties that produced less than 100,000 pounds, except in the total production for the State, which indicates that the output of some of these counties increased from less than 100,000 pounds eight or nine years ago to from one to two million pounds. The progress of these and other interior counties in the dairy business points a great future for California as a dairy State.

Of those counties that have retrograded in butter production, Los Angeles and Orange are conspicuous. The cause, however, is not difficult to find. These counties are rapidly filling up with people, who either live in the cities and towns, or, if in the country, they engage in lines of agriculture less arduous than dairying, often for recreation rather than profit, with two results: The increasing population draws more and more heavily on the cows of these counties for milk and cream, which are thereby diverted from butter production; and secondly, the same increase in population has advanced the value of land to a level that has induced many dairymen to remove their herds to other counties where land and water are cheaper and conditions for dairying equally as favorable. Formerly Los Angeles and Orange county dairy-

men have contributed very largely to the increased butter production in the San Joaquin Valley, and also to San Diego County, which has come to the front in recent years as a dairy county, largely through irrigation that has been applied to the valley of the Colorado River.

The last year shows a decline from the preceding year in the important dairy counties of Marin and Sonoma, and slightly in Humboldt County, which is attributable, from what the Bureau can learn, to a less favorable season than in 1905.

BUTTER IN SAN FRANCISCO.

San Francisco being the leading consuming and distributing center of butter on the coast, the amount of butter arriving last year is a matter of considerable interest among shippers and dealers. Unfortunately the Bureau is unable to give these figures for the twelve months, as no records were obtainable for a period of two months following the fire in the city, which was at a season when the receipts were the highest of the year. For the year ending September 30, 1905, the figures are available, and are given below:

	Pounds.
1904—October.....	912,290
November.....	943,050
December.....	833,308
1905—January.....	899,200
February.....	1,076,842
March.....	1,701,164
April.....	2,220,257
May.....	2,880,781
June.....	1,773,378
July.....	1,735,902
August.....	1,646,821
September.....	1,313,789
Total.....	17,936,782

Compared with former years the receipts of butter in San Francisco show as follows:

	Pounds.
1901.....	15,222,951
1902.....	14,823,048
1903.....	15,511,214
1904.....	15,713,692
1905.....	17,936,782

CHEESE PRODUCTION.

During the years ending September 30, 1905, and September 30, 1906, cheese was produced by the different counties as follows:

Cheese Production for the Years Ending September 30, 1905, and 1906.

Counties.	1905. Pounds.	1906. Pounds.
Calaveras	4,800	-----
Contra Costa	15,450	19,010
Fresno	52,154	-----
Humboldt	-----	34,400
Kern	7,270	8,460
Kings	24,900	51,232
Lake	57,681	2,223
Lassen	-----	60,000
Los Angeles	730,000	710,042
Marin	329,619	450,177
Mendocino	36,484	33,684
Modoc	6,600	7,000
Monterey	1,131,641	1,125,969
Napa	38,404	36,784
Plumas	9,780	5,896
Riverside	22,500	116,635
Sacramento	549,219	559,580
San Benito	404,494	393,621
San Joaquin	72,677	81,798
San Mateo	744,486	675,596
San Luis Obispo	61,569	147,717
Santa Barbara	-----	16,575
Santa Clara	637,504	569,001
Santa Cruz	350,825	490,027
Siskiyou	-----	25,000
Sonoma	116,284	258,036
Stanislaus	182,562	33,640
Sutter	229,975	331,979
Tehama	83,182	79,648
Tulare	54,750	-----
Yolo	-----	94,750
Yuba	45,863	-----
Totals	6,020,672	6,418,480

It will be noted from the above table that out of the fifty-seven counties in the State only thirty-two produce cheese. A comparison of the total production with that of former years for which figures have been compiled is shown in the following table:

	Pounds.
1897	6,399,625
1898	5,148,372
1899	5,294,938
1900	4,989,960
1901	5,681,366
1902	6,503,441
1903	7,218,639
1904	6,133,898
1905	6,020,672
1906	6,418,480

It seems from the figures given that the tendency in California dairying is in the direction of butter production. While this has almost doubled in less than ten years, cheese production remains at a standstill; at the same time large quantities are shipped in from other states and also from foreign countries. This is not because producers have not had the benefit of good prices on cheese, for unusually high prices have ruled in the markets for cheese during the past several years, which on the average returned more profit on milk than when it was made into butter.

The best reason that can be given for the lack of advancement in cheese production lies in the fact that dairy development, as we have stated before, has taken place mostly in the irrigated, alfalfa-growing sections of the State. It has been the experience among those who have tried to make cheese from milk from alfalfa-fed cows that, despite the care and skill of the maker, the quality is not satisfactory, a difficulty that is less pronounced—if it is present at all—in making butter. At any rate there seems to prevail a prejudice that a superior quality of cheese can not, under our present state of knowledge of the art, be produced in alfalfa-growing territory. While there may be considerable basis of reason in this view, the Bureau can not here overlook the fact that the most successful and largest cheese factory in the State produces cheese from cows almost exclusively fed on alfalfa. It has for a number of years not only competed successfully with butter production in its immediate vicinity, but has held its business in competition with the fresh milk trade of Los Angeles.

CONDENSED MILK PRODUCTION.

The production of condensed milk, and what is known as evaporated cream, has not reached any extensive proportion in this State, notwithstanding the fact that its mines, lumber camps, and the vessels that ply between her shores and every part of the world consume immense quantities of these articles. Out of at least a dozen efforts that have been made to establish condensaries in the State, only three are in operation to-day. The output of two of these has suffered during the past year as a result of the San Francisco disaster, which for many months prevented the factory from getting a supply of cans in which the articles are packed.

The following table shows the annual output of the condensaries since 1899:

	Cases.
1899.....	52,558
1900.....	66,302
1901.....	100,140
1902.....	146,860
1903.....	126,874
1904.....	186,905
1905.....	244,878
1906.....	113,025

BUTTER AND CHEESE PRICES.

The table below is presented to show the prices that have ruled on butter and cheese in the market of San Francisco, which to a large extent governs the markets of the coast. They are the average daily quotations, in cents, on the best grade of butter and cheese, and are of interest to producers and dealers:

Month.	1904-1905.		1905-1906.	
	Butter.	Cheese.	Butter.	Cheese.
October	28.8	11.6	29.2	10.5
November	22.3	12.3	27.2	14.0
December	23.1	11.6	30.6	14.5
January	26.6	11.0	31.0	15.0
February	28.0	11.9	29.8	14.0
March	27.5	12.5	24.4	13.2
April	19.2	12.4	18.8	10.6
May	19.2	12.2	17.6	10.7
June	20.2	10.5	19.0	9.1
July	21.4	9.7	21.0	11.0
August	25.1	11.0	25.4	11.6
September	26.2	11.7	27.0	12.5
Average for twelve months	23.9	11.5	25.5	12.2

Compared with former statistical years, the average yearly prices given in the preceding table show as follows:

Statistical Year.	Butter. Cents.	Cheese. Cents.
1896-97	20.8	8.9
1897-98	23.9	10.4
1898-99	22.9	11.2
1899-00	23.0	10.0
1900-01	22.8	10.1
1901-02	25.8	10.8
1902-03	27.8	13.5
1903-04	25.3	10.5
1904-05	23.9	11.5
1905-06	25.5	12.2

ANNUAL VALUE OF THE DAIRY OUTPUT.

In former reports this Bureau has endeavored to give an estimate of the annual valuation of what the dairy industry of California yields. Such an estimate must of necessity be a rather crude approximation, and it is not claimed to be anything more than an estimate on the basis of prices prevailing in the San Francisco market.

For the Year ending September 30, 1905.

Value of 41,961,047 pounds of butter	\$10,490,262
Value of 6,020,672 pounds of cheese	722,480
Value of 244,878 cases of condensed milk	820,341
Value of milk and cream consumed	6,279,222
Value of calves produced on dairies	1,750,000
Value of skim milk from butter production	1,510,597
Total	\$21,572,902

For the Year ending September 30, 1906.

Value of 44,044,578 pounds of butter	\$11,671,814
Value of 6,418,480 pounds of cheese	815,146
Value of 113,025 cases of condensed milk	378,633
Value of milk and cream consumed	6,467,598
Value of calves produced on dairy farms	1,837,500
Value of skim milk from butter production	1,586,120
Total +	\$22,756,811

SOME INFORMATION CONCERNING OUR DAIRYMEN.

In the data that the State Dairy Bureau has secured through its inspectors from the dairymen of the State, relating to the conducting of their business, there is much interesting material, notwithstanding the fact that the bulk of it was lost when the office was destroyed by the fire. The most conspicuous feature noted is the wide valuation in the productiveness of the herds. We find that there are many who report an average gross earning of only \$20 or \$25 per annum per cow, while there are many who report that the gross earnings exceed an average of over \$100 per cow, and in some cases over \$200 is the average reported.

Going more into detail, the Bureau can report on data representing 598 dairies, having a total of 28,912 cows. The average value of the gross income for a year from these cows is shown to be \$54.98. There is a marked difference in the average figures from different parts of the State, due largely to the disposition of the product of the cows. In the case of Humboldt, Del Norte, and Mendocino counties we find that out of 13,294 cows, whose product goes almost exclusively into butter, the average annual gross income per cow is \$52.02. In Marin, Sonoma, and San Mateo counties, where a large part of the product goes to market as milk and cream, the average per cow is \$57.57; while in Los Angeles County for the same reason the average amounts to \$81.16. If we take out of this average for Los Angeles County the dairies that sell their product as milk exclusively, we find their average gross income per cow for a year is \$102.46, which would reduce the average of those dairies that dispose of their milk for butter and cheese materially.

COST OF PRODUCTION.

It would be both interesting and valuable if we could report with exactness what it costs to produce the gross average results that are conveyed in the above figures, but this is next to impossible, for the reason that the average dairyman can give little or no information as to what it costs him to do business, or what his profits are. Too often it happens that the dairyman does not know that he is losing money by his efforts until he is confronted by his creditors. When the

question is put to him as to what it costs him to feed and care for a cow for a year, he hesitates even to make a guess.

Bearing on the high average gross income per cow when milk is sold for consumption, the cost of production and selling increases vastly. From the reports, it is shown that seventy-two per cent of the dairymen who produce milk for consumption feed concentrated foodstuffs, much of which is purchased in the feed market, in order to keep up the milk flow throughout the year. On the other hand, it appears from the data at hand that dairymen who produce milk for butter and cheese making rely almost altogether on the pasturage and roughness that can be produced on their land, grains and milk feeds being used by less than ten per cent of the dairymen. This is well shown in the case of Humboldt, Mendocino, and Del Norte counties, from which the Bureau has the most complete records. Out of 296 dairymen in those counties from which reports are at hand it appears that only eight per cent of them feed grain and mill feeds, relying entirely upon the pasturage and rough forage that is grown upon the land. Almost the same practice is followed throughout the alfalfa-growing districts of the San Joaquin and Sacramento valleys. That it is possible for a dairyman to secure from cows of even average producing capacity a gross annual income of from \$50 to \$60, taking into consideration the mild climate that eliminates almost altogether the necessity for the sheltering of cows, is splendid proof of California's adaptability for dairying, at least in those areas from which the Bureau has secured its data.

Having arrived at the fact that the cows in at least certain districts of California earn from the roughage that grows and that may be grown on the land, an average of \$52.02, as in the case of Humboldt, Mendocino, and Del Norte counties, and even better in the irrigated territory, it will be worth while to note the area of land that it takes on an average to support a cow. In this way we can see what land realizes when utilized for dairying. Of the 598 dairymen from which data are at hand, it appears that 28,912 cows are kept on 152,549 acres of land, or an average of one cow for every 5.28 acres of land. If data were at hand including more dairies in the irrigated, alfalfa-growing districts this average would be materially lower. Thus it is shown that in the seven counties south of the Tehachapi, the average is one cow to 3.19 acres; but even here there are included large areas that consist of rough, hilly land upon which only natural grasses grow during the often brief humid season. In Yolo County, where alfalfa is the main reliance for food, we find that on an average one cow is maintained on 2.24 acres. If we take all the data we have as a basis, which includes the coast counties from Del Norte to San Diego, but not including the important dairy counties of Monterey and San Luis Obispo, we have, as has already been stated, an average of one cow

maintained on 5.28 acres of land; and as the gross average income per cow has been shown to be \$54.98, we may say that the acreage devoted to dairying in this large district of the State realizes a gross annual average income of a trifle over \$10 per acre. In considering this feature, sight should not be lost of the fact that a large proportion of this area is hilly, semi-mountainous, and generally unillable.

From the very nature of the business and from the fact that farmers and dairymen do not, as a rule, keep a close account of the money details of their business, it is difficult to secure and present a statement showing the cost of keeping cows. However, the Bureau, through its inspectors, endeavored to secure some information bearing upon this question. The data secured were supplied through the answers made by dairymen to the question, "What is the cost of operating your dairy during a year?"

The difficulty in securing any satisfactory information in reply to a question of this kind, aside from the fact that the information is taken not from an expense account kept by the dairymen, but from memory only, lies in the fact that dairymen do not always have the same or right conception of what the cost of operating is. Too often they will not make a full charge against their business for the labor of themselves and their families. Neither are they always likely to make a full and uniform charge for the pasturage consumed, which should be on a basis of the rent or interest on investment in the land. Assuming that the replies to the inspectors in this regard were reliable, we are in a position to make the statement that, in the case of 529 dairymen, owning 26,890 cows, the cost of feeding, handling, and disposing of their product was \$394,164, or an average of \$14.65 per cow for a year. If these figures are correct they certainly speak eloquently of California as a State of wonderful dairy possibilities. In states less favored by soil and climate, the cost of the hay alone for carrying cows through the winter exceeds this figure. In the East the generally estimated cost of keeping a cow for a year is about \$30. If cows that will average a gross yearly income of \$54.98 can be kept at a total cost per year of \$14.65, it is easy to see the reason for the rapid expansion of the dairy business in this State that has already been mentioned in this report.

FORAGE RESOURCES.

Out of an area of 152,559 acres of land devoted to dairying in the part of the State referred to, which is only a small part of the total, the data secured by the Bureau show that of this area 12,413 acres are devoted to alfalfa-growing, 15,305 acres to other introduced forage crops, and the remainder, or 124,841 acres, is relied upon for the natural pasturage that grows on the land. Of the introduced forage crops the reports show that alfalfa is grown, to more or less extent,

throughout every county in the State except Mendocino, Sonoma, Marin, San Mateo, and San Luis Obispo. In Lake, Napa, Santa Clara, Santa Cruz, Monterey, San Benito, and Santa Barbara it is grown in limited areas, while in the counties where irrigation is general it is almost the sole reliance in the way of rough forage.

The introduced clovers we find in use in no part of the State to any extent outside of Humboldt, Del Norte, and to a small extent in Siskiyou and other limited areas in the Sierras, and also to a small extent on the reclaimed lands about the delta of the Sacramento and San Joaquin rivers; but wherever the clovers are grown they have in recent years been yielding their place in a considerable measure to alfalfa, as our farmers are learning how to utilize this desirable forage crop under various conditions.

The rye grasses, of which there are two varieties—the Australian and the Italian—that have been introduced into this country, play a small part in the feed of dairy cattle in the State. Their chief advantage lies in the fact that they grow in a soil too moist for alfalfa and the clovers, and on wet, soft soil, whether from lack of drainage or excessive rainfall, as in the case of Humboldt County, they form a firm turf that will support stock and prevent the land being cut up. As the result of these advantages the rye grasses have found much favor in reclaimed lands devoted to dairying about Humboldt Bay and in the delta of the San Joaquin and Sacramento rivers. Another advantage that may be mentioned for the rye grasses is that there is no objection to them because of imparting unpleasant flavors to milk and its products, as is often urged against alfalfa.

The foregoing crops, with the natural pasturage, are the main reliance of California dairymen in the way of pasturage. There are a few others, such as timothy, Bermuda-grass, millet, sorghum, and even the noxious Johnson-grass mentioned as being used to a limited extent only. Vetches, which have met with much favor among Oregon dairymen, are not at all included among the fodder crops of the California dairymen. That the range of dairy forage is so limited in California, with its variations of climate and soil, is somewhat remarkable, and it develops the fact that those fodders that are grown must be so satisfactory that the introduction of others fails to interest our farmers.

In the way of supplementing the pastures, that is, by growing various crops that may be fed green or by means of root crops, California dairymen, from the data at hand, do not seem to favor the plan very much outside of Humboldt and the counties in the southern part of the State. The most successful dairymen, especially if they must depend upon the natural unirrigated pasturage, realize that by relying on the green pasture season solely, which may last from four to seven months, according to the particular district of the State, a cow can not in this

brief period be made to yield a good season's work in milk production. To prolong the lactation period, good dairymen resort to growing crops such as corn, sorghum, pumpkins, or, in the way of roots, sugar beets, carrots, and so on. Where dairy farming is carried on intensively, that is, by trying to get the greatest usefulness out of the land, as is done on the rich valley lands of Humboldt County and in the case of Los Angeles County, the practice of growing supplementary crops is common and often accounts for the large production by their herds. Soiling cattle is a term applied where forage is cut and fed in a green state, and is the common way of feeding these supplemental fodder crops. Observing the results, as this Bureau has, of the system of dairying, it seems that California dairymen in other sections than those under irrigation, overlook a great opportunity when they rely solely on the briefness of the average pasture season to secure a good season's work out of their cows. There are few dairy farms in the State, regardless as to how rough and hilly the land may be, on which there are not tillable areas that should be used for growing supplemental crops. Instead, we note that this land is generally grazed, or hay is made from it, which from the results that could be obtained in a larger amount of food and ready to feed at a season when most needed, indicates a great loss to dairymen.

Another means of prolonging the milking season with cows is by the use of the silo, a system whereby green fodder, such as corn, may be placed into an air-tight pit and preserved in a succulent state for use when desired. That the system has not found favor with California dairymen is shown by the fact that out of 598 dairymen the inspectors of the Bureau found only 11 who use the silo. In Eastern dairy states the use of the silo is becoming very general. One county alone in the State of Wisconsin is reported to have silos on over 500 farms. It may be a question as to whether the silo system has any advantage in the irrigated sections of this State, where the mild winters permit green feed to grow from eight to ten months of the year, if not throughout the year entirely; but even here those few dairymen who have adopted it have much to say to its credit. But for the reason we have advanced in referring to supplemental crops, and from its observations, this Bureau is convinced that those dairymen outside of the irrigated districts in this State are losers by overlooking the advantages of the silo system.

CALIFORNIA DAIRY COWS.

Although there is every indication that the keeping of cows in California at the present time is profitable, it is remarkable to note the apparent lack of interest on the part of our dairymen in securing the largest possible production out of their cows. There are two ways of doing this. One is by liberal and right feeding, and the other is by

being sure that you are feeding cows capable of turning this food into the maximum product. Good cows are most economically secured through careful selection and breeding to animals of known milking capacity. When we refer to cows of known breeding we usually refer to thoroughbred cows, which means that their ancestry is known for many generations and that they carry in their veins the results of generations of breeding for the special purpose of usefulness in the dairy, and that in this breeding there is a prepotency imparted which enables the animal to transmit dairy capacity to its descendants that was derived from its ancestors by it. When a dairyman seeks to improve his cows he secures thoroughbreds of some special breed. That California dairymen are doing little along this line appears from the fact that out of 28,912 cows owned by 598 dairymen, only 318 are thoroughbreds, from the data secured. But it is not necessary that a dairyman should, in order to breed up his herd in usefulness, invest in thoroughbred cows. He can accomplish this more slowly, but just as safely, by breeding to thoroughbred males, and in a few generations eliminate almost entirely from his herd the inferior, indiscriminately bred cows and have in their place cows in whose veins run the blood and prepotency that are the results of centuries of careful breeding for the single purpose of the greatest usefulness in the dairy.

The investment in a breeding male whose power and prepotency in a certain line are almost a certainty, is the first manifestation of intelligence on the part of the dairyman. But this spirit of enterprise seems to be sadly lacking among California dairymen. The data at hand show that the 28,912 cows referred to above are bred to males with apparently no purpose on the part of their owners to improve their offspring. The mating of the male and female seems to be only a matter of renewing the lactation period of the latter, for which any kind of a male will serve the purpose. The 28,912 cows are bred to 923 males, or one male to 31 cows. Of these 923 males only 171 are thoroughbreds, or, as we may say, specially bred, the remaining 757 being animals mostly of promiscuous and unknown breeding. In other words, we may say that less than twenty per cent of the 598 dairymen, from the data at hand, pay any attention to the question of improving their herds through breeding.

In concluding this report this Bureau wishes to emphasize the significance of what has been stated in reference to the providing of feed for the cows of the State and of their breeding. From what a few dairymen are accomplishing in every part of the State, it is readily apparent that the great majority of our dairymen lose enormously through their failure to work intelligently and thereby secure a larger volume of feed from the same acreage than they do. It may not be easy to make two blades of grass grow where only one grew before, but it only needs

observation, search, and study—in a word, the application of intelligence—to find another crop that will often multiply many times the feed units of the crop that has incumbered the land before. As the dairyman learns to produce larger and larger yields of feed from his land, let him be sure that he is not wasting it on unresponsive cows on account of their limited capacity for work in the dairy. Looking over the data turned in by the inspectors we find in every dairy district of the State many of the dairymen reporting the gross average annual production of their cows at from one hundred to one hundred and fifty pounds of butter a year, while their neighbors, under similar conditions, report that their cows yield from two hundred to three hundred pounds of butter. This great discrepancy is due to the lack of enterprise and intelligence displayed by most of our dairymen. The principle upon which the dairymen should act is to have only good cows—cows with capacity for work in the dairy thoroughly bred into them and to feed these cows liberally. To get the dairymen to comprehend this fully would mean less physical effort for them and greater prosperity for the industry.

The State can do much along the line of getting our dairymen to take hold of the principle of better cows and caring for and feeding them better, as has been shown by what has been accomplished in other dairy states. California needs to arouse a spirit of enthusiasm for better methods and a display of more intelligence upon the part of her dairymen. That many of them are alive to the fact that they need improvement is shown by the manner in which they accept the suggestions from the inspectors of the Bureau. In numerous instances thoroughbred bulls have been placed at the heads of herds through an inspector telling a dairyman what he was losing by not breeding his cows with an object of improving the milking capacity of his heifers. Some states and countries have traveling instructors for the special purpose of working among individual dairymen and factory operators in order that a class may be reached by educational efforts that can not be aroused from their indifference in any other way. California, compared with other states, has done little along the line of educating her dairymen. This Bureau views with great satisfaction the action taken by the last session of the Legislature in providing the University of California with a farm, without which as a basis the State has been able to accomplish little in the way of practical dairy education and in investigating the scientific problems that confront our dairymen. We take occasion to express the hope that the State will lose no time in further developing the farm to meet its intended purpose. From information that this Bureau has gathered from the dairymen of the State it can say with safety that in less than ten years the application of intelligent, scientific dairy methods would result in giving California

a class of cows that would enable the number that we have to-day to double the annual output of dairy products of the State. In other words, intelligent dairying would mean over twenty million dollars a year to the industries of the State with no additional draught upon its resources. Surely efforts along this line on the part of the State would be profitable.

PART III.

FINANCIAL STATEMENT.

ORIGINAL DAIRY BUREAU APPROPRIATION.

FIFTY-SIXTH FISCAL YEAR.

Amount appropriated for the fifty-sixth year \$5,000 00

Disbursements.

Salary of J. M. Thomas, Secretary, to March 31, 1905	\$900 00	
Traveling expenses of Secretary to March 31, 1905	605 00	
Salary of Wm. H. Saylor, Assistant Secretary and Chemist, to March 31, 1905	900 00	
Salary of Wm. H. Saylor, Secretary and Chemist, from March 31 to June 30, 1905	300 00	
Traveling expenses of Wm. H. Saylor	86 70	
Salary of clerk and stenographer, three months	120 00	
Telephone service	63 94	
Expressage, drayage, and freight	26 87	
Office rent	420 00	
Services of janitor	45 00	
Scavenger service	2 50	
Press clipping service	36 00	
Water service	11 50	
Gas and light service	18 20	
Office supplies	61 53	
Laboratory fixtures and supplies	265 02	
Notary fees	6 00	
Towel service	6 00	
Miscellaneous employment	187 15	
Printing	313 00	
Traveling expenses of J. A. Bliss	230 75	
Per diem of J. A. Bliss	70 00	
Postage stamps	92 00	
Paid for suspicious samples	2 65	
Office equipment	149 80	
Traveling expenses of George E. Peoples	21 00	
Cheese-branding stencils	8 25	
Traveling expenses of George R. Sneath	7 00	
Per diem of George R. Sneath	40 00	
Telegrams	3 45	
Unexpended balance	69	
	<hr/>	
	\$5,000 00	\$5,000 00

FIFTY-SEVENTH FISCAL YEAR.

Amount appropriated for the fifty-seventh year. \$5,000 00

Disbursements.

Salary of Wm. H. Saylor, Secretary and Chemist.....	\$1,200 00	
Traveling expenses of Wm. H. Saylor.....	127 95	
Salary of clerk and stenographer.....	540 00	
Per diem of J. A. Bliss	110 00	
Traveling expenses of J. A. Bliss	20 90	
Per diem of George R. Sneath	90 00	
Traveling expenses of George R. Sneath.....	15 75	
Per diem salary of J. L. Starr, Inspector.....	852 00	
Per diem salary of W. K. Freeman, Inspector	32 00	
Traveling expenses of W. K. Freeman.....	8 45	
Per diem salary of H. J. Faulkner, Inspector.....	484 00	
Per diem salary of P. C. Krog, Inspector.....	220 00	
Per diem salary of L. P. Branstetter, Inspector.....	140 00	
Traveling expenses of stenographer	1 90	
Cheese-branding stencils.....	90	
Office equipment.....	188 50	
Paid for suspicious samples	8 80	
Postage stamps	74 00	
Telegrams.....	3 50	
Printing.....	27 00	
Miscellaneous employment.....	3 80	
Towel service	6 75	
Notary fees	7 00	
Laboratory equipment and supplies.....	98 49	
Office supplies.....	51 35	
Press clipping service.....	36 00	
Office rent.....	571 00	
Expressage, freight, and drayage	11 30	
Telephone service.....	68 35	
Unexpended balance.....	31	
	<hr/>	
	\$5,000 00	\$5,000 00

DAIRY INSPECTION APPROPRIATION.

FIFTY-SIXTH FISCAL YEAR (THREE MONTHS).

<i>Available Funds.</i>	
Appropriation	\$1,500 00
<i>Disbursements.</i>	
Per diem salary of P. C. Krog, Inspector.....	\$140 00
Traveling expenses of P. C. Krog.....	153 65
Per diem salary of S. G. Whitney, Inspector.....	128 00
Traveling expenses of S. G. Whitney.....	117 90
Per diem salary of E. W. Major, Inspector.....	16 00
Traveling expenses of E. W. Major.....	8 80
Per diem salary of H. P. Glasier, Inspector.....	60 00
Traveling expenses of H. P. Glasier.....	110 35
Per diem of J. A. Bliss.....	30 00
Traveling expenses of J. A. Bliss.....	57 15
Per diem of George R. Sneath.....	10 00
Traveling expenses of George R. Sneath.....	1 75
Per diem salary of J. L. Starr, Inspector.....	92 00
Traveling expenses of J. L. Starr.....	40 60
Salary of Wm. H. Saylor, Secretary.....	233 33
Notary fees.....	1 50
Office furniture and supplies.....	125 30
Expressage and incidentals.....	4 85
Printing	121 50
Unexpended balance.....	02
	<hr/>
	\$1,500 00 \$1,500 00

FIFTY-SEVENTH FISCAL YEAR.

<i>Available Funds.</i>	
Appropriation	\$5,000 00
Fees and fines collected.....	279 85
	<hr/>
	\$5,279 85
<i>Disbursements.</i>	
Per diem salary of P. C. Krog.....	\$648 00
Traveling expenses of P. C. Krog.....	944 88
Per diem salary of S. G. Whitney, Inspector.....	36 00
Traveling expenses of S. G. Whitney.....	7 50
Per diem salary of H. P. Glasier, Inspector.....	12 00
Traveling expenses of H. P. Glasier.....	5 50
Per diem and salary of J. L. Starr, Inspector.....	92 00
Traveling expenses of J. L. Starr.....	539 10
Per diem salary of L. P. Branstetter, Inspector.....	276 00
Traveling expenses of L. P. Branstetter.....	289 20
Per diem salary of H. J. Faulkner, Inspector.....	312 00
Traveling expenses of H. J. Faulkner.....	727 50
Per diem salary of W. K. Freeman, Inspector.....	156 00
Traveling expenses of W. K. Freeman.....	22 00
Salary of Wm. H. Saylor, Secretary.....	1,200 00
Expressage and incidentals.....	4 75
Notary fees.....	6 00
Unexpended balance.....	42
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	\$5,279 85 \$5,279 85

APPENDIX.

PART IV.

THE DAIRY LAWS OF CALIFORNIA.

OLEOMARGARINE AND FILLED CHEESE LAW.

An Act to prevent deception in the manufacture and sale of butter and cheese, to secure its enforcement, and to appropriate money therefor.

[Approved March 4, 1897.]

The people of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. That for the purpose of this Act, every article, substance, or compound, other than that produced from pure milk or cream from the same, made in the semblance of butter, and designed to be used as a substitute for butter made from pure milk or cream from the same, is hereby declared to be imitation butter; and that for the purposes of this Act, every article, substance, or compound, other than that produced from pure milk or cream from the same, made in the semblance of cheese, and designed to be used as substitute for cheese made from pure milk or cream from the same, is hereby declared to be imitation cheese; *provided*, that the use of salt, rennet, and harmless coloring matter for coloring the product of pure milk or cream, shall not be construed to render such product an imitation; *and provided*, that nothing in this section shall prevent the use of pure skimmed milk in the manufacture of cheese.

SEC. 2. No person, by himself or his agents or servants, shall render or manufacture, sell, offer for sale, expose for sale, or have in his possession with intent to sell, or use, or serve to patrons, guests, boarders, or inmates, in any hotel, eating-house, restaurant, public conveyance or boarding-house, or public or private hospital, asylum, or eleemosynary or penal institution, any article, product, or compound made wholly or partly out of any fat, oil, or oleaginous substance or compound

thereof, not produced directly and at the time of manufacture from unadulterated milk or cream from the same, which article, product, or compound shall be colored in imitation of butter or cheese produced from unadulterated milk or cream from the same; *provided*, that nothing in this section shall be construed to prohibit the manufacture or sale, under the regulations hereinafter provided, of substances or compounds, designed to be used as an imitation, or as a substitute for butter or cheese made from pure milk or cream from the same, in a separate and distinct form and in such a manner as will advise the consumer of its real character, free from coloration or ingredients that cause it to look like butter or cheese made from pure milk or cream, the product of the dairy.

SEC. 3. Each person, who, by himself or another, lawfully manufactures any substance designed to be used as a substitute for butter or cheese, shall mark by branding, stamping, or stenciling upon the top and sides of each tub, firkin, box, or other package in which such article shall be kept, and in which it shall be removed from the place where it is produced, in a clear and durable manner, in the English language, the words "substitute for butter," or "substitute for cheese," as the case may be, in printed letters in plain roman type, each of which shall not be less than one inch in height by one half inch in width, and in addition to the above shall prepare a statement, printed in plain roman type, of a size not smaller than pica, stating in the English language its name, and the name and address of the manufacturer, the name of the place where manufactured or put up, and also the names and actual percentages of the various ingredients used in the manufacture of such imitation butter or imitation cheese; and shall place a copy of said statement within and upon the contents of each tub, firkin, box, or other package, and next to that portion of each tub, firkin, box, or other package, as is commonly and most conveniently opened; and shall label the top and sides of each tub, firkin, box, or other package by affixing thereto a copy of said statement, in such manner, however, as not to cover the whole or any part of said mark of "substitute for butter," or "substitute for cheese."

SEC. 4. No person, by himself or another, shall knowingly ship, consign, or forward by any common carrier, whether public or private, any substance designed to be used as a substitute for butter or cheese, unless the same be marked and contain a copy of the statement, and be labeled as provided by section three of this Act; and no carrier shall knowingly receive the same for the purpose of forwarding or transporting, unless it shall be manufactured, marked, and labeled as hereinbefore provided, consigned, and by the carrier receipted for by its true name; *provided*, that this Act shall not apply to any goods in transit between foreign States and across the State of California.

SEC. 5. No person or his agent shall knowingly have in his possession or under his control any substance designed to be used as a substitute for butter and cheese, unless the tub, firkin, box, or other package containing the same shall be clearly and durably marked and contain a copy of the statement, and be labeled as provided by section three of this Act; and if the tub, firkin, box, or other package be opened, then a copy of the statement described in section three of this Act shall be kept with its face up, upon the exposed contents of said tub, firkin, box, or other package; *provided*, that this section shall not be deemed to apply to persons who have the same in their possession for the actual consumption of themselves or family.

SEC. 6. No person, by himself or another, shall sell, or offer for sale, or take orders for the future delivery of, any substance designed to be used as a substitute for butter or cheese, under the name of or under the pretense that the same is butter or cheese; and no person, by himself or another, shall sell any substance designed to be used as a substitute for butter or cheese, unless he shall inform the purchaser distinctly, at the time of the sale, that the same is a substitute for butter or cheese, as the case may be, and shall deliver to the purchaser, at the time of the sale, a separate and distinct copy of the statement described in section three of this Act; and no person shall use in any way, in connection or association with the sale, or exposure for sale, or advertisement, of any substance designed to be used as a substitute for butter or cheese, the words "butterine," "creamery," or "dairy," or the representation of any breed of dairy cattle, or any combination of such words and representation, or any other words or symbols, or combinations thereof, commonly used by the dairy industry in the sale of butter or cheese.

SEC. 7. No keeper or proprietor of any bakery, hotel, boarding-house, restaurant, saloon, lunch-counter, or other place of public entertainment, or any person having charge thereof, or employed thereat, or any person furnishing board for others than members of his own family, or for any employés where such board is furnished as the compensation or as a part of the compensation of any such employé, shall place before any patron or employé, for use as food, any substance designed to be used as a substitute for butter and cheese, unless the same be accompanied by a copy of the statement described in section three of this Act, and by a verbal notification to said patron that such substance is a substitute for butter or cheese.

SEC. 8. No action can be maintained on account of any sale or other contract made in violation of, or with intent to violate, this Act by or through any person who was knowingly a party to such wrongful sale or other contract.

SEC. 9. Every person having possession or control of any substance designed to be used as a substitute for butter and cheese which is not

marked as required by the provisions of this Act shall be presumed to have known, during the time of such possession or control, that the same was imitation butter, or imitation cheese, as the case may be.

SEC. 10. No person shall efface, erase, cancel, or remove any mark, statement, or label provided for by this Act, with intent to mislead, deceive, or to violate any of the provisions of this Act.

SEC. 11. No butter or cheese not made wholly from pure milk or cream, salt, harmless coloring matter, shall be used in any of the charitable or penal institutions that receive assistance from the State.

SEC. 12. Whoever shall violate any of the provisions or sections of this Act shall be deemed guilty of a misdemeanor, and shall, upon conviction thereof, be punished for the first offense, by a fine of not less than fifty dollars, nor more than one hundred and fifty dollars; or by imprisonment in the county jail for not exceeding thirty days; and for each subsequent offense, by a fine of not less than one hundred and fifty dollars nor more than three hundred dollars, or by imprisonment in the county jail not less than thirty days, nor more than six months, or by both such fine and imprisonment, at the discretion of the court. One half of all the fines collected under the provisions of this Act shall be paid to the person or persons furnishing information upon which conviction is procured.

SEC. 13. Whoever shall have possession or control of any imitation butter or imitation cheese, or any substance designed to be used as substitute for butter or cheese, contrary to the provisions of this Act, shall be construed to have possession of property with intent to use it as a means of committing a public offense, within the meaning of chapter three, of title twelve, of part two, of an Act to establish a Penal Code; *provided*, that it shall be the duty of the officer who serves a bench warrant issued for imitation butter or imitation cheese, or any substance designed to be used as a substitute for butter or cheese, to deliver to the Agent of the Dairy Bureau, or to any person by such Dairy Bureau authorized in writing to receive the same, a perfect sample of each article seized by virtue of such warrant, for the purpose of having the same analyzed, and forthwith to return to the person from whom it was taken the remainder of each article seized as aforesaid. If any sample be found to be imitation butter or imitation cheese, or substance designed to be used as a substitute for butter or cheese, it shall be returned to and retained by the magistrate as and for the purpose contemplated by section fifteen hundred and thirty-six of an Act to establish a Penal Code; but if any sample be found not to be imitation butter or imitation cheese, or a substance designed to be used as a substitute for butter or cheese, it shall be returned forthwith to the person from whom it was taken.

SEC. 14. It shall be the duty of the District Attorney, upon the application of the Dairy Bureau, to attend to the prosecution, in the name of the State, of any suit brought for the violation of any of the provisions of this Act within his district.

SEC. 15. The Governor shall, on or before the first day of July, eighteen hundred and ninety-seven, appoint three resident citizens of this State, who shall have practical experience in the manufacture of dairy products to constitute a State Dairy Bureau, and which shall succeed the one now in existence in every respect. Members of this Bureau shall hold office for the period of four years from and after the first day of July, eighteen hundred and ninety-seven, and until their successors are appointed and qualified; *provided*, that the first members appointed under the provisions of this Act shall at their first meeting so classify themselves by lot as that one shall go out of office at the expiration of two years, one at the expiration of three years, and the other at the expiration of four years. Any vacancy shall be filled by appointment by the Governor for the unexpired term. The members of said Bureau shall serve without compensation, and within twenty days after their appointment shall take the oath of office as required by the Constitution, and they shall thereupon meet and organize by electing a Chairman and Treasurer. Any one of them may be removed by the Governor for neglect or violation of duty. They shall make a report in detail to the Legislature not later than the first day of December next preceding the meetings thereof.

SEC. 16. It shall be the duty of the State Dairy Bureau to secure, as far as possible, the enforcement of this Act. The State Dairy Bureau shall have power to employ an agent at a salary of twelve hundred dollars a year, and such assistants or chemists as from time to time may be necessary therefor.

SEC. 17. There is hereby appropriated for the use of this State Dairy Bureau, out of any money in the State Treasury not otherwise appropriated, the sum of five thousand dollars for each fiscal year hereafter, and commencing with the forty-ninth fiscal year. All salaries, fees, costs and expenses of every kind incurred in the carrying out of the law shall be drawn from the sum so appropriated, and the State Controller shall draw his warrant on the State Treasurer in favor of the person entitled to the same.

SEC. 18. All Acts and parts of Acts inconsistent with this Act are hereby repealed.

SEC. 19. This Act shall take effect immediately.

LAW RELATING TO RENOVATED BUTTER.

An Act to prevent deception in the sale of renovated butter and to license manufacturers and dealers in the same.

[Approved March 20, 1905.]

The people of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. No person or persons, firms or corporations, by themselves or their agents or employes, shall sell, offer for sale or expose for sale or have in his or their possession for sale any renovated butter unless the same shall have printed upon each and every package, roll, print, square, or any container of such renovated butter the words "renovated butter" in letters not less than one-half inch in height, or who shall not have secured from the State Dairy Bureau, now existing under the laws of this State, a license as provided hereinafter.

SEC. 2. The term renovated butter as used in this Act is hereby defined to mean and include butter that has been reduced to a liquid state by melting, and drawing off such liquid or butter oil and churning or otherwise manipulating it in connection with milk or any product thereof.

SEC. 3. Any person or persons, firms or corporations, desiring to manufacture or deal in renovated butter shall make application to the State Dairy Bureau for a license and upon payment of a license fee of the amount mentioned herein, to the State Dairy Bureau, said Bureau shall issue to the applicant a license. All such licenses shall expire December 31st of each year and may be issued in periods of one year or six months, upon payment of a proportionate part of the license fee. Manufacturers of renovated butter within this State shall pay an annual license fee of one thousand dollars; wholesale dealers shall pay an annual license fee of four hundred dollars; retail dealers shall pay an annual license fee of fifty dollars; hotels, restaurants, boarding houses and all other places where meals are served and payment is received therefor, either immediately or by the day, week or month, and which use or furnish renovated butter in connection with said meals, shall pay an annual license fee of ten dollars. The term wholesale dealers as used herein includes all persons, firms or corporations, who shall sell renovated butter in quantities of ten pounds or more. The term retail dealers includes all persons who sell in quantities of less than ten pounds. All licenses while in force shall be conspicuously displayed in the place of business of the party or parties to whom they

have been issued. The State Dairy Bureau shall require all persons holding a manufacturer's or wholesaler's license, as provided in this Act, to keep a record in a form separate from all other business in which every sale of renovated butter shall be recorded, giving the quantity sold, the name and location of the buyer and the place to which it was shipped. Such record shall be accessible at all times to duly authorized representatives of the State Dairy Bureau.

SEC. 4. All license fees paid to the State Dairy Bureau under this Act shall be paid by said Bureau into the State treasury, the same to be added to the appropriation made for the same fiscal year for the Bureau and its expenditure shall be at the disposal of said Bureau for its use.

SEC. 5. Whoever shall violate any of the provisions or sections of this Act shall be deemed guilty of a misdemeanor, and shall, upon conviction thereof, be punished for the first offense by a fine of not less than twenty dollars nor more than one hundred dollars; or by imprisonment in the county jail for not less than ten days and not exceeding thirty days; and for each subsequent offense by a fine of not less than fifty dollars nor more than two hundred dollars, or by imprisonment in the county jail for not less than twenty days nor more than one hundred days, or by both such fine and imprisonment, at the discretion of the court.

SEC. 6. It shall be the duty of the district attorney of each and every county in this State, upon application, to attend to the prosecution in the name of the people of any action brought for the violation of any of the provisions of this Act within his district. One half of all the fines imposed for the violation of any of the provisions of this Act shall be paid to the county in which the fine is imposed. The other one half shall be paid to the State Dairy Bureau, and by said Bureau to the State Treasurer, and the same shall become a part of the appropriation made by law for the use of said State Dairy Bureau.

SEC. 7. An Act which became a law under constitutional provision without the Governor's approval, February 23, 1899, entitled "An Act to prevent deception in the sale of process or renovated butter" and all other Acts or parts of Acts inconsistent with this Act are hereby repealed.

SEC. 8. This Act shall take effect thirty days after its passage.

CHEESE GRADING AND BRANDING LAW.

An Act defining the different grades of cheese and for branding the same, manufactured in the State of California.

[Approved March 4, 1897.]

The people of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. Every person or persons, firm, or corporation, who shall at any creamery, cheese factory, or private dairy, manufacture cheese in the State of California, shall, at the place of manufacture, brand distinctly and durably on the bandage of each and every cheese manufactured, and upon the package or box, when shipped, and grade of cheese manufactured, as follows: "California Full-Cream Cheese," "California Half-Skim Cheese," and "California Skim Cheese."

SEC. 2. All brands for branding the different grades of cheese shall be procured from the State Dairy Bureau, and said Bureau is hereby directed and authorized to issue to all persons, firms, or corporations, upon application therefor, uniform brands, consecutively numbered, of the different grades specified in section one of this Act. The State Dairy Bureau shall keep a record of each and every brand issued, and the name and location of the manufacturer receiving the same. No manufacturer of cheese in the State of California, other than the one to whom such brand is issued, shall use the same, and, in case of a change of location, the party shall notify the Bureau of such change.

SEC. 3. The different grades of cheese are hereby defined as follows: Such cheese only as shall have been manufactured from pure milk, and from which no portion of the butter fat has been removed by skimming or other process, and having not less than thirty per cent of butter fat, shall be branded as "California Full-Cream Cheese"; and such cheese only as shall be made from pure milk, and having not less than fifteen per cent of butter fat, shall be branded "California Half-Skim Cheese"; and such cheese only as shall be made from pure skim-milk shall be branded "California Skim Cheese"; *provided*, that nothing in this section shall be construed to apply to "Edam," "Brickstein," "Pineapple," "Limburger," Swiss, or hand-made cheese, not made by the ordinary Cheddar process.

SEC. 4. No person or persons, firms or corporations, shall sell, or offer for sale, any cheese manufactured in the State of California, not branded by an official brand and of the grade defined in section three of this Act.

SEC. 5. Whoever shall violate any of the provisions of this Act shall be deemed guilty of a misdemeanor, and shall, upon conviction thereof, be punished for the first offense by a fine of not less than twenty-five dollars (\$25) nor more than fifty dollars (\$50), or by imprisonment in the county jail for not exceeding twenty-five days; and for each subsequent offense by a fine of not less than fifty dollars (\$50) nor more than one hundred dollars (\$100), or by imprisonment in the county jail not less than fifty days nor more than one hundred days, or by both such fine and imprisonment, at the discretion of the court.

SEC. 6. All Acts or parts of Acts inconsistent with this Act are hereby repealed.

SEC. 7. This Act shall take effect sixty days after its passage.

SANITARY DAIRY LAW.

An Act to prevent the sale of dairy products from unhealthy animals and produced under unsanitary conditions; to provide for the inspection of dairy stock, dairies, factories for the production of dairy products and places where dairy products are handled and sold; to improve the quality of dairy products of the State; to prevent deception in the sale of dairy products and to appropriate money for enforcing its provisions.

[Approved March 20, 1905.]

The people of the State of California, represented in senate and assembly, do enact as follows:

SECTION 1. No person or persons, firms or corporations, by themselves or their agents or employes, shall sell, expose for sale or offer for sale, or exchange, present or deliver to any creamery, cheese factory, milk condensing factory, or any other buyer or consumer, any unclean, unwholesome, stale, impure milk, cream, butter, condensed or evaporated milk or other article produced from such milk or cream. Neither shall any person or persons, firms or corporations, by themselves or their agents or employes, sell, expose for sale, or offer for sale, or exchange, present or deliver to any consumer, creamery, cheese factory, milk condensing factory, or any other buyer or consumer, any milk, cream, butter, cheese, condensed milk or other products manufactured therefrom, which has been produced in or by a dairy, or factory of dairy products or that is, or has been, handled in any store or depot that is in an unsanitary condition or that is produced from cows affected by any disease or from cows within five days after or fifteen days preceding parturition.

SEC. 2. A dairy shall be deemed unsanitary under the meaning of this Act when, among other causes that render milk, or products made therefrom, unclean, unwholesome, impure, and unhealthy,

(b) If the drinking water is stagnant, polluted with manure, urine, drainage, decaying vegetable or animal matter.

(c) If the yards or enclosures are filthy or unsanitary or if any part of such yards or enclosures, other than pastures, are made the depositories of manure in heaps or otherwise where it is allowed to ferment and decay.

If the walls become soiled with manure, urine or other filth.

(g) If to the interior of cattle stables, barns or milking sheds an application of lime whitewash is not made at least once in two years, or if in the mangers, or other receptacles from which cows are fed, decaying food or other material is allowed to accumulate.

(i) If the pails, cans, bottles or other containers of milk, or its products, strainers, coolers or other utensils coming in contact with the milk or its products are not sterilized by boiling water or superheated steam each and every time the same are used.

(j) If the person or wearing apparel of the dairyman, his employés, or other persons, who come in contact with milk and its products, are soiled or not washed from time to time.

SEC. 3. A creamery or any factory of dairy products or any store depot or other place where milk is handled or kept for sale shall be deemed unsanitary under the meaning of this Act when, among other causes that render milk, or products made therefrom, unclean, unwholesome, impure, stale or of low grade or inferior quality.

(a) If milk or cream is received that has reached an advanced stage of fermentation, or that shows a state of putrefactive fermentation, or if it is received in cans or other containers that have not been sterilized by means of boiling water or superheated steam after each delivery.

(b) If the utensils and apparatus that comes in contact with milk or its products in process of manufacture are not thoroughly washed and sterilized by means of boiling water or superheated steam.

(c) If the floor is so constructed that permits the flowing or soaking of water, milk or other liquids underneath or among the interstices of such floor where fermentation and decay may take place or if such floor may not be readily kept free from dirt.

(d) If drains are not provided that will convey refuse milk, water and sewage at least fifty yards from such creamery or factory of dairy products or if any cesspool, privy vault, hog yard, slaughter-house, manure or any decaying vegetables or animal matter shall be within a distance that will permit foul odors from reaching any creamery or other factory of dairy products or store or depot where milk or its products is sold or handled.

(e) If such creamery or factory of dairy products, does not permit access of light and air sufficient to secure good ventilation.

(f) If in any building or buildings used in connection with any creamery, or factory of dairy products, any insects or other species of animal life are permitted or if upon the floor, the sides and walls any milk or its products, or if any other filth is allowed to accumulate and ferment and decay or if the bodies or wearing apparel of persons employed, or coming in contact with any milk or its products in any creamery, or factory of any dairy products, shall be unclean and not washed from time to time.

SEC. 4. No person or persons, firms or corporations, by themselves or their agents or employes, shall sell, expose for sale, or exchange, present or deliver to any creamery, cheese factory, milk condensing factory, ice cream producer, or any other buyer, or consumer, any milk, or any product manufactured or prepared therefrom, to which any compound containing salicylic acid, formaldehyde, coloring matter or any other chemical or preparation other than common salt, or sodium chloride, shall have been added with intent to prevent fermentation, or to change the color (in case of milk and cream); *provided*, that such person or persons, firms or corporations, or their agents or employes may use preparations of boron to prevent fermentation in milk or its products, but whenever any preparation of boron is used for such purpose, each and every package or container of milk or its products shall have plainly marked thereon, that it contains such preparation of boron.

Neither shall any gelatin, or other substance, be added to milk or cream with intent to increase its viscosity or otherwise cause it to appear better in quality than it is, except each and every package and container of such milk or cream shall have marked thereon in a manner, or be accompanied by a statement, to be prescribed by the State Dairy Bureau, showing the nature of the substance added; *provided*, that this section shall not be construed to prevent the use of harmless coloring matter in butter, ice cream or confectionery into which milk or its products enter.

SEC. 5. No person or persons, firms or corporations, by themselves or their agents or employes, shall manufacture for sale, offer for sale, expose for sale, or have in his or their possession for sale, any package of butter upon which, or upon the wrapper, or container of which, there shall be printed, or otherwise marked, the word pasteurize or any of its derivatives unless in the process of the manufacture of the butter contained therein either the milk or cream from which the same was made shall have been exposed to a temperature exceeding one hundred and fifty degrees Fahrenheit.

SEC. 6. In case any butter is sold or offered for sale in a package or wrapper purporting to designate the producer of such butter, such producer must be correctly designated; and if under a label purporting or calculated to designate the place of production, specifying county and state, must be correctly designated. No person, firm or corporation shall put up in package or wrapper or otherwise prepare for shipment or sale any butter under label purporting to designate the producer or place of production, except in accordance with the provisions herein; nor shall any person sell or offer for sale any butter in a package or wrapper purporting to designate the name of the producer or the place of production except in accordance with the provisions herein.

SEC. 7. It shall be the duty of the State Dairy Bureau, now existing under the laws of this State, to carry out and enforce the provisions of this Act, and it is authorized and directed under this Act out of the money appropriated as provided herein, to employ such assistant agents as inspectors as it may deem necessary and to fix their compensation not to exceed four dollars per day, exclusive of their necessary and actual expenses, such expenses to be itemized and rendered under oath, or one hundred dollars per month exclusive of their necessary and actual expenses. Such agents shall have had experience in the manufacture of dairy products and the handling of dairy cattle. In carrying out the provisions of this Act the secretary and agent of the State Dairy Bureau, shall receive, in addition to the salary now received under the provisions of the Act creating said State Dairy Bureau, such additional compensation as the Dairy Bureau may see fit, but not to exceed one hundred dollars per month to be drawn from the amount appropriated herein. The State Dairy Bureau, through its agent and secretary, and assistant agents, shall inspect the dairies, dairy cattle, creameries and other factories of dairy products, markets and other places where dairy products are prepared or handled, and keep a careful record of such inspection and report the same to the State Dairy Bureau, and upon evidence obtained that any of the provisions of this Act are being violated, the State Dairy Bureau, through its agent and secretary, or its assistant agents, shall duly enter complaint against the party or parties, responsible for such violations and cause the same to be prosecuted, except in cases where any dairy, creamery or other factory of milk products, or store or depot where milk and its products are handled and sold, is found to be in an unsanitary condition, in which case the agent and secretary, or the assistant agent, for the district in which the violation occurred, shall serve upon the owner, or owners, or person in charge of the dairy, creamery or other factory of milk products so found to be in an unsanitary condition, a written notice specifying in detail such changes that are to be made that will place such dairy, creamery, or other

factory of milk products or store or depot in a sanitary condition as defined in this Act. Should such changes not have been made at the expiration of thirty days after the date when the notice was served, the State Dairy Bureau, through its agent and secretary, or its assistant agents, shall enter complaint against the person or persons responsible for such unsanitary conditions and cause them to be prosecuted for violating this Act.

SEC. 8. The State Dairy Bureau is authorized under this Act to gather and compile statistics relative to the dairy industry and to disseminate the same and other information useful to, and to the general good and development of the dairy industry of the State.

SEC. 9. Whenever any agent or inspector of the State Dairy Bureau shall discover the existence of any contagious or infectious disease among dairy cattle, or have good reason to believe that such disease may exist the same shall be immediately reported to the State Veterinarian.

SEC. 10. Whoever shall violate any of the provisions of this Act shall be deemed guilty of misdemeanor, and upon conviction thereof shall be punished by a fine of not less than ten dollars nor more than two hundred dollars or by imprisonment in the county jail for a period of not less than ten days nor more than one hundred days, or by both such fine and imprisonment. Any person or persons who shall hinder or prevent an agent or inspector of the State Dairy Bureau, in the performance of his duty under this Act, shall likewise be deemed guilty of a misdemeanor, and upon conviction, shall be fined as already provided in this Act. One half of all fines imposed for the violation of this Act shall be paid to the State Dairy Bureau which shall pay the same to the State Treasurer and the same shall become a part of the appropriation under this Act. The remaining one half of such fine shall be paid to the county in which the fine is imposed.

SEC. 11. It shall be the duty of the district attorney, upon application of the State Dairy Bureau, through its agent and secretary, or assistant agents, to attend to the prosecution, in the name of the people, of any suit brought for the violation of any of the provisions of this Act within his district.

SEC. 12. There is hereby appropriated for the use of the State Dairy Bureau in enforcing and carrying out the provisions of this Act, out of any money in the State treasury not otherwise appropriated, the sum of one thousand five hundred dollars (\$1,500) for the remainder of the fifty-sixth fiscal year; five thousand dollars (\$5000) for the fifty-seventh fiscal year and five thousand dollars (\$5000) for the fifty-eighth fiscal year. All salaries, fees, costs and expenses shall be drawn from the money so appropriated, and the State Controller shall

draw his warrant on the State treasury in favor of the person or persons entitled to the same.

SEC. 13. An Act approved March 22, 1899, entitled "An Act to provide for the inspection of dairies, factories of dairy products, and of dairy products as to their sanitary condition, and as to the health of stock; to prevent the sale of milk and products of milk drawn from diseased animals; to prevent the spread of infectious and contagious diseases common to stock, and to appropriate money therefor," and all other Acts or parts of Acts inconsistent with this Act are hereby repealed.

SEC. 14. This Act shall take effect thirty days after its passage.

LAW RELATING TO TESTING APPARATUS.

Enacted March 16, 1901.

SECTION 1. A new section is hereby added to the Penal Code, to be known and numbered as section three hundred and eighty-one *a*, and to read as follows:

381*a*. Any person, or persons, whether as principals, agents, managers or otherwise, who buy or sell dairy products, or deal in milk, cream, or butter, and who buy or sell the same upon the basis of their richness or weight or the percentage of cream or butter fat contained therein, who use any apparatus, test-bottle, or other appliance, or who use the "Babcock test," or machine of like character, for testing such dairy products, cream, or butter, which is not accurate and correct, or which gives wrong or false percentages, or which is calculated in any way to defraud or injure the person with whom he deals, is guilty of a misdemeanor, and upon conviction shall be fined not more than five hundred dollars (\$500) or imprisonment in the county jail not more than six months.

SEC. 2. This Act shall take effect immediately.

Enacted March 18, 1905.

SECTION 1. A new section is hereby added to the Penal Code, to be known and numbered as section three hundred and eighty-one *b*, and to read as follows:

381*b*. It shall be the duty of the State Dairy Bureau, now existing under the laws of this State, to enforce the provisions of section three hundred and eighty-one *a* of the Penal Code and cause the prosecution of persons whom it knows, or has reason to believe, are guilty of violating the provisions of said section of the Penal Code. It shall be the duty of the district attorney of each and every county in the State to attend to the prosecution of all persons within his district against whom the State Dairy Bureau shall enter complaint for violating

the provisions of said section of the Penal Code. Said State Dairy Bureau shall from time to time inspect and examine as to their accuracy, or their adaptability to give accurate results, all glassware, measures, scales, weights and other apparatus used in creameries, and factories of dairy products where milk and cream are purchased, to determine the amount or percentage of fat in milk or cream. Said State Dairy Bureau shall supply at cost, and not oftener than once a year, to every creamery, or other factory of dairy products where milk and cream, or either, are purchased, on application not more than two tubes or bottles and one pipette of the forms used with the Babcock test, which it shall first examine as to its accuracy, and if accurate, or adapted to give accurate results under the usual method of operating the Babcock test, said State Dairy Bureau shall certify to this by marking durably and permanently upon each and every piece of apparatus supplied the letters "D. B." Said State Dairy Bureau shall also, upon payment at the rate of one dollar for each dozen, test or examine into the accuracy of all test bottles or tubes and pipettes sent to it direct from any creamery, or other factory of dairy products where milk or cream are purchased, and if found accurate, or adapted to give accurate results, the letters "D. B." shall be marked upon each piece of apparatus examined. The State Dairy Bureau shall pay all money received for making such tests for examinations into the State treasury, and the same shall become a part of the appropriation for the use of the State Dairy Bureau, and its disposition shall be at the disposal of the State Dairy Bureau in enforcing the provisions of this Act.

SEC. 2. This Act shall take effect sixty days after its passage.

RESOLUTIONS OF THE STATE DAIRY BUREAU RELATING TO GELATIN IN MILK AND CREAM.

WHEREAS, Chapter 369, Statutes of California, 1905, makes it unlawful for gelatin or other substance to be added to milk or cream "with intent to increase its viscosity" or consistency, unless each container of such milk, or cream, whichever the case may be, shall have marked thereon the nature of the substance added in a manner to be prescribed by the State Dairy Bureau; and

WHEREAS, Request has been made that the State Dairy Bureau prescribe the manner in which such marking shall be done; and

WHEREAS, Resolutions relating to the same subject were duly passed by the members of the State Dairy Bureau at a regular meeting of the

same and entered upon the minutes, which minutes were regularly adopted; and

WHEREAS, The copy of the said minutes were destroyed by fire, thereby rendering the resolutions referred to inoperative, making the adoption of the following resolution advisable; therefore,

Resolved, That all persons selling, offering or presenting to any persons, any milk or cream to which gelatin or other substance has been added to increase its viscosity or consistency shall apply or attach a label, tag, or "cap" to the container of such milk or cream, on which either of the following forms:

(a) Contains gelatin,

(b) Cream (or milk) containing gelatin,

shall be printed in or across the center of such label, tag or "cap" in bold letters at least one-eighth of an inch high. If the article added be other than gelatin, the commercial or chemical term by which it is known shall be given in place of the word "gelatin" in either of the above forms. No other statement or advertising matter shall appear upon the same paper, label, tag, or "cap" upon which the statement prescribed above appears, except the name of a person or firm, together with their address and telephone number of the seller, if desired; but if any such printing or "business card" does appear in connection with the statement, the letters in which it is printed must not be larger than those in the statement in regard to gelatin or other substance added as thickening material.

Resolved, That the form of marking prescribed by the above resolution may be changed as the State Dairy Bureau may deem it advisable to carry out the purpose of the Act involved.

SUPREME COURT DECISION.

Crim. No. 1296. In Bank. March 31, 1906.

EX PARTE ROBERT DIETRICH, ON HABEAS CORPUS.

Application for writ of habeas corpus, prayed to be directed against Peter Curtis, Sheriff of the City and County of San Francisco.

For Petitioner—Titus, Wright & Creed.

For Respondent—I. Harris.

Petitioner was convicted of violating the provisions of an Act of the Legislature approved March 20, 1905 (Stats. 1905, p. 316), and was sentenced to imprisonment, and he seeks to be discharged on

habeas corpus upon the ground that the said Act is unconstitutional and void because violative of petitioner's common right to the enjoyment of property and to make ordinary and lawful contracts. The title of the Act and Section 1 thereof—which alone are important here—are as follows:

“An Act requiring the marking of packages of butter containing less than six pounds and more than one-half pounds so as to advise the purchaser or others as to the weight of butter contained in such package.

“SECTION 1. No person or persons, firms or corporations, by themselves or their agents or employés, shall sell, manufacture or prepare for sale, offer for sale or expose for sale, or have in his or their possession for sale, or consign, ship or present to any dealer, commission merchant, consumer, or other person, any butter in packages containing less than six pounds and more than one-half pound, unless the exact weight of such butter contained in such package or packages, rolls, prints or other form of package, expressed in the number of pounds or ounces or in both pounds and ounces, shall be printed or durably and legibly marked upon the wrapper or other container of such butter in letters or figures, or in both letters and figures, not less than one-fourth inch high and upon the same side or face of such package upon which the producer's or seller's name and address appears, and if such name and address does not appear, the weight alone shall be legibly and durably placed upon such package in letters or figures not less than one fourth of an inch high.”

A violation of this section is made a misdemeanor.

The clear purpose, as expressed in the title, is that of “requiring the marking of packages of butter,” which the owner proposes to sell; and the body of the Act requires that each package, between certain weights, shall have its “exact weight” marked on it in letters or figures not less than one fourth of an inch high. In our opinion the Act is unconstitutional and void, within the decisions of this court in *Ex parte Drexel and Holland*, 30 Cal. Dec. 345; *Ex parte Hayden*, 30 Cal. Dec. 277; *Ex parte Hickey*, 144 Cal. 234; *Ex parte Jentzsch*, 112 Cal. 468; *In re Kelso*, 30 Cal. Dec. 247; *Ex parte Whitwell*, 98 Cal. 736. It would serve no useful purpose to here restate the views and declarations of law expressed in the opinions in those cases. The general principle therein declared is that the Legislature can not impose onerous and unnecessary burdens upon property and business and the right of contract, except when this may be done under the police power for the protection of the public health, morals, safety, etc. The Act in question here is not for the purpose of preventing the sale of impure food, or the adulteration of food, or selling one kind of food under the name of another. The offense which it endeavors to create is that of not

marking in the exact manner prescribed by the Act. And this manner is certainly a most onerous one. Indeed, it would scarcely be practicable to comply literally with the requirement; and an approximate compliance would be exceedingly expensive and burdensome. The Act does not come within the legitimate scope of the police power as described in the cases above cited, and seems to be an unwarranted restriction on the citizen's constitutional right to his property and to his privilege of freely following a legitimate business, and not required by any public necessity. Respondent has cited some authorities, but most of them are not in point, being in the category of "oleomargarine cases." Perhaps one or two of them lend some countenance to respondent's contention; but if they can be so construed they do not meet our approval.

It is ordered that the respondent Robert Dietrich be and he hereby is discharged from custody.

McFARLAND, J.

We concur:

HENSHAW, J.

LORIGAN, J.

BEATTY, C. J.

DISSENTING OPINION

I dissent. The Act is intended to prevent in some degree the practice of fraudulently selling packages of butter at underweight, a practice which we cannot say is infrequent. The prevention of fraud is a legitimate exercise of the police power. That the putting of a label on the outside of every package, showing its weight correctly, will tend to prevent the fraud at which the law is directed, must be admitted. If so, the extent of the preventive effect, and whether the results are sufficient to justify the inconvenience entailed upon a lawful business, are questions which the Legislature must, in the first instance, decide. Its decision on such questions is conclusive upon the courts, unless it appears that the interference with the business, as compared with the benefits resulting therefrom, will be so great as to render the law an unreasonable exercise of the police power. This we cannot do without violating the rule of statutory construction to the effect that a statute must, if possible, be so construed as to make it constitutional. The requirement that the package shall be marked with its "exact weight," must receive a reasonable interpretation, and a slight deviation from the precise weight, not willfully or knowingly made, would not be held a violation of the law. Thus construed, I am of the opinion that the burden imposed on the business is not sufficiently onerous to justify this court in declaring it void as an unreasonable interference with business. It is common knowledge that in this State, butter is almost invariably pressed in molds and wrapped in cloth or paper to prepare it for the

market. The weight is always known or very easily ascertained by the maker. With modern facilities for printing, it will not be difficult or expensive to make that weight appear on the outside of the package as required by the law in question. That it may be oppressive in rare instances is not a judicial objection to the validity of a law of this character. The legislative judgment that such frauds are so prevalent as to justify the preventive legislation is not so clearly wrong as to require interference by the court. The error must be beyond reasonable doubt, or the legislative decision must be upheld. (*Bourland vs. Hildreth*, 26 Cal. 184; *University vs. Bernard*, 57 Cal. 612; *In re Madera Irr. Dist.*, 92 Cal. 310; *Cooley Const. Lim.* [7th ed.], 228.)

SHAW, J.

We concur:

SLOSS, J.

ANGELLOTTI, J.

Misc

